Commission of Inquiry into the Decline of Sockeye Salmon in the Fraser River

Commission d'enquête sur le déclin des populations de saumon rouge du fleuve Fraser

Public Hearings

Audience publique

Commissioner

L'Honorable juge /
The Honourable Justice
Bruce Cohen

Commissaire

Held at:

Room 801
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Vancouver, B.C.

Friday, October 29, 2010

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Cour fédérale
701, rue West Georgia
Vancouver (C.-B.)

le vendredi 29 octobre 2010

Errata for the Transcript of Hearings on October 29, 2010

Page	Line	Error	Correction
ii		Lara Tessaro's title is incorrect	Junior Commission Counsel
ii, iii		Chris Buchanan, Gregory McDade, Q.C., Barbara Harvey, Rob Miller,	remove names from record
iv		James Walkus is not a participant and R. Keith Oliver is not counsel	remove names from record
iv		Musgagmagw Tsawataineuk Tribal Counsel	Musgamagw Tsawataineuk Tribal Council
7	45	search	research
12	21	Karl	Carl

Suite 2800, PO Box 11530, 650 West Georgia Street, Vancouver, BC V6B 4N7
Tel: 604 658 3600 Toll-free Tel: 1 877 658 2808
Fax: 604 658 3644 Toll-free Fax: 1 877 658 2809
www.cohencommission.ca

APPEARANCES / COMPARUTIONS

Brian J. Wallace Lara Tessaro	Senior Commission Counsel Associate Commission Counsel
Mitchell Taylor, Q.C. Jonah Spiegelman	Government of Canada
Boris Tyzuk, Q.C. D. Clifton Prowse, Q.C.	Province of British Columbia
	Pacific Salmon Commission
Chris Buchanan	B.C. Public Service Alliance of Canada Union of Environment Workers B.C. ("BCPSAC")
David Bursey	Rio Tinto Alcan Inc. ("RTAI")
Alan Blair Shane Hopkins-Utter	B.C. Salmon Farmers Association ("B.C.SFA") Seafood Producers Association of B.C. ("SPAB.C.")
Gregory McDade, Q.C.	Aquaculture Coalition: Alexandra Morton; Raincoast Research Society; Pacific Coast Wild Salmon Society ("AQUA")
Judah Harrison	Conservation Coalition: Coastal Alliance for Aquaculture Reform Fraser Riverkeeper Society; Georgia Strait Alliance; Raincoast Conservation Foundation; Watershed Watch Salmon Society; Mr. Otto Langer; David Suzuki Foundation ("CONSERV")
Don Rosenbloom	Area D Salmon Gillnet Association; Area B Harvest Committee (Seine) ("GILLFSC")

APPEARANCES / COMPARUTIONS, cont'd.

David Butcher	Southern Area E Gillnetters Assn. B.C. Fisheries Survival Coalition ("SGAHC")
Christopher Harvey	West Coast Trollers Area G Association; United Fishermen and Allied Workers' Union ("TWCTUFA")
Keith Lowes	B.C. Wildlife Federation; B.C. Federation of Drift Fishers ("WFFDF")
	Maa-nulth Treaty Society; Tsawwassen First Nation; Musqueam First Nation ("MTM")
	Western Central Coast Salish First Nations: Cowichan Tribes and Chemainus First Nation Hwlitsum First Nation and Penelakut Tribe Te'mexw Treaty Association ("WCCSFN")
Brenda Gaertner Leah Pence	First Nations Coalition: First Nations Fisheries Council; Aboriginal Caucus of the Fraser River; Aboriginal Fisheries Secretariat; Fraser Valley Aboriginal Fisheries Society; Northern Shuswap Tribal Council; Chehalis Indian Band; Secwepemc Fisheries Commission of the Shuswap Nation Tribal Council; Upper Fraser Fisheries Conservation Alliance; Other Douglas Treaty First Nations who applied together (the Snuneymuxw, Tsartlip and Tsawout)
Barbara Harvey	Adams Lake Indian Band
Rob Miller	Carrier Sekani Tribal Council ("FNC")
	Council of Haida Nation

APPEARANCES / COMPARUTIONS, cont'd.

	Métis Nation British Columbia ("MNB.C.")
Tim Dickson	Sto:lo Tribal Council Cheam Indian Band ("STCCIB")
	Laich-kwil-tach Treaty Society James Walkus and Chief Harold Sewid Aboriginal Aquaculture Association ("LJHAH")
Lisa Fong	Heiltsuk Tribal Council ("HTC")
Krista Robertson	Musgagmagw Tsawataineuk Tribal Counsel ("MTTC")

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THE REGISTRAR: Order. The hearing is now resumed.
MR. WALLACE: Good morning, Commissioner Cohen. It's Brian Wallace, Senior Commission Counsel. And Mr. Butcher, if I might, I just have a couple of preliminary matters I'd like to raise just with respect to process.

The material documents and several listed documents and summaries of evidence has now been emailed to everybody. I do apologize for the delay in getting that material to everybody, but the process is that summaries of evidence are provided to the witnesses to make sure that that is, in fact, what they will say, and the last of those summaries was only returned to us this morning. So we're trying to streamline our timeline on that.

The second thing, for next week, is on Wednesday one of the witnesses is in Paris and she will be attending by video link, and because of the time change, we will start the hearing on Wednesday morning at 8:30.

Thank you.

THE COMMISSIONER: Mr. Butcher?
MR. BUTCHER: Mr. Commissioner, I've asked Mr. Lunn to pull up Exhibit 11, and he has done that.
THE REGISTRAR: Microphone, please.
MR. BUTCHER: Sorry. It's David Butcher.

CROSS-EXAMINATION BY MR. BUTCHER, continuing:

Q Dr. Reynolds, Mr. Leadem put this document to you yesterday, and you told us that this was a -- this statement was produced after a think-thank meeting of scientists in early December of 2009, and that those scientists had gathered to examine the shortfall in the 2009 sockeye runs.
DR. REYNOLDS: Yes.
Q You also told us, yesterday, that Department of Fisheries and Oceans staff had been told they could not attend this meeting.
DR. REYNOLDS: Yes.
Q Who told you that?
DR. REYNOLDS: I believe Patricia Gallaugher, from the Centre for Coast Studies at SFU, told me that.

Q Did she tell you why they were forbidden to attend?
DR. REYNOLDS: My recollection was that there was a concern -- by the time we were holding this, although we had made plans for this workshop before the Cohen Commission had been announced, by the time it was in play, that announcement had come out, and as of that point, as in -- as at that point, there were concerns, I am told. So this is me telling you what someone else told me, okay? But my understanding was that there were concerns about DFO staff participating in a forum such as this which would lead to public statements which might then conflict with official departmental positions or other testimony that individuals might be giving to this commission.
Q I left on your desk this morning, a list of the participants at this conference, and I found this overnight, after looking at the history of this matter on the internet. They included a Dr. Susan Allen, a physical oceanographer?
DR. REYNOLDS: Yes.
Q Mark Angelo, who was Chair of the Pacific Fisheries Resource Conservation Counsel?
DR. REYNOLDS: Yes.
Q Dr. Ken Ashley, who had 25 years of experience with the B.C. Ministry of Environment?
DR. REYNOLDS: Yes.
Q Patricia Gallaugher, who is an adjunct professor in biosciences at Simon Fraser?
DR. REYNOLDS: Yes.
Q A fellow called Kees Groot, who was a scientist emeritus from DFO?
DR. REYNOLDS: Yes.
Q A UBC fisheries scientist, called Scott Hinch?
DR. REYNOLDS: Yes.
Q A Dr. Jeffrey Hutchings, whose field of study was salmonid fisheries?
DR. REYNOLDS: Yes.
Q Mike Lapointe, who we heard from on Monday?
DR. REYNOLDS: Yes.
Q Dr. Connie Lovejoy, a fishery biologist?
DR. REYNOLDS: Yes.
Q Dr. Nathan Mantua, a professor in the school of aquatic and fishery studies -- or fishery sciences at the University of Washington?
DR. REYNOLDS: Okay, so we need to clarify something.

He was unable to attend. He was invited, but he was unable to attend. And that's, to my recollection, everyone else you've mentioned did attend. I'm not sure that Susan Allen was there.

Q Dr. Catherine Michielsens?

DR. REYNOLDS: Yes.

Q From Imperial College, in London?

DR. REYNOLDS: Yes, she was there.

Q Dr. Arne Mooers is a Simon Fraser professor?

DR. REYNOLDS: Yes.

Q Alexandra Morton, who is Mr. Dade's client in these proceedings?

DR. REYNOLDS: Yes.

Q Craig Orr, a behavioural ecologist from Watershed Watch?

DR. REYNOLDS: Yes.

Q I think one of Mr. Leadem's clients. Randall Peterman, a professor in the School of Resource and Environmental Management?

DR. REYNOLDS: Yes.

Q Sorry, that was at Simon Fraser.

DR. REYNOLDS: Simon Fraser.

Q Yourself?

DR. REYNOLDS: Yes.

Q Brian Riddell, who is the president of the Pacific Simon Foundation?

DR. REYNOLDS: Yes.

Q That should be Dr. Brian Riddell?

DR. REYNOLDS: Yes.

Q Dr. Marvin Rosenau, a local fishery biologist?

DR. REYNOLDS: Yes, he's with BCIT.

Q A fellow called Rick Routledge?

DR. REYNOLDS: I'm pretty sure he was there.

Q Mike Staley, a -- sorry, and Rick Routledge is a professor at Simon Fraser?

DR. REYNOLDS: Yes.

Q Mike Staley, a professional biologist locally?

DR. REYNOLDS: I'm pretty sure he was unable to attend.

Q Ken Wilson, a representative of the Marine Conservation Caucus?

DR. REYNOLDS: Yes.

Q Howie Wright, a fisheries manager from the Okanagan National Alliance Fisheries Department?

DR. REYNOLDS: Yes.

Q A collection of people both locally and internationally, who clearly have a lot of knowledge about managing the fishery?

DR. REYNOLDS: Yes. And I'd just like to add, for the record, to the best of my recollection of who actually came. There was a lot of to-ing and fro-ing as we put this together, but to the best of my recollection, this is the group, and I would agree with your characterization of them.

Q And you would agree, I take it, that it would be useful for the managers of the fishery, locally, to attend such meetings, even if it was only for listening purposes?

DR. REYNOLDS: Yes, it was -- yes. And just to be clear, biologists in particular. Scientists, not just biologists, but scientists from the department, yes.

Q And turning to the document itself, the conclusion of this particular think-tank, and I'm looking at the second paragraph with respect to the 2009 collapse, the second sentence reads, simply -- I'll read the first two sentences of that paragraph:

> We believe that expectations in 2009 for Fraser sockeye were overly optimistic because forecasts did not adequately account for this decreased productivity. The trend is not due to fishing.
>
> Have I read that correctly?

DR. REYNOLDS: Yes, you have. I don't have the document right in front of me, but that sounds fine. I didn't bring my binoculars, either, but I almost have it on my screen, if you'll...

Q Okay. Sorry, we're trying to do this without paper.

DR. REYNOLDS: Thank you.

MR. TAYLOR: Just while that's happening, I wonder if Mr. Butcher is going to put this on the rest of our desks.

MR. BUTCHER: It's an exhibit that's been marked. It's Exhibit 11.

MR. TAYLOR: No; the list of attendees.

MR. BUTCHER: I have copies for everybody. I had a discussion with commission counsel beforehand. Well, I'll let Mr. Wallace address the issue of exhibits and paper.

MR. WALLACE: Mr. Commissioner, Mr. Butcher wanted to put the names of the attendees of a conference

which had come into evidence yesterday. He provided me and the witness with the attendance list, which he read from. I objected to the fact that he was going to introduce a document with information that no one had seen before, and I understood from Mr. Butcher that the only point was to determine who the attendees were at the conference, which came into evidence yesterday, and I take the document as simply being an aid memoir for that list, and I wasn't intending that it would be marked as an exhibit; it simply was a list that Mr. Butcher put orally to the witness, the witness confirmed who was and who he could not recall was there, and I took that to be the sole point that Mr. Butcher was to make, and I didn't think it was necessary to mark the exhibit.

If others want it in, it offends our Rule 61. I can see how it came up, because it deals with something that happened yesterday, and I think that's the issue, but I'm not sure Mr. Butcher needs to have it in, and I'm not sure he's asking to have it in.

MR. TAYLOR: I'm not asking or advocating it be an exhibit, I'd just like to know what witnesses have in front of them.

MR. WALLACE: That's a fair comment.

MR. BUTCHER: And I'm content with the questions, although my preference, frankly, would be that the document be marked as an exhibit.

THE COMMISSIONER: Which document are you speaking of, Mr. Butcher?

MR. BUTCHER: The bio sketches of the people that attended the conference that led to the statement that's been marked as Exhibit 11.

THE COMMISSIONER: Ms. Gaertner?

MS. GAERTNER: It's Brenda Gaertner, for the First Nations Coalition. I wonder if we could have a copy of it?

MR. BUTCHER: Sure. I have brought a limited number of copies.

THE COMMISSIONER: I think, for now, then, we'll leave it, Mr. Butcher. Counsel can look at the copies you've provided and they can address it later if they think there's a reason to mark it.

MR. BUTCHER: Certainly.

Q You were one of the -- you, Dr. Reynolds, were one of the members of the steering committee for the

March 2010 SFU summit on Fraser River sockeye salmon --
DR. REYNOLDS: Yes.
Q -- is that correct?
DR. REYNOLDS: That's correct.
Q And there were 34 speakers at that two-day summit?
DR. REYNOLDS: I don't recall.
Q I've put the list in front of you.
DR. REYNOLDS: Well, I could take your word for it, or we could pause while I count. It sounds like the right ballpark.
Q We can agree that it's about 30 speakers?
DR. REYNOLDS: Fine.
Q There were none from DFO there, were there?
DR. REYNOLDS: No.
Q Was there a reason for that?
DR. REYNOLDS: It was the same reason that I explained for the original think-tank in December 2009.
Q Historically, had Department of Fisheries and Oceans scientists participated in these kinds of panels in the community?
DR. REYNOLDS: Yes.
Q Did you receive any advice whilst you were preparing for this conference from anybody at DFO about why they would not be attending?
DR. REYNOLDS: I didn't have any direct contact with anyone from DFO, myself.
Q Did you hear anything from one of the other members of the steering committee, perhaps?
DR. REYNOLDS: Yes, my recollection was that an attempt was made to bring them to this meeting, as we typically do at SFU, but that they were unable to comply or to accept our invitation.
DR. REYNOLDS: Now, you have the document in front of you. There were three findings, or three recommendations for further work. The first involved a conclusion by you that -- sorry, I'm going back to the document of Exhibit 11. The first was a conclusion that there was a lack of empirical data on the different sockeye populations and that you needed to do more work in that area?
DR. REYNOLDS: Yes.
Q Was it your collective view that there was insufficient population data on the various sockeye populations in the watershed, or merely that you hadn't collected them?

DR. REYNOLDS: Well, we had Mike Lapointe and Catherine Michielsens from the Pacific Salmon Commission as participants in that think-tank, and we had a presentation from Michael Lapointe, which summarized a lot of the information available on the different stocks and their status and trends, so we felt that this was not an analytical exercise; it was two days of considering the information that we could put together as basically a first kick at the can. So we had, I think, sufficient information in front of us to -- okay, so your question is: Was there more information that we did not have access to, sorry?

Q And then, was there more information that you determined should be obtained?

DR. REYNOLDS: Yes. It was really more the latter. It was that -- well, we certainly -- to refer to your point, you're referring to point 1; is that right?

Q Yes.

DR. REYNOLDS: Okay. If I can just quote it and then pick it apart.

> First, there is a need to assemble and analyze all existing data on Fraser river sockeye health and condition and to estimate survival throughout their life cycle. The gaps revealed in this review merit immediate attention to explain changes in the survival of Fraser sockeye by life stages.
>
> By that, we were really referring to the fact that if the data did exist, we certainly didn't have them, and we were mostly concerned about the need for new information that did not exist. That was the main thrust of our point there.

Q And what do you know, if anything, has been done to satisfy the need that you've identified in that paragraph?

DR. REYNOLDS: Well, you cannot -- the sort of data that we would like would be a time trend understanding, for example, of diseases that wild fish might have at the critical, early juvenile stage in the sea, and those sorts of things. You cannot just suddenly make those data appear. That implies search programs. So I don't know if anyone has, in response to this, gone out and launched a program, but if they have, it would be

just the beginning of such an exercise.
MR. WALLACE: Mr. Commissioner, Mr. Butcher is well over his time estimate, and although these questions, I don't think, are on the topic that we're here to address.
MR. BUTCHER: Given the time issue -- the problem is these witnesses are not coming back, none of them, as I understand it. But maybe other witnesses who are dealing with these subjects are coming back. I'll turn to some of the evidence that some of these witnesses have given, quickly, if I may.
Q Dr. Close, you have told us about the value of Aboriginal traditional knowledge and the need to insert, if I may, that knowledge, for want of a better term, we've been calling western science. And I heard, during your evidence, some very general principles, but I'm wondering if there are any specific areas where you think Aboriginal traditional knowledge would be particularly useful?
DR. CLOSE: Yes. Well, first of all, it's considered indigenous knowledge and then TEK, traditional ecological knowledge, is considered as a subset of indigenous knowledge. And also, I also, yesterday in the evidence, I mentioned that both of them - and I promote both of them - should be used in attaining knowledge about biological questions needed for management. So I'll just try to straighten that out.

I think that, yeah, there are examples and there are many things that western science and society, the research that's going on in the Fraser right now, may not be addressing, and there are fisheries or species that may be in trouble that aren't being addressed, and this traditional knowledge might be the only knowledge base, and we need to be able to tap that and for better management. For example --
Q And I think we'd all agree that any knowledge from any source is useful, but it's the examples that I was interested in.
DR. CLOSE: Yeah, well, like oolichan, traditional knowledge on oolichan, they're basically about to be listed, I believe they should be, and they are in the Columbia, they were just listed as endangered, and there really hasn't been much work at all on oolichan using western science, you

know, scientific methods. So I think that with that being said, I think there's a lot of knowledge based on thousands of years of use and harvest by First Nations and tribes in the States, so that's my main point.

Q And one last question for you, Mr. Morley. You mentioned that the history of the sockeye harvests in Alaska was rather different than the recent history in British Columbia?

MR. MORLEY: That's correct.

Q Would you think it would be useful for this commission to gather evidence from Alaska about their management strategies?

MR. MORLEY: I definitely think it would be useful for the commission to look at their sockeye management programs and strategy for how they manage the balance between biodiversity and harvest, yes, I do.

Q Is there anybody in the panel who disagree with that comment? I note there's silence.

MR. BUTCHER: Thank you, those are my questions.

THE COMMISSIONER: Mr. Wallace, just --

MR. WALLACE: Thank you. I --

THE COMMISSIONER: Just for the record, Mr. Wallace, I think Ms. Tessaro is with you again this morning. Can we put her in --

MR. WALLACE: Thank you. With me is Ms. Lara Tessaro. Mr. Harvey.

MR. HARVEY: Chris Harvey for the Area G Trollers and the UFAWU.

CROSS-EXAMINATION BY MR. HARVEY:

Q My first question is to Dr. Reynolds. Dr. Reynolds, you described the two roles which should be separately identified; the scientific role and the determination of objectives. But the sum of your evidence, isn't it, is this; that science does have a proper and appropriate use in informing fisheries managers on scientific aspects and impacts of their decisions?

DR. REYNOLDS: Yes.

Q Yes. Because one thing you don't want, of course, is uninformed decision-making. Now, on issues of scientific aspects and impacts, would you include economics within the body of science that should inform DFO managers? I'm not meaning to pick a

fight between you and Mr. Morley, but...

DR. REYNOLDS: Oh, we're able to do that on our own. I wasn't referring to economics.

Q No. But as a general proposition, would you agree that economics should also inform fishery manager decision-makers?

DR. REYNOLDS: For the management decision-makers, yes, because clearly decisions that are made about salmon management will have economic costs and benefits, and one of the benefits that we derive from salmon is certainly economic.

Q Yes. Now, Mr. Morley's evidence -- I haven't got the exact transcript, but my note is that - and I'm asking this question of Dr. Reynolds, whether he agrees with the general import of this - Mr. Morley said:

> So managers must be forced to analyze what impacts are to both the resource and the beneficial users of the resource and to quantify them, rather than the current system that is consultative and asks for opinions rather than analysis.

Dr. Reynolds, do you agree with the general tenor of that comment in that the current system of consultation at any rate runs the risk of decision-making on uninformed public opinion rather than sound analysis?

DR. REYNOLDS: I don't actually feel qualified to answer that, because I have not spent a great deal of time -- in fact, I haven't really spent any time on that edge of the decision-making process.

Q I see. All right. I wanted to ask you one other subject, that's what you said about the precautionary principle. The Wikipedia definition, that source of all knowledge, defines it, I think, in the same way that you define it. I just want to get it clear.

> The precautionary principle states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is *not* harmful falls on those taking the action.

Is that basically correct?
DR. REYNOLDS: Yes, I think that's --
Q Thank you.
DR. REYNOLDS: -- pretty much consistent with the way I've framed it.
Q Yes. And in the area we're dealing with there are, of course, areas of scientific controversy?
DR. REYNOLDS: Yes.
Q Yes. And in such cases, the action or question should not be taken in areas where one side of the controversy asserts that the action is harmful to the public or the environment, the principle would, properly applied, would indicate that action should not be taken unless and until proven not to be harmful; is that correct?
DR. REYNOLDS: Can you just state that one more time, sorry?
Q In cases where the action in question, and I'm talking about management decisions or policy, where that -- where there's scientific controversy and one side of the controversy indicates that the action is detrimental to sustainable use of the resource, then the precautionary principle would indicate that the action should not be taken until it is proven that it is not harmful to the resource?
DR. REYNOLDS: Yes.
Q Yes, all right. Now, would the phenomenon of over-escapement be one of those areas where there is an absence of scientific consensus as to whether it is harmful or not?
DR. REYNOLDS: Can you define "harmful", please?
Q Harmful to productivity in the sense of being harmful or detrimental to the reproductive capacity of the conservation unit in question.
DR. REYNOLDS: Well, it raises the point of -- okay, the answer is, if all you're concerned about is the reproductive capacity of the stock, then I would agree with your statement that there is lack of scientific consensus on that, and in that case you could apply the precautionary principle to that particular objective. But I want to be clear that that is an objective-specific application of that rule and that there could be other objectives which --
Q Yes.
DR. REYNOLDS: -- might require a different

application. I think we're coming back into the zone - I'm not trying to make it complicated - but I honestly believe that we're back in the zone of deciding how we approach the precautionary principle and management of different potential objectives.

Q All right. We haven't had a discussion, yet, of the Ricker's curve, but there is a body of scientific opinion that if you put too many spawners on the spawning grounds, the late arrivals will destroy the eggs and nests of the earlier ones and the alevins and fry, they exceed the carrying capacity of the system; correct?

DR. REYNOLDS: Sorry, is your question is there evidence for that, or --

Q No. Is there a body of scientific opinion supporting that?

DR. REYNOLDS: The strongest consensus of scientific opinion that I am aware of was the report that was done for the Pacific Fisheries Resource Conservation Council by Karl Walters and Brian Riddell, and I believe one other author, possibly.

MR. GLAVIN: Tom Quinn.

DR. REYNOLDS: It was Tom Quinn, I'm told, which suggested that the weight of evidence was that this was a very rare phenomenon in terms of its impacts on returns four years later. There is no question that the salmon can dig up each other's nests. I think the controversy, if you want to put it like that, or that the key question that we are interested in, I know that commercial industry is interested in, is whether that has the effect of reducing the number of adults that will be returning four years later. And on that, the PFRCC document is the best evidence that I have --

Q All right. Well --

DR. REYNOLDS: -- that I know of.

Q -- I won't pursue that further with you, because I expect we'll have --

MR. WALLACE: Thank you.

MR. HARVEY: -- ample evidence on that.

Q Mr. Glavin, you made mention of the so-called 1992 collapse and the events of 1994 that were followed by a review board finding - and we now have the transcripts, so I can get this right - that:

> ...aggressive fishing...had so imperilled the

> Fraser River sockeye runs that "One more 12-hour opening could have virtually eliminated the late run in the Adams River."
>
> That was the review board, I think, chaired by John Fraser following the 1994 fishery; is that correct?

MR. GLAVIN: That's correct.

Q And that one statement, I expect that you can appreciate it, with your background as a journalist, immediately caught the public's attention. It was an effective sound bite; correct?

MR. GLAVIN: Perhaps not as effective as it might have been. I don't know how to gage the effectiveness of that statement as a sound bite.

Q Would you not agree with me that that was the single most effective statement leading to a transformation of the structure of the salmon fishing industry in the west coast?

MR. GLAVIN: I certainly would not.

Q No, all right. Do you recall it immediately caught the minister's attention?

MR. GLAVIN: I do.

Q Did it not -- well, at any rate, whether it was causative or not, you mentioned that by 2002 the run had revived to such an abundance that another federal review was ordered; is that correct?

MR. GLAVIN: It was not ordered because the run had revived to abundance, but it had revived to some abundance.

Q But you said this time it was:

> ...to examine industry complaints that the fisheries managers had allowed too many sockeye to make it through the coastal fishery gauntlet. There were alarms about an ecological catastrophe that had befallen the Adams river sockeye, this time on account of too many spawners being allowed to make it back to their spawning grounds.

MR. GLAVIN: That's my recollection, yes.

Q And you answered that by saying:

> ...the offspring of the 2002 catastrophe somehow made it back to the Adams River in

> 2006 and their offspring made [it] back to the mouth of the Fraser River in 2010 in numbers unseen in anyone's lifetime.

And you compared the biomass to that of the population of the City of Vancouver.

MR. GLAVIN: Yeah, I might have been actually shy on that. I was just, this morning, thinking it may actually be closer to the combined population of Vancouver and Burnaby.

Q All right. But any rate, you were attributing the success in 2010 to the escapement in 2002, in some --

MR. GLAVIN: You may remember that I - and I may have spoken too quickly - but I did caution that we not draw cause and effect lines too clearly from this.

Q No, I'm not asking --

MR. GLAVIN: I don't think it's directly attributable in that quite so easily.

Q Indirectly attributable?

MR. GLAVIN: It may be. It may be. I think, as I recall, I did raise -- I think I may have used the word "irony" when I was addressing that point.

Q Yes, all right. Well, I'd just like to examine it a little more closely, now. Firstly, with the -- this question goes to the extent of your research in this area. Have you had a look at the book published by the Pacific Salmon Commission written by John Roos and entitled, *Restoring Fraser River* --

MR. GLAVIN: *Salmon*.

Q -- *Salmon*, yes.

MR. GLAVIN: Yes.

Q Yes. Do you recall a discussion in that book about the 1958 run being the - which was a run of about 15 million, I think - the largest run, prior to 2010, in recent times?

MR. GLAVIN: I believe I do, yes.

Q Do you recall a section on optimum escapement determinations?

MR. GLAVIN: Not specifically, no.

Q All right. The 1958 run, do you recall that the grandparents of that run in the -- 1950, there was only 1.2 spawners in the Adams system and it produced a return, in 1954, of nine million; do you recall that?

MR. GLAVIN: I don't recall that.

Q Okay.
MR. GLAVIN: It wouldn't surprise me to learn this. All right, well, we'll get that when the commission comes.
MR. WALLACE: The risk on this, of course, is we're getting into areas which will be considered in detail during the course of the hearing, as opposed to the overview on the concepts of conservation sustainability, which is the topic of this panel.
MR. HARVEY: Yes, all right. Well, thank you.
Q With respect to what you said in 2002, the facts are, are they not, that in 2002 the amount that reached the spawning grounds was in the range of 4.5 million spawners in 2002?
MR. GLAVIN: I can't recall the number of spawners to reach the Adams grounds in 2002.
Q It was sufficiently large to have produced an outcry from the industry that led to the review that you mentioned.
MR. GLAVIN: Well, there was certainly lots of outcry from the industry, yes.
Q All right. That run --
MR. WALLACE: Mr. Commissioner and Mr. Harvey, if I may, Mr. Commissioner, I'm not sure how this line of questions informs the specific issues before this panel and, as I mentioned a moment ago, issues of the particular runs and escapement of patters in various years will become very much a part of the evidence before you as we proceed.
THE COMMISSIONER: All right, thank you.
MR. HARVEY: I just wanted to test the connection between 2002, 2006 and 2010.
Q And what I wanted to put to you, so that you have a chance to comment on it, because it will be gone into more fully later, no doubt, that the productivity between 2002 and 2006 was about one to one; in other words, the total return was about the same as the number of spawners in 2002. Were you aware of that?
MR. GLAVIN: As I say, I can't remember the precise findings of the post-season spawning escapement estimates for those two years. This does sound about right to me, though.
Q All right. And as for the escapement in 2006 --
MR. WALLACE: With respect, Mr. Commissioner, I really do not understand how this is helpful in the

context of this panel.
MR. HARVEY: Well, let me just ask this:
Q Before you could draw any connections between 2002 and 2010, you would want to look at the record in 2006, would you not, return levels and escapement levels in 2006?
MR. GLAVIN: The connection that I draw --
MR. TAYLOR: Well, I have -- I have a --
MR. GLAVIN: -- is that it's the same population of salmon.
THE COMMISSIONER: Just a minute.
MR. TAYLOR: I have --
MR. GLAVIN: It's the same cycle year.
MR. TAYLOR: -- an objection at this point. Mr. Wallace is putting it on the basis we're outside the topic; I'm putting it on the basis we're outside the expertise.
MR. HARVEY:
Q Mr. Glavin, would you agree with that, this is outside --
MR. GLAVIN: Well, you know, what expertise does it require to simply observe that this is the same cycle year in the same population of salmon? That's all I observed yesterday, and I don't think you need a law degree to understand the difference.
MR. TAYLOR: I'm the one objecting at the moment. Mitchell Taylor. I think you need a scientific degree or science degree. That's my objection.
THE COMMISSIONER: Thank you, Mr. Taylor. Mr. Harvey, could you move on, please.
MR. HARVEY: Yes.
THE COMMISSIONER: Thank you.
MR. HARVEY:
Q Mr. Morley, you made the statement that conservation is ensuring that we can enjoy optimum benefits from the resource phase in its entirety; have I got that right?
MR. MORLEY: That's correct.
Q Yes. You spent 13 years with the DFO, did you say?
MR. MORLEY: I did, starting in 1974 through to -- or 13 years after that.
Q '74. And in what area of the DFO?
MR. MORLEY: I began my career as a junior economist working in the northern operations branch in the habitat section, and I moved onto being an

economist in the planning section of the salmonid enhancement program and was the director of planning in the salmonid enhancement program, and I went from there to being the advisor on international and intergovernmental affairs to the director general.

Q In the days that you were there, what sort of an economic unit did the DFO have?

MR. MORLEY: They had several economic units. In fact, as I said, I was in one that was responsible for northern operations and spent a lot of time working on habitat issues. There was another -- and we had about three or four economists involved in that section, there was a similar sized section that was working on southern operations, and there was a more general one that worked on policy and management issues that had half a dozen economists in it as well.

Q Yes. How does that compare with the staffing today; do you know?

MR. MORLEY: I don't know in details what the exact staffing level is, but I would suggest to you that it's -- the level and breadth of knowledge and issues that they get involved in, today, are miniscule compared to what we used to.

Q Yes. When you were there, was cost benefit analysis a major part of your work?

MR. MORLEY: It was a -- yes, it was a very large part of our work. In fact, we developed a system, when we were involved in the salmonid enhancement program, it was really based on what are the resource planning systems that had been used throughout North America at the time that were sort of state of the art for doing multi account benefit cost analysis of the implications of various public policy decisions on resource use and resource users, and we used that to help plan the salmonid enhancement program and to analyze the impacts of various management decisions. So we looked at the impacts on national income in terms of the treasury board guidelines, but also impacts on First Nations, impacts on employment, impacts on the environment, and developed an evaluation system that could demonstrate to decision-makers what those implications might be, before they made decisions on how to invest money or how to make changes in the management of the

fishery.

Q Yes. Have you had any involvement, recently, in the Cultus Lake habitat restoration, or revival program?

MR. MORLEY: I have, as I mentioned yesterday, I was on the Cultus sockeye recovery team that was put together to look at what the strategies might involve for recovering Cultus Lake as an industry from -- after that document came out, and when the government announced -- the minister announced their recovery plan for Cultus Lake. There were a number of activities that were indicated as being ones that should be undertaken, including such things as increased hatchery production and increased hatchery as well as some freshwater predator control programs and other programs. The industry, at the time, in 2006, decided that we would, in fact, devote part of the catch in 2006, towards a fund that would assist in those Cultus recovery teams.

I have sat on a committee that has been administering those funds jointly with the representatives of the Sto:lo First Nation for the last four years, and we have been providing those funds to programs that have been attempting to deal with some of the freshwater issues, particularly with the predator control program. And, as well, we tried to provide additional money to DFO to do some of the programs and hatchery supplementation, but they have refused to accept the money from us, so we have been forced to use the money on things that we can do that they will allow us to do.

Q The money, if I've got this right, was raised by industry in 2006, from 100,000 fish that was used for the purpose of raising money for this project?

MR. MORLEY: That's correct. The Commercial Salmon Advisory Board sat down and decided that we wanted to provide some additional funding to assist in the recovery of Cultus sockeye, because it was seen as an impediment in terms of pursuing a higher level of harvest, and so we decided that we'd put aside funding for two reasons. One, two-thirds of the funding out of the 100,000 fish, that the net proceeds from the fishing and selling those fish, were devoted towards the Cultus recovery program; one-third went to the ongoing

operations of the Commercial Salmon Advisory Board.
Q Yes. About 800,000 was raised, I think; is that right?
MR. MORLEY: Yes.
Q That resulted in the harvest rate being changed from 10 percent to 30 percent?
MR. MORLEY: Well --
Q Have I got that --
MR. MORLEY: -- I mean, I guess the question is, the minister decided, in the end, on a 30 percent exploitation rate. Whether or not that was to do with our efforts, I think that it was certainly the -- in discussions the Sto:lo and the recreational community and ourselves, recommended that we should go to 30 percent.
MR. HARVEY: All right. Could I have one final question?
MR. WALLACE: I would object if it was to continue on this line. Mr. Commissioner, this is not relevant.
MR. HARVEY: I just -- I'll ask my question and maybe Mr. Commissioner will determine whether it's a proper question or not.
Q You're an economist. I wanted to -- if we assumed for a minute - and this will have to be dealt with by somebody else - that there was a difference in harvest rate between 10 and 30 percent, that came about at the same time as the Cultus habitat work was proposed and the money was raised, as an economist, how does the 800,000 for habitat restoration compare with --
MR. WALLACE: Mr. Commissioner, this is a matter -- this whole area will be canvassed. This is not the time for on this point. The matter is quite clearly going to be before you with witnesses and proper notice on these issues.
MR. HARVEY: All right, well, if the matter is going to be dealt with more thoroughly with other witnesses, I'm content to leave it.
THE COMMISSIONER: Thank you, Mr. Harvey.
MR. WALLACE: My notes take me to First Nations.
MS. GAERTNER: Thank you, Mr. Wallace. Brenda Gaertner, for the First Nations Coalition, and with me is Leah Pence.
I want to, perhaps, just lay the foundation for what I'm going to try to do in my questions,

as distinct from cross-examinations, I'm hoping. I'm, first, going to just ask a few questions about the perspective or expertise that each of you have been willing to bring to this inquiry, and then I'm going to stick to the definitions of conservation and stewardship, biodiversity, trade-offs, which is something we've talked a little bit about, and then end with the precautionary approach. So I'll cover those questions in my remarks.

CROSS-EXAMINATION BY MS. GAERTNER:

Q I'm going to first start, we've heard a lot about the importance of world views, and Mr. Reynolds, you're a biologist, but you're not a biologist for the Department of Fisheries and Oceans; is that correct?

DR. REYNOLDS: That's correct.

Q And you would agree with me that scientific perspectives are only one of the perspectives that will be useful when looking at the difficult issues around conservation?

DR. REYNOLDS: Probably. Can you just tell me what the other ones were that -- just to make sure I understand the question?

Q Well, perhaps I'm going to say that --

DR. REYNOLDS: What other ones --

Q -- not only scientists have a useful perspective to bring --

DR. REYNOLDS: Oh, certainly.

Q Yes, thanks. And you're also going to agree with me, perhaps, that science is somewhat biased in that science is usually dependent on the studies that they rely upon?

DR. REYNOLDS: I don't know if I'd call that biased. I'd say it's limited by the studies --

Q Okay.

DR. REYNOLDS: -- that they have available to them.

Q And that those studies usually are directly related to the funding decisions that are made around them?

DR. REYNOLDS: That's probably fair to say.

Q Mr. (sic) Close, you're a holder and a scholar of traditional knowledge and biology; is that correct?

DR. CLOSE: Yes.

Q And is it fair to say that one of the things you're trying to teach and live is walking the bridge between those?
DR. CLOSE: Yes.
Q And I heard you mention, yesterday, that ecological knowledge is informed by experiment and pattern recognition, and that would be the traditional ecological knowledge that you're talking about there?
DR. CLOSE: I think it works both ways with the scientific method or western science and traditional or indigenous knowledge or TEK.
Q And then just briefly this morning, and I want to stress this a bit, there is another traditional knowledge that is more informed or by the ethics and the beliefs and how that traditional ecological knowledge is applied into certain patterns?
DR. CLOSE: Well, could you explain?
Q The holders of traditional knowledge within any society have both the traditional ecological knowledge --
DR. CLOSE: Mm-hmm.
Q -- which is informed by the pattern recognitions and the familiarity with the place and all of the ecosystem --
DR. CLOSE: Mm-hmm.
Q -- but they also hold knowledge around how their society has used that knowledge over time to make decisions based on the ethics of that society, the belief systems --
DR. CLOSE: Yes.
Q -- and that which is important to them?
DR. CLOSE: Yes, that's true.
Q And that one of the things that you have been able to study are similarities amongst some of those traditional knowledge patterns?
DR. CLOSE: Yes.
Q You're not a holder of specific knowledge and ecological knowledge in the traditional way as it relates to the Fraser River sockeye?
DR. CLOSE: That's correct.
Q Mr. Glavin, I heard, yesterday, some acute cross-examination about the fact that you're not a biologist.
MR. GLAVIN: Something like that, yeah.
Q But am I correct in understanding that what you've

come here to offer is a world view informed by being an observer of recent history and how that recent history compliments or relates to some of the traditional or older history?

MR. GLAVIN: That may be why I was called.

Q Not so much why you were called. Why --

MR. GLAVIN: Oh, sorry.

Q I'd like to see more about where you feel comfortable speaking from. What interests you?

MR. GLAVIN: Oh. Well, what particularly interests me and what I've spent a great deal of my life writing about is the relationship between the -- among and between the values that we articulate as values that we're trying to conserve in biological diversity, and these include science, ceremonial issues, economic interests, and so on.

Q And when I heard -- one of the values that I heard you refer to both in your written material and I'm going to risk asking a question about, because I wasn't clear about, was the value of the public interest -- or the public trust. Could you just give me a definition, or give us all a definition of what you mean by that?

MR. GLAVIN: In this specific context, actually, I think, if you look, you know, you can only look to the sources that are available to us. The commitment that this country made in its -- in the convention on biological diversity I think quite clearly sets out what that public trust is, or the values that we're trying to protect, and they were articulated as ecological, scientific, economic, commercial, cultural, social, educational - what have I missed - aesthetic. And, similarly, in the Wild Salmon Policy, you will have a number of values that are similarly articulated and not -- I don't know that it's fair to say that one -- any one is given a higher ranking, in terms of the principles, than another.

Q Thank you, Mr. Glavin. Mr. Morley, now, you're not a biologist, either, are you?

MR. MORLEY: No, I'm not.

Q And you're not a scientist, either, are you?

MR. MORLEY: Not by -- no, I'm not a scientist.

Q All right. But you also felt that you had something useful to offer this commission with respect to conservation?

MR. MORLEY: Absolutely. I think my perspective, from

my training as a resource economist, my experience working for a management agency, and experience being a user who has been involved in countless consultative processes developing fishing plans over my entire career, gives me a good perspective to provide, yes.

Q And one of those perspectives, as you've just said, is a perspective of being a user within the commercial industry; correct?

MR. MORLEY: That's correct.

Q And would you agree with me that that industry has, at least over the last 50 years, gone through a lot of growing pains?

MR. MORLEY: It would be nice if it was all growth, actually. A lot of pain, I would say, yes.

Q A lot of pain, all right. And would you also agree that partly that pain is, for the first while and for a good portion of it, you had strong, predictable access to runs, and it allowed you to develop heavily capitalized interception of fisheries, and that one of the growing pains that you're now experiencing is that that's not there for you?

MR. MORLEY: I would say that, again, I wouldn't call it a growing pain, I would say that we're adjusting to a changed management approach and it has caused significant restructuring of the business, that access to the resource is certainly a critical part of that, and as well as a far more conservative and restrictive harvest regime as being two components.

Q And part of that is because it's difficult to manage and change a heavily capitalized interception fishery when we're talking about mixed stock fisheries and worrying about weak stocks; is that correct?

MR. MORLEY: No, I wouldn't agree with that.

Q No?

MR. MORLEY: I would say that the industry, throughout its entire career, has dealt with considerable changes in abundances and the -- in fact, the -- just simply because something is heavily capitalized is not a reason why it can't adjust. I think, in fact, the private sector is well placed to make adjustments under the right circumstances.

Q Excellent. I like to hear that the commercial

industry is getting more flexible.
MR. MORLEY: The commercial industry has been flexible for its entire history. If you weren't flexible in exploiting an exhaustible natural resource with huge fluctuations, you wouldn't survive, and our company has been in business for 104 years --
Q Right.
MR. MORLEY: -- and we hope to be for another 104 years.
Q Great. One final question about the industry and the perspectives that you've done, I'm not sure about this, but would it be fair to say that the commercial fishery is not really a self-regulating fishery, but basically when you get an opening you're out there?
MR. MORLEY: The industry will respond to the regulatory system that is in place, and certainly the regulatory system in commercial fisheries in British Columbia differs depending on the particular fishery and species and, as you heard Mr. Glavin say yesterday, the majority of the fisheries are managed by individual quota and, I would suggest have a -- under that system, have a far more sort of direct self-regulation component to it than some of the fisheries that are still managed under a system of just calling for openings and closures, and that would, in fact, mean that you go out when it's open and you stop when it's closed, if you're fishing legally.
Q Yes, I guess I appreciate the details of how we can improve the regulation of the fishery, and I think that's where you went, but I was just trying to make sure that I understood historically -- I'm not, in my own experience with fishery, not aware of any time in which the fishery was opened and the commercial fishery said, "No, we're not going to go. That's not going to be good for conservation."
MR. MORLEY: You know, that's difficult in the sense that the industry, on many occasions, has said, "We do not want the fishery to be opened, because we're concerned about conservation," and so certainly that when you make your living going fishing, when they call an opening and people go fishing, then you go fishing. But the industry has a tremendous commitment to conservation and, again, wouldn't be here if we didn't.

Q Okay. All right, I'm going to turn, now, to some of the information that was provided yesterday around the definitions of conservation and stewardship, and I've just got a couple of clean-up questions for you, Dr. Reynolds.

Your definition of conservation, you quite use the words "ecosystem" and "interdependence", and I just want to make sure that -- perhaps we're just dealing with semantics, and I did hear your evidence yesterday refer to ecosystems. So when you use the words "protection of salmon and their habitat throughout the lifecycle," is that fair to say that you're talking about ecosystems there?

DR. REYNOLDS: Ecosystems come in under my definition of salmon diversity, and my definition of conservation makes, let's see here, this makes reference to including diversity. So it says, "This includes maintaining salmon diversity as I've just defined it." As I've defined it, so...

Q So maybe if I've heard that answer right, your definitions really need to be read as a unit, all three of them; they don't stand on their own?

DR. REYNOLDS: That's probably fair to say.

Q All right.

DR. REYNOLDS: That's right.

Q That's very helpful.

DR. REYNOLDS: And yes, I'm glad I got a chance to clarify that.

Q Thank you.

DR. REYNOLDS: So in the Wild Salmon Policy, and a point I made yesterday, the diversity is contained within the definition of conservation, and I agree with that. I broke it out to help us unpack what we mean by diversity, but I absolutely agree with your statement.

Q Thank you, Doctor, that's very helpful to me, and hopefully to Mr. Commissioner.

And then the other question that I just had was the difference that I've heard over the years between the word -- using the word "interdependence". You've got "interactions" amongst the other -- around the other species.

DR. REYNOLDS: Mm-hmm.

Q I suppose that's a semantics issue, is it, or is -- I just want to make sure that I've got it right.

DR. REYNOLDS: I think it's probably largely a semantic

issue. I think we probably mean the same thing. I guess if you say "interdependence" you might have to define what you mean by "depend", but I think that is largely a semantic. I'm certainly referring to ecological interactions between species.

Q And then, in your definition of "sustainable use" you use the word "diversity", and again, I'm sorry, but lawyers have a tendency to be very particular about words, and I want to make sure we get them right. That's why we brought you here, today, was to just help us with some definitions. So you use the word "diversity" there. Is it fair to say you mean "biodiversity" in your definition of sustainable use?

DR. REYNOLDS: No, actually, I'm referring to the salmon. So biodiversity of salmon. Because I'm looking at this as a -- I've got sustain -- I'm looking at this in terms of the use of salmon and their benefits that they provide to people.

Q So then you'll have to agree with me that the -- or perhaps comment on the definition of biodiversity in the Wild Salmon Policy does refer to the biodiversity within ecosystems, yes?

DR. REYNOLDS: Yes, I believe it does. But this is one of the distinctions between sustainable use and conservation.

Q Say more?

DR. REYNOLDS: Well, perhaps we don't need to go back down this, but this is one of the reasons why I disagree with Mr. Morley, that conservation is the same as sustainable use. I believe they are two separate concepts.

Q And you would agree with me that conservation sometimes has to preclude use?

DR. REYNOLDS: Yes, clearly.

Q Now, just again on the words, I, over the years, have observed that we used to use the word "environment" a lot, and now we use the word "ecosystem" a lot, and one of the ways that I have heard that distinction is that "environment" refers to something outside of the human population or something we relate to outside of us, and that the ecosystem includes all of us, includes humans within that system. Is that something that, Dr. Reynolds, you could comment on?

DR. REYNOLDS: Okay, so I defined, yesterday, an ecosystem - and I'll just try to make sure I get the words right, again - it's the combination of species that interact with one another.
Q Which would include humans?
DR. REYNOLDS: Which would include humans and the physical environment.
Q Okay.
DR. REYNOLDS: Is that okay?
Q That works for me.
DR. REYNOLDS: Okay.
Q I'm not trying to challenge your definitions, I was just trying to make sure that as we go forward, when we use those words, we're clear, amongst ourselves and with Mr. Commissioner, about those words.
DR. REYNOLDS: Fine.
Q All right. Dr. Close, I'm going to ask you a few questions, now. These might seem a bit basic for you, but bear with me.
DR. CLOSE: Okay.
Q Would you agree, Dr. Close, that the First Nations in the Pacific Northwest have practices and laws, that they would call laws, and traditions that are what we would call holistic or ecological in nature?
DR. CLOSE: Yes.
Q For example, that the entire system, the animals, the trees, the waters, the air, the lands, are all referred to as a whole and are treated as that and respected as that?
DR. CLOSE: Yes, it's true.
Q That none are fundamentally higher or better or more important?
DR. CLOSE: That's right. Including fish.
Q Including fish. And would you also agree that First Nations see themselves as interacting fundamentally within that ecological system?
DR. CLOSE: Yes. Could you repeat that question?
Q That First Nations don't see themselves out of the system?
DR. CLOSE: Oh no.
Q They don't have an --
DR. CLOSE: No, no.
Q They're directly part of --
DR. CLOSE: Yes, yes.
Q -- and next to all the other species and beings --

DR. CLOSE: Yes.
Q -- that are in the ecosystem?
DR. CLOSE: It's true.
Q And so you'd probably agree with me, given the discussion that we have, that First Nations come with a perspective that is an ecosystem-based perspective?
DR. CLOSE: I would agree with that, yes.
Q It's not something new for them?
DR. CLOSE: That's right. We've held that for a very long period of time.
Q And would you also agree that when you spoke about the fishing chiefs on the Columbia River and regulating their fisheries and who had access or where or what families and at what times, that those were part of how they managed the fisheries?
DR. CLOSE: Yes. We call it "meockt" on the -- meockts are the leaders or salmon chiefs, would manage and have people pulling nets or stopping fisheries at certain times. And to my knowledge, on the Fraser it's "siem" is the correct term for the salmon chiefs on the Fraser River.
Q And kukwpi7, have you heard kukwpi7?
DR. CLOSE: No, I haven't.
Q You'll learn -- maybe you'll learn about that. Have you heard First Nations often refer to their territories in the English terms "homelands"?
DR. CLOSE: Little bit. I have to say, I am relatively new to the area, so...
Q And I wanted to stress that that relationship that we're talking about, that ecosystem approach, is fundamentally informed by our responsibility; is that correct?
DR. CLOSE: Yeah, it's what I'd call -- what we call the Tamaalwit, which is the unwritten law of how we're supposed to interact with the fish and the deer and such.
MS. GAERTNER: I just have a couple more questions on conservation, Mr. Commissioner. I note the time, but maybe I'll finish those and then I could suggest a break to you.
Q I want to just pick up, briefly, on the information that Dr. Reynolds has provided about the value-laden nature of conservation and the importance of those values. And I just want -- perhaps, Dr. Reynolds, if you could answer these questions.

Would you agree with me that one group of people could see salmon conservation being around and ensuring healthy animals, like bears and eagles and fish and humans?

DR. REYNOLDS: Yes.

Q That would be a value that they would hold and that perhaps other groups might not hold that value?

DR. REYNOLDS: Yes.

Q You also agree with me that some groups might hold the value that ensuring sufficient salmon is really about ensuring human harvest and sockeye migration up to the tops of the rivers to the spawning grounds?

DR. REYNOLDS: Yes.

Q And would you also agree that historically, at least, some of the groups thought of conservation as really being about ensuring maximum sustainable yield?

DR. REYNOLDS: By historically, do you mean First Nations' viewpoints, or within --

Q No; more recent historic --

DR. REYNOLDS: -- the more recent fisheries -- the commercial fisheries world?

Q Yes.

DR. REYNOLDS: Okay. So, sorry, can you repeat the question, please?

Q And these are current, so this is like -- I shouldn't have used the word "historical".

DR. REYNOLDS: Oh,

Q But another group, actually, would -- could use or could hold the value that conservation is really just about ensuring maximum sustainable yield?

DR. REYNOLDS: Yes, groups could hold that value.

Q And would you also agree with me that part of the difficulty in managing to conserve a resource is most of those values are not reflected in science, but those are values that are held by the broader society?

DR. REYNOLDS: Well, the value that you just described of maximum sustainable yield is one that scientists are quite comfortable working with. The other value is to - I've forgotten, now, what they were - but human wellbeing or ecosystems are more difficult to deal with.

Q And maybe, Mr. Glavin, I'll ask you this next question, because you're an observer of recent

history. Has it been your experience that scientists, First Nations, recreational fisheries and commercial fisheries and organizational and environmental organizations don't always hold the same meaning to the word "conservation" and don't always carry the same values?

MR. GLAVIN: Precisely.

Q And would you also agree with me that one of the challenges associated with managing a fishery is not just managing for biodiversity of stocks, but because of all those different values?

MR. GLAVIN: Precisely.

MS. GAERTNER: Those are my only questions on conservation, Mr. Commissioner. If this is an appropriate time to break, then?

THE COMMISSIONER: It is, Ms. Gaertner, thank you very much. May I ask you and your learned friends to just confer while I'm out of the room, to make sure that with the hour remaining everybody gets a fair opportunity to ask their questions. Thank you.

THE REGISTRAR: The hearing will now recess for 10 minutes.

(PROCEEDINGS ADJOURNED FOR MORNING RECESS)
(PROCEEDINGS RECONVENED)

THE REGISTRAR: The hearing is now resumed.

MS. GAERTNER: Thank you, Mr. Commissioner. I understand I'll be within my time if I finish in 10 minutes, so I'm going to do my absolute best.

CROSS-EXAMINATION BY MS. GAERTNER, continuing:

Q So I want to turn, now, to the definition of "biodiversity" and I want to ask if Exhibit PPR-2, in particular paragraph 114 of that exhibit, could be put before the panel. And just as a way of background, at paragraph 114 we're talking about Article 8 of the Convention on Biological Diversity that's been accepted and to which Canada has been a signatory to.

Are you familiar with that --

DR. REYNOLDS: Oh, you're asking -- sorry.

Q -- convention, Dr. Reynolds?

DR. REYNOLDS: Yes.

Q Dr. Close, are you familiar with that convention,

the UN Convention on Biological Diversity?
DR. CLOSE: No.
Q All right. Then I'll have to go to Dr. Reynolds on this.
DR. REYNOLDS: Thanks a lot.
MS. GAERTNER: Actually, they're not hard questions, and I'm going to put them right over to Dr. Close soon, so you're okay.
Mr. Commissioner, I actually was -- didn't, I guess, do my homework correctly, and I hadn't realized that the actual convention wasn't in that paragraph and it was just a reference to the substance of the convention, and what I wanted to bring to the attention of the Commissioner, through the witnesses, was the list of items that are set out in the convention as it relates to biodiversity and the steps that can be taken.
MR. WALLACE: Mr. Commissioner, the convention was provided with our material last week to the participants, and it had been my intention to introduce it as an exhibit in re-examination because it's been mentioned a number of times. So perhaps this would be a convenient time --
MS. GAERTNER: Excellent.
MR. WALLACE: -- to mark the UN Convention on Biodiversity as the next exhibit.
THE REGISTRAR: That will be marked as Exhibit 13.

EXHIBIT 13: UN Convention on Biological Diversity

MS. GAERTNER:
Q So then I would ask you to go to Article 8 of that exhibit. Primarily why I am taking you there is because I find it to be a useful listing of the steps that can be taken to enhance biodiversity. Do you agree with me, Dr. Reynolds, that that list that's there are various different methods by which states can take steps to enhance biodiversity?
DR. REYNOLDS: I'm just briefly looking through the list, if I may. If you could scroll down for a moment, please, I'd appreciate it.
Yes, I think I would agree with that.
Q All right. And in particular, Dr. Close, I'd like you to pay attention to Article 8(j) --
DR. CLOSE: Mm-hmm.

Q -- in which it stresses that one of the ways to enhance and enforce biodiversity and conservation is to preserve and maintain knowledge, innovations and practices of indigenous and local communities.
DR. CLOSE: Mm-hmm. Yeah, I see that.
Q And I'm wondering if you could speak about the particular types of traditional ecological knowledge that would be useful for enhancing or preserving biodiversity?
DR. CLOSE: Well, we, for an example, in the Columbia, our elders were noticing that there was a collapse of lamprey from the -- coming up from the 1970s, and nobody had been doing any work on this, and so we started off with traditional ecological knowledge from our elders to provide baseline biological data so we could initiate restoration and preservation of this important cultural species. And so, at the time, that was the only knowledge about lamprey biology, was from our elders in the Columbia River base, and that was -- so we did interviews and brought the knowledge forward, and that formed the foundation for a restoration planning. And then the State and the federal governments started jumping in later and joining our efforts, but we basically led the way with that body of knowledge in restoring these -- trying to restore these fish.
Q And I'm wondering if you would agree with me that the types of body of knowledge that you are relying on are things like information around particular parts of a stream or the amount -- or the flows of the water in particular areas?
DR. CLOSE: Yes, it's very local knowledge -- knowledge-base, and that's one of the disadvantages, but it can also be an advantage. For instance, if you're trying to restore the biodiversity in a certain area and you need to know about a certain species' lifecycle, it can be very useful, and so I believe it's really important to include that. And I'm not saying, you know, western science -- we shouldn't be doing western science, but I think we should, but we should also include this body of knowledge in moving forward with conservation and --
Q I'm just trying to give Mr. Commissioner some --
DR. CLOSE: Yes.
Q -- examples of the types of knowledge that could

be useful, and we've got the localized streams and the flows of water. Would you also agree that there are other timing indicators that traditional ecological knowledge also includes, usually, so you can get a sense of when a stream -- when run is likely to be expected by other things that are going on in the ecosystem, based on the local environment?

DR. CLOSE: Yeah, we've got some examples of this. And some of it's embedded within stories that are told and, you know, for example, one, there's certain ants that show up along the river when the lamprey are running, and so this is like an indicator. And also, when certain berries are coming in, are available, you know it's time to go down and collect these fish and where they're going to be, where to look for them. And so there's these kinds of correlations and pattern recognition that have occurred through long periods of time, and some of these are handed down, and that's the knowledge base that -- like trans-generational knowledge.

So, for instance, for spring Chinook we have the morning dove. When the morning dove is -- basically shows up in the spring and is very active, that's a sign that we're supposed to go down and fish. And the same thing with huckleberries and lampreys. So there's a lot of pattern recognition, among other things, so -- as well as biological information about the lifecycle of the animal, so I think it's all important.

Q In addition to that, you also have selective fishing methods that would have been reflective of that local knowledge; is that correct?

DR. CLOSE: Yes.

Q Okay, I want to take you to the words "precautionary" and the "precautionary approach", and Dr. Close, I'm going to start with you. Yesterday, or earlier today, I can't recall, you began to mention the principle within traditional knowledge, or principles of the seven generations.

DR. CLOSE: Mm-hmm.

Q That's something you're familiar with?

DR. CLOSE: A little bit, yes.

Q Something that many -- most First Nations on the Pacific North Coast carry?

DR. CLOSE: Yes.

Q And can you say a little bit about that principle, if you want -- if you could? If you could inform Commissioner Cohen about the content of that principle?

DR. CLOSE: Well, it's basically when we're dealing or making decisions about, say, resources and such, we need to -- or in council with each other about -- about issues, we're supposed to take into consideration the future effects of these decisions that may be made, and so we're supposed to be thinking ahead, how this is going to affect seven generations forward, and so that's where that comes from, is thinking ahead about future -- our future people and the children and whether they're going to have these opportunities to continue to practice cultural harvesting of fish and preparing and learning, so...

Q And would you agree with me that fundamentally it's quite similar to what we, in English, are now calling the "precautionary approach"?

DR. CLOSE: I think there's some similarities there.

Q And I guess based on some of the information I heard yesterday, would you agree that First Nations that are trained in those principles and have been raised by the elders don't have difficulty in applying that principle; they generally feel comfortable in applying it on behalf of future generations?

DR. CLOSE: Yeah, I think there's no -- there's not a problem with that, and I think it's an important part of who we are. Also, it should be noted, though, that this -- not everybody is living by this principle, now, and so it makes for difficult management, also.

Q Absolutely.

DR. CLOSE: So...

Q There's been changes and evolutions that have --

DR. CLOSE: Yes.

Q -- occurred, yes.

DR. CLOSE: Yes. However, I still think a lot of this is very important, and we should be promoting a lot of these values.

MS. GAERTNER: Now again, just briefly, because this is about definitions, Mr. Cohen, I wanted to bring to the attention, in the same policy and practice report, at paragraph 17, there's a reference to the definition of the precautionary approach that

was accepted in the Rio Declaration. And it's there, in full, in that report.

Q And perhaps Mr. (sic) Reynolds and Dr. Close may have something to say about this, but one of the things that I noticed, when we start hearing -- seeing these definitions, is that we now add the words "lack of full scientific certainty".

Dr. Close, you would agree with me that, traditionally, even in a modern context, the application of precautionary principle is not only when there is scientific uncertainty; is that correct?

DR. CLOSE: Yes. There's -- well, there's always scientific uncertainty as well as traditional knowledge systems as well, and so I think you -- we always try to err on the side of -- we should try to err on the side of, you know, being conservative with how we move forward, usually, as a general principle.

Q Conservative and caution, is that --

DR. CLOSE: Yes.

Q -- would that be fair? And Dr. Reynolds, would you agree with me that, generally speaking, reasonable people might have a different view as to what is highly scientific uncertainty?

DR. REYNOLDS: Let me think about that. Reasonable people would have different views on --

Q What's a scientific uncertainty?

DR. REYNOLDS: Of what is a scientific uncertainty. Yes, I suppose so.

Q I'm just wondering, if we were applying the precautionary principle, and I guess, is it fair to say amongst you that it's agreed that there were a lot more stocks and a lot more fisheries 100 years ago than there are today on the Fraser River?

DR. REYNOLDS: I don't know very much about the historical fisheries, I'm afraid.

Q Mr. Glavin, you've researched this information. Would you agree with me?

MR. GLAVIN: I think, generally, yes, there's an overwhelming body of evidence for populations that were there that aren't there anymore.

Q And would we also --

MR. MORLEY: Could I add my comment as well?

Q Sure, Mr. Morley. Absolutely.

MR. MORLEY: I'm not sure that there were necessarily

that many more fisheries, and in terms of the number of stocks, I think, again, it goes back to what is the definition of a stock, and that is something that I think you're going to get into in more detail when you start talking about harvest management, but because, again, what we call a stock is, by the terms of reference, it is the Fraser sockeye stock, which is one.

Q All right. I actually will be more precise, then. Is it common knowledge amongst us that the stocks were generally more predictably abundant about 100 years ago than there are now?

MR. MORLEY: No, I disagree with that, entirely. There was huge variation in abundance, and that goes back, historically, for -- further than 100 years. And if you look at records throughout the North Pacific, you can see, in fact, salmon populations have varied widely, even in areas where there is no human habitation and had never been any use.

Q All right. Dr. Close, in your experience with fisheries, there's this concern that I've heard a number of times over today, and I definitely heard it over the years, about too many spawners getting onto the spawning ground. Is that something that, from traditional knowledge, you've heard much concerns about?

MR. TAYLOR: Mitchell Taylor. I thought this witness said he didn't know the Fraser.

MS. GAERTNER:

Q Generally speaking, from a traditional ecological knowledge perspective, when it comes to the migrating salmon of the Pacific Coast, have you heard too many concerns around too many spawners getting to the spawning ground?

THE COMMISSIONER: Just a minute, Ms. Gaertner. Mr. Lowes?

MR. LOWES: J.K. Lowes. A simple submission, Mr. Commissioner. What's sauce for the goose should be sauce for the gander. Mr. Harvey was stopped in this line of questioning, and I think the same rule should apply to Ms. Gaertner.

THE COMMISSIONER: Ms. Gaertner, I am going to ask you to move on. I also note your 10 minutes is now 20 minutes.

MS. GAERTNER: I have one more question.

THE COMMISSIONER: All right.

MS. GAERTNER: I just wanted to finish with one last

question, which we've heard a lot about sustainability and conservation, and I thought it might be helpful to Mr. Commissioner, I'm not sure, but I'm going to try it, to try to put those things together, and so to get to a definition of "sustainable fisheries". And I did some work on this and was able to find a definition that was reached at a conference in Victoria in 1996, in which 500 participants attended and worked towards a definition of what's a sustainable fisheries. And I'll just read it to the panel. I have it, but I didn't have it in the ringtail and do all of the things that needed to be done, and I have it in printed form, and if counsel want it, I'm more than happy to give it. But I want to put it to the panel, if I may, just in the terms of the definition.

And that is that a sustainable fisheries could be defined as:

> The conditions that support healthy, diverse, and productive ecosystems, viable Aboriginal, sport and commercial fisheries, and vital and stable communities throughout the historical range of the anadromous Pacific salmonids.

Would each of the panel members be able to speak about their comfort levels with respect to that definition.

DR. REYNOLDS: I'm comfortable with that.

DR. CLOSE: I didn't catch the last part.

Q I'll read it again, because I really do want each of the panel members to speak about it.

> The conditions that support healthy, diverse, and productive ecosystems, viable Aboriginal, sport and commercial fisheries, and vital and stable communities throughout the historical range of the anadromous Pacific salmonids.

DR. CLOSE: I would agree with that. Are you talking about communities of -- are you talking about people -- humans here, or -- okay. But for the most part, I would agree that that's a fairly good definition of sustainable fisheries, yeah.

Q Mr. Glavin? Mr. Morley?

MR. GLAVIN: I think, without question, that would be

in keeping with what you might call a public objective, but I don't know whether or not all of that -- all of those components are necessary before you could make the judgment that it's a sustainable fishery that we're describing.

MR. MORLEY: And I would tend to agree with Mr. Glavin on that, the -- certainly indicating that you need to have fisheries that are -- I don't know what "viable" actually means, and I certainly don't think you need to specify who is harvesting the fish in order to define a sustainable fishery. And, again, a sustainable fishery does not necessarily -- it was outlined at the start saying the conditions. Well, I don't think it's the conditions. I think we need to talk about the fishery and what makes it sustainable. And so I really don't like that definition very much at all.

MS. GAERTNER: All right. Another way of being surprised. Those are my questions, Mr. Commissioner.

THE COMMISSIONER: Thank you.

MR. WALLACE: Thank you. Mr. Commissioner, that brings us, I think, to the Sto:lo Tribal Council, Mr. Dickson.

MR. DICKSON: Mr. Commissioner, Tim Dickson for the Sto:lo Tribal Council and Cheam Indian Band. I'm going to put some questions to Dr. Reynolds and then ask the other panellists to comment on them.

CROSS-EXAMINATION BY MR. DICKSON:

Q Dr. Reynolds, you were speaking of biodiversity yesterday, and actually, it may be useful to refer to -- bring up Exhibit 4 and the PowerPoint, the fourth page, please. I believe, Dr. Reynolds, one of the positive effects of biodiversity that you were identifying is what we've been calling the portfolio effect, and that is that biodiversity better allows a population, as I understand it, to weather environmental variation. It can cope better with environmental variation in the sense that some stocks may do worse, but some stocks may do better; is that fair?

DR. REYNOLDS: Yes, that's correct. So as long as we're clear, when you say "a population", I think

what we really mean is an aggregate of populations collectively do better, because some individual populations --

Q Thank you.

DR. REYNOLDS: -- go up and down.

Q Thank you. And another positive effect is that biodiversity allows for greater capacity of the species to adapt to longer-lasting environmental changes?

DR. REYNOLDS: Yes.

Q And so more genetic diversity means more possibility for mutations --

DR. REYNOLDS: Yes.

Q -- adaptations?

DR. REYNOLDS: More possibility -- it would provide more raw material for natural selection to have at its disposal for -- which would then provide a genetic response to selection.

Q Thank you.

DR. REYNOLDS: If you don't mind my jargon, but yes.

Q Thank you. And in terms of conserving salmon populations, conserving the species, diversity becomes more important as environmental variation and change increase; is that fair?

DR. REYNOLDS: Yes.

Q Maintaining biodiversity means maintaining weaker, smaller stocks, as well as larger stocks, it means maintaining a suite of stocks; is that --

DR. REYNOLDS: That's correct.

Q -- fair? And so if we care about maintaining the diversity of stocks, then we have to be careful to preserve weaker stocks; is that fair?

DR. REYNOLDS: Yes.

Q And yesterday you stated, I believe, that there is a significant body of science showing that if a weak stock is migrating alongside a strong stock, then heavy fishing on the strong stock can damage the weak stock?

DR. REYNOLDS: Yes.

Q And so, again, if we care about maintaining the diversity of stocks, then fishing selectively, not fishing on the weak stock, becomes important?

DR. REYNOLDS: That's right.

Q And towards fishing selectively, it's important to have information about the fish that are being fished?

DR. REYNOLDS: That seems reasonable, yes.

Q About the timing of runs, what are the runs?
DR. REYNOLDS: Yes.
Q And the more information you have on that, the more you can fine-tune fishing so as to fish stronger stocks and not weaker stocks?
DR. REYNOLDS: Yes, the more information you have to -- potentially to fine-tune. It may be that the information will end up showing that there might be no way to do -- accomplish what you're trying to do, but I agree with the thrust of your argument.
Q Is there more capacity to have greater information about the runs of fish when the fish are in the ocean or in the river?
DR. REYNOLDS: By the "runs of the fish", do you mean the timing of which fish are where at a given --
Q Which stocks they are, you know, which -- what is composing the fish that are going through, the fish that are being fished --
DR. REYNOLDS: Well, we -- the way that -- I mean, I'm not the best expert to explain that, but the way I understand it, we do get -- the genetic samples are taken in test fisheries out in the sea, and these are to understand what is going to be coming past the fish counting stations in-river, so the fish counting stations are giving the most accurate information on the number of fish that are passing by them, but to calibrate which fish you're looking at, you need, in this case, the way it's done, we -- it's based on the genetic information that's coming from the sea.
MR. WALLACE: Mr. Commissioner, again, we're getting into some specifics which we will hear far more about as we go along, and I think we're beyond the tenor of the definitions.
MR. DICKSON: Fair enough, Mr. Commissioner.
Q On the questions that were leading up in nature of biodiversity being important to conserving the salmon populations and the importance of maintaining weak stocks to maintain biodiversity, do the other panellists agree? Dr. Close, do you agree with Dr. Reynolds' answers to those?
DR. CLOSE: Well, he's characterized, you know, the genetics portion of this and it is important if you have this diversity of -- basically, it's really important for adaptability of these fish. And as far as weaker stocks go, you can have more

selective fishery, I believe and think, that you're always going to have a mixed -- somewhat of a mixed fishery, maybe a component, but you can increase the selectivity in some of the rivers and using selective gear. So I don't think it's impossible.

You're not always going to get completely selective, but you can try to minimize, and so I think it's reasonable to say that.

Q Thank you.

DR. CLOSE: Does that -- did I answer?

Q I think that's responsive, thank you. Mr. Glavin? And Mr. Morley, I'll also ask you.

MR. GLAVIN: Yeah, I think in the -- from my limited expertise, in the absence of fairly elaborate and extremely well-resourced assessment methodology prosecuted in-season to determine the various components of migrating runs and a tremendous amount of faith in the capacity of those elaborate systems to be in any way accurate, I think it should be without controversy to say that the easiest or the most obvious way to prosecute selective fisheries is as close to the spawning areas as possible.

Q Thank you. Mr. Morley?

MR. MORLEY: Well, since I wasn't asked to speak about how we should be organizing the fishery, I'll limit my response to the question about strong stock versus weak stock and genetic diversity, okay? And again, I covered this a little bit yesterday in my testimony, and partly it was related to -- goes back to the definition of, what is a stock, and the question is, "What is a strong stock and a weak stock, and how do they respond in different situations?" and I think, looking from my knowledge of Fraser River sockeye and from my analysis of the data, that if you define a -- the strong -- I mean, it's the question, how do you define a strong or more productive stock? And some of the larger populations, if you go by the definition of "returns per spawner" that we are now seeing in some of the larger populations, could be called a weaker stock, and some of the smaller populations, because they have higher productivity in terms of returns per spawner, could be called a stronger stock.

So when people make these value judgments of

strong and weak, I want to know what they're talking about, and I think everyone jumbles them together, and really what we're talking about, here, is that every population is contributing, as Dr. Reynolds said, to the genetic diversity, and certainly resiliency, there's no question that the broader the genetic diversity the more opportunity there is to respond, and the real question is, how quickly and how much do we need in terms of that respond in order to have sustainable fisheries. That's the question that needs to be answered.

Q One of the benefits of having a suite of stocks is resilience; would you agree with that?

MR. MORLEY: Certainly that is one of the benefits, in the sense that you have a greater opportunity to have some surviving populations in the face of some stocks, for sure. But resilience is also accounted for by abundance, and again, if you look at historical and development of the Fraser, that we had populations colonize the Fraser that never resided in the Fraser River, and within the Fraser River we are still seeing straying and moving around from some of the larger stocks when, in fact, they have large abundances that, in fact, you see straying and residency taking up elsewhere. So that also provides for some resilience and some adjustment to the population. So it's not simply biodiversity, but abundance also helps the fish to respond.

Q Mr. Glavin, did you want to comment on that?

MR. GLAVIN: Only to sort of agree, kind of, with what Rob said in terms of muddling up the differences between stocks and populations. But you can't have it both ways. The question that we were previously asked about, well, you know, how much have we lost, what do we know about the stocks that we've lost, if you use the term "population", if you look at the scientific literature, and I referred to it yesterday, we, in the paper by Brian Riddell, we find that fully one-third of all the known salmon populations that were known to us in the 1950s, as recently as the 1950s, in the southwest corner of British Columbia, are gone, or at least have been reduced so much that they're not even noticeable or even monitored anymore.

And stocks, if you just want to use the term "stocks", if you just want to talk about sockeye,

if you just want to talk about sockeye within shouting distance of Vancouver, we've lost Coquitlam sockeye, we've lost Alouette sockeye. We may have -- it may be said that we have "lost" Cultus sockeye. I think there may have been a population at Stave, as well.

MR. DICKSON: Thank you. Those are my questions.

MR. WALLACE: Thank you, Mr. Dickson. Mr. Commissioner, that brings us to the last participant on the list, the Heiltsuk Tribal Council, Ms. Fong.

MS. FONG: Lisa Fong, for Heiltsuk Tribal Council. The Heiltsuk, just for this panel, the Heiltsuk are First Nation, and they are located on the northern coast of British Columbia, at Bella Bella.

My questions are going to be directed at Dr. Close, and they're going to be regarding his comments yesterday about conservation in relation to hatcheries. And I am aware that there will be a portion of this hearing on, I believe, hatcheries, so I'm going to try and keep this very general in relation to conservation in particular, thank you. And if you could bring up Exhibit 4, Dr. Reynolds' description -- or definitions of salmon diversity, conservation, sustainable. I believe that was page 3. Thank you.

CROSS-EXAMINATION BY MS. FONG:

Q Now, Dr. Close, yesterday, to address the collapse of fisheries on the Columbia River, you mentioned that the Cayuse used conservation hatcheries, that was a term that you had used. Focusing on the purpose, just because we are going to have some additional evidence later on in the hearing regarding hatcheries themselves, focusing on the purpose, can you explain to us, what is a conservation hatchery?

DR. CLOSE: Well, the conservation hatchery, there is different types of aquaculture activities, and, you know, everybody is probably aware of the aquaculture industry on the coast and with Atlantic salmon and such. And there's other, like on the Snake River and the Columbia, there's rainbow trout and such. And then you have hatcheries that are considered conservation hatcheries that are basically for restoration.

And then there is some hatcheries that have been built on the Columbia that are primarily just straight up mitigation hatcheries and to restore a fishery, just supply a fishery.

Q Okay, so --

DR. CLOSE: And so --

Q Sorry. So what I understand is, with conservation hatcheries and these, you've called them, mitigation hatcheries, their main purpose is restoration of a population of fish?

DR. CLOSE: Correct.

Q Okay.

DR. CLOSE: One is maybe for more than just catching the fish. So a conservation hatchery, we had salmonid populations were extirpated in our seeded areas, and so we were trying to restore these traditional fisheries in our lands, our territories, and so we employed conservation hatcheries to rebuild these runs, and without those we wouldn't have the salmon fishery in our homelands right now, so...

Q And so this type of a salmon fishery being restoration-based, is it also known as, another terminology, supplementary hatchery?

DR. CLOSE: It can be interchanged with supplementation, yes.

Q The purpose of both these conservation hatcheries and supplementary hatcheries being restoration of the population of salmon, then?

DR. CLOSE: Yes.

Q Okay. And would you agree with me, then, looking at the definition provided by Dr. Reynolds, of conservation, that these restoration-type hatcheries are consistent with the concept of conservation?

DR. CLOSE: Well, it's a tool. Conservation hatcheries are just simply a tool that can be used in the efforts for conservation --

Q Right.

DR. CLOSE: -- of these populations. So within this definition, I guess it could be used -- let's see --

Q In that they help restore the population of --

DR. CLOSE: Yes.

Q -- for example, salmon?

DR. CLOSE: I think so.

Q Okay. And would you also agree, then, these sorts

of restoration hatcheries are consistent with the definition of sustainable use provided by Dr. Reynolds?

DR. CLOSE: Well, you're getting into an area that I'm -- well, you know, we -- you know, grinding up fish, you know, for fish food and feeding fish in these hatcheries, is not really, you know, probably not sustainable. It's stop gap, you know, measures to stop the -- or rebuild a population, or try to get the population back on its feet. And so I don't know if I would call these kind of measures to stop the -- or rebuild a population or try to get the population back on its feet. So I don't know if I would call these kind of measures sustainable.

Q Well, is --

DR. CLOSE: But -- or part of sustainable use. It's a little bit tricky.

Q Okay. But sustainable at least in the sense that they're rebuilding a population which then goes to maintaining abundance and diversity of that particular population?

DR. CLOSE: Yes.

Q Okay. And would you then agree that these types of hatcheries then support a multitude of salmon-rearing streams?

DR. CLOSE: They do.

Q Okay.

DR. CLOSE: They supply a multitude of streams in the Columbia and Snake River basins.

Q Okay. And could do so elsewhere?

DR. CLOSE: Yeah.

Q I'm asking more generally. Yes. Okay, and supporting a multitude of salmon-rearing streams, generally, increases the diversity of salmon conservation units, so that suite of stocks that Mr. Dickson --

DR. CLOSE: It can, but --

Q -- was speaking of?

DR. CLOSE: -- it's also been shown to be a problem, you know, it's a two-edged sword here. We've got a loss of genetic diversity as well as, you know, it can happen with fishing, too. We've got all the -- the king Chinook are basically gone from the Columbia because of harvest, the size of the fish have been harvested off, so now we have just small Chinook salmon. So there's been a genetic

impact on the diversity -- you know, for the diversity of these fish.

So there's problems with hatcheries. It's not a -- I wouldn't say that it's a great solution, but you may have to use it to save a population. So I don't think it's something we just go out and build a bunch of hatcheries and say it's okay. That's the problem with the Columbia right now, and so in the Columbia we've got hatcheries going up for all the wrong reasons, and so now the fisheries are still -- are being conducted at high levels and nobody is paying attention to the ecosystem.

So when technology replaces ecosystem, you have a problem, okay? That's the real issue with me, in my mind, is when this gets out of hand, you just look to the south, in the Columbia, and you'll see what's gone wrong with this idea that we're smart enough, as human beings, to replace the ecosystem with technology. It's really not a good way to go.

Q Correct. And with hatcheries, though, just sort of very generally here --

MR. WALLACE: Mr. Commissioner, I think, once again, we're getting down into some specifics of techniques as opposed to --

MS. FONG:

Q Actually, and that was my question, which was simply that there are a variety of ways in which hatcheries can be operated, like in terms of whether you select wild broodstock, whether you, you know, when you release, if you release at the fry stage, where you release, and things like that. So when you're talking about the conflict of technology, it would vary, depending on the particular situation?

DR. CLOSE: Yeah, it depends in how they're used, but there's not a great record, I guess you would say, historically.

MS. FONG: Okay, and I'll just leave my questions there, thank you.

MR. WALLACE: Mr. Commissioner, I understand that the Musgagmagw Tribal Council has one question.

MS. ROBERTSON: Thank you. Krista Robertson for the participant Musgagmagw Tsawataineuk Tribal Council.

CROSS-EXAMINATION BY MS. ROBERTSON:

Q Dr. Reynolds, I have a question for you. Earlier today, Ms. Gaertner asked you if you felt it would be useful for the commission to consider salmon management in Alaska as a comparative basis.

DR. CLOSE: Who are you talking to?

Q Dr. Reynolds.

MS. GAERTNER: I think, just for the record, I think that was Mr. Harvey's question, was it not, that we go to Alaska? It wasn't my question, but the question was --

MS. ROBERTSON: Okay.

Q The question was put to you - it was actually put to the whole panel - if it would be useful for the Commission to consider harvest salmon management practices in Alaska as a comparative basis in British Columbia, and do you recall that you agreed that it would be useful?

DR. REYNOLDS: I don't have the transcript in front of me, so I guess I would be helped if I could be reminded exactly the way that question was phrased, but I think we can always learn from other fisheries and other places. If that's the general point you're trying to make I would have to agree with that, yes.

Q Okay. And so I just ask you, then: In your -- I think it was yesterday you spoke about sort of the red and the blue zones of the salmon and the salmon health along the coast. Do you agree that it would be helpful to the commission to look also at the red zones further south of British Columbia as a comparative basis to help us understand salmon management in British Columbia?

DR. REYNOLDS: Yes.

Q And are there any panellists that would disagree with that statement? No disagreement?

MR. MORLEY: I mean, I think it's more to look at what not to do, but I, frankly, wouldn't spend a lot of time on it, because I think the terms of reference talk about how we can improve the system and, again, I don't think there's as much to be learned looking south as there is looking north.

MR. GLAVIN: If I might, it's what happens when you look south. Is it all red? It isn't, actually. We're all excited this year about all the sockeye that returned to the mouth of the Fraser River.

What was it like two years ago, when the Great Bear Rainforest was practically barren of salmon? What was the salmon population that was the most astonishing? It was Okanagan sockeye that has to traverse nine mainstem dams on the Columbia River. Unbelievable return. No one alive had seen spawning escapements like that.

Yes, please, look south and look north. I would hope that the commission, when it does that, would do it for perhaps purposes that are not being suggested to the commission. If you look north, what you find is that at least twice Alaska was declared a federal disaster area because of the salmon populations. The salmon fisheries had gone.

So I just don't want to leave anybody with the impression that if we do look to these other jurisdictions that we are only looking for certain narrow and predetermined answers.

MS. ROBERTSON: Those are my questions, thank you.

MR. WALLACE: Thank you, Ms. Robertson.

Mr. Commissioner, I understand that Mr. Blair, for the Aquaculturists (sic), and Mr. Taylor, for the Government of Canada, both would seek leave to ask a question in re-examination. One of the issues that arises, of course, is that lots of things happen after someone's opportunity to cross-examine is gone, and I suggest it might well be fair to give Mr. Blair and Mr. Taylor an opportunity to ask their short questions, I understand, on re-examination for matters that have come up since they were last on their feet.

THE COMMISSIONER: Mr. Taylor?

MR. TAYLOR: Thank you. In general terms, I understand that five minutes is allotted to re-examination. I certainly will seek to be short. At the same time, my re-examination is coming from cross-examinations that haven't stuck to their time.

CROSS-EXAMINATION BY MR. TAYLOR, continuing:

Q Now, there were questions asked of, I think - yes, it was - Dr. Reynolds about some conferences in December and March, and one of my friends over to my left, I think, asked them. You recall those questions this morning?

DR. REYNOLDS: Yes.

MR. TAYLOR: And for the record, Mitchell Taylor.
Q Now, as I understand it, you received third-hand or so information about DFO, or why DFO scientists were not at those conferences; is that right?
DR. REYNOLDS: Yes, I was told by --
Q Patricia.
DR. REYNOLDS: -- by Patricia Gallaugher --
Q Right.
DR. REYNOLDS: -- what -- that DFO had told her.
Q Yeah. And it boils down to, does it not, that DFO had decided not to attend?
DR. REYNOLDS: That's correct.
Q And DFO was not an organizer of either the December or March events, were they?
DR. REYNOLDS: They were not.
Q And DFO would have been only -- would only have limited influence on what the outcome would be from those conferences?
DR. REYNOLDS: Each person at those meetings would have the same opportunity to make their arguments and carry the same weight. There wouldn't be an undue influence expected just because they're from DFO or any other organization.
Q All right. Now, we all know that the Cohen Commission was announced just before that?
DR. REYNOLDS: Yes.
Q Just before the December one. And did you also hear that there was a point being taken by DFO that they did not want to be seen to be coming and influencing or undermining the work of a commission that was about to start?
DR. REYNOLDS: I don't recall the subtlety -- the nuances. I guess I'm less comfortable explaining to you exactly what the nuances were for their motivation in not attending, but in broad terms, it was as I responded earlier this morning.
Q Now, were there some organizations that sought to attend that were not in attendance at either or both the December and March conferences?
DR. REYNOLDS: I don't know.
Q Okay. Were the B.C. Salmon Farmers there, at either conference?
DR. REYNOLDS: They were not at the think-tank, the December 2009 think-tank.
Q Right.
DR. REYNOLDS: I don't recall whether they were at the Wosk Centre. That was a public -- that was a

public meeting. That was wide open to the public. Anybody could attend that one.
Q The March one you're talking about, now?
DR. REYNOLDS: The March one, yes.
Q There was another conference in June, organized by the Pacific Salmon Commission in Nanaimo, wasn't there?
DR. REYNOLDS: Yes.
Q Were you part of that?
DR. REYNOLDS: No.
Q You're a colleague of - and I'll get the name wrong, I think in part - but Professor Randall Peterman, is it?
DR. REYNOLDS: Yes.
Q And was he part of the June one?
DR. REYNOLDS: Yes.
Q And did you have discussions with him about it?
DR. REYNOLDS: I'm not sure we've ever discussed it directly.
Q Okay. Do you know whether --
MR. TAYLOR: Yes, Mr. Wallace, we're off topic, but there were questions off topic by my friend in cross.
MR. WALLACE: Mr. Commissioner, my point is that this is not, in my view, proper re-examination.
THE COMMISSIONER: I'll allow it, Mr. Taylor.
MR. TAYLOR: Allow, you said?
THE COMMISSIONER: Yes.
MR. TAYLOR: Thank you.
Q I think I can wrap this fairly quickly, now. Do you know whether DFO scientists were at the June meeting?
DR. REYNOLDS: I'm pretty sure they were. It would be very easy to verify that, by looking at the output, the document that resulted from that meeting, which was on the -- is on the commission's website.
Q Yeah, I have actually looked at the output and I'm not sure there is a list of attendees there, but I may not have the complete one. But anyhow, your recollection is that you're pretty sure there were some DFO scientists there?
DR. REYNOLDS: In fact, I am sure.
Q All right. And a fair number, then?
DR. REYNOLDS: Sorry?
Q A fair number?
DR. REYNOLDS: Well, you're -- I think they were well

represented at that meeting, is -- that is my guess. My understanding was that there was -- the restrictions did not apply to that meeting that applied to the first two, and --

Q All right.

DR. REYNOLDS: -- so I --

Q Okay.

DR. REYNOLDS: -- presumed they were probably well represented.

Q And is it fair to say, then, that at the end of the day there was a pause in attendance? There were DFO scientists at these kinds of conferences before December, you've said that, and they were there in June and onwards?

DR. REYNOLDS: Yes, there was a pause.

Q Thank you. Now, Mr. Glavin, you've already said that you're not a scientist; you are a journalist and a writer and have been for decades, including writing in this area. Is it fair to say, and I think you have said this, that you do not profess to speak to causal effect of why something is or isn't happening with regard to salmon stocks? Are you with me so far, or do you agree with that?

MR. GLAVIN: In the context of the very, very specific matter in which this was raised this morning, yeah, I'm with you with it --

Q All right.

MR. GLAVIN: -- with you on it.

Q And is it fair to say that what you really do do is you report on what is going on --

MR. GLAVIN: Yeah. Sometimes. Sometimes I actually work as an advocate for conservation organizations, but, yeah, this is where I come from.

Q But you're reporting, you're not assessing causal effect?

MR. GLAVIN: I don't think you should draw too much of a distinction between these two things in the specific matter in which this issue has arisen today. The question was about whether or not I had any expertise to make an assessment about cause and effect, which I actually didn't make, in the 2010 cycle year of Adams' sockeye. What I did is I actually referred to the scientific assessment of claims that "ecological catastrophe" and "biological disaster" were appropriate terms to be used in 2002 and 1994, I guess it was, and I

only observed - and I will resort to the language of common speech - to characterize the scientific assessment of those claims as superstitious mumbo-jumbo. I feel perfectly comfortable in using that language, not being a scientist.

Q All right. Dr. Reynolds, you were asked about maximum sustained yield earlier this morning, and I recall, or heard your evidence to be that you said some scientists are comfortable with that. Do you agree with me that the world is changing and that maximum sustained yield is no longer a governing operative approach?

DR. REYNOLDS: Yes.

MR. TAYLOR: Thank you. Those are my questions.

MR. BLAIR: For the record, Alan Blair for the B.C. Salmon Farmers Association. Mr. Commissioner, I'm seeking leave to re-examine on a very narrow area. They're questions that arose from the cross-examination of Ms. Fong.

I would like to say, generally, with respect to the question of re-examination, and I'm sure this is the end of week one, and we'll have to revisit this many times, but there's a distinct disadvantage of going early and having a variety of cross-examinations following those of us who are numbered six in the batting order for the San Francisco Giants this week. I think we're up two nothing, and we're all on the same team, I'm sure.

But by going early, of course, cross-examination arises, and without any ability to re-examine, we're somewhat hamstrung by the early part of the batting order. That's particularly so when documents are being produced without any notice, and I make that point because I'm sure all of us, including yours truly, will suffer from the need from time to time to ask for leave, but as I understand it, the rule, generally, is questions and documents to be put to people for cross-examination should have two days notice. We received no notice in some cases, and I'm sure perhaps next week I'll be asking leave because a document comes to my attention, but it further, I think, indicates the need for there to be liberal use of re-examination certainly in those situations, and that's part of the context for rising today.

Really, as well, with respect to the right of

re-examination, I should say the request, some parties are able to share their time more effectively than, I think, my client will be able to, and we saw an example very late in the piece when number 20 had a question that arose from sort of a fellow in the cause. And again, if we have no such ability to do that, we may again be looking for the request for re-examination.

With that preamble, I do have a question that comes up as a result of a cross-examination, a single area, if I may? Thank you.

CROSS-EXAMINATION BY MR. BLAIR, continuing:

Q Dr. Close, the question is for you, and it relates to the questioning from Ms. Fong just a few moments ago with respect to conservation and conservation hatcheries.

DR. CLOSE: Yes.

Q And I'm going to ask you whether or not you agree with this proposition arising out of that question. It seems, to me, that what I heard you saying, but perhaps not in quite so many words, were that hatcheries aren't necessarily the be all and end all for conservation, there may be technological abilities to advance hatcheries, but that, by itself, doesn't necessarily lead strictly towards conservation, correct?

DR. CLOSE: That's correct.

Q And in part it's because the technology, itself, doesn't replace the natural ecosystem ability to evolve salmon in a natural way?

DR. CLOSE: Well, more than that. I think the problem is -- that's one problem, but the other issue is the mindset that it gets into people's minds that we can forget about the rivers and the ecosystem and just focus on building more of these hatcheries and producing it -- and that this is all they need; the more fish we put out, the more fish we get back. And that's simply -- I don't -- I don't think that's helpful with the efforts of conservation.

Q So in fact, it's not a stretch to say that hatcheries, in some cases, can be inconsistent with conservation and biodiversity because of removing some element of genetic diversity, for example?

DR. CLOSE: It can, yes.
Q And hatchery fish can have disease, for example, which comingle with the stocks, migrating out of the river systems, and that could be a negative effect, as well?
DR. CLOSE: You could have mismanagement with hatchery systems and disease problems have, you know, they've been shown to be of issue, yeah.
Q Well, documented?
DR. CLOSE: Yeah.
MR. BLAIR: Thank you. Thank you, Mr. Commissioner.
THE COMMISSIONER: Thank you, Mr. Blair.
MR. WALLACE: Mr. Commissioner, I will forego any re-examination. I think nothing I have to ask is necessary.

I would like to make, just as we close the week, make two observations coming from Mr. Blair's comments a moment -- his preamble a moment ago. The first is, I agree that there is an issue about the order that I would be interested in hearing from participants if they think there is a better order, drawing lots, I don't know, but we may want to vary it, but I'll talk to the participants about that issue.

With respect to being surprised by documents, there's no question, and we've seen it already, that there will be circumstances where the fair thing to do is to allow someone to introduce a document that hasn't previously been brought to anyone's attention. You have the discretion, under Rule 62, to either deny, allow -- or allow that document to go in, or to put conditions on it for fairness.

The general rule is, in Rule 61, with respect to providing documents to witnesses and other participants, and the expression there is "reasonable notice", so it will depend on the context.

And that's all I have, thank you.

THE COMMISSIONER: Thank you. Ms. Gaertner?
MS. GAERTNER: Mr. Commissioner, I just have a question and a concern that I wanted to raise with respect to the proceedings, going forward. And I don't in any way intend this to be a criticism. I know people are working extremely hard and with commission staff. But as I understand it, I've received, by e-mail today, as best as can be, the

summaries for the evidence next week, including any documents that will be produced at that time. It's Friday afternoon.

I represent a large coalition of people that I have to get instructions from, and it's very difficult to get these kinds of documents so late in the day. What I'm just asking for, at this stage, is to make sure that in those situations it's clear that any witnesses that will be produced with such notice will be available at a later time should there be additional questions that will arise from it.

MR. WALLACE: Thank you. Mr. Commissioner, I am aware of the late provision of this material, and it just happens as a result of the circumstances. We had difficulties communicating and getting things back from witnesses in a timely way, and the commission turned them around today, very quickly, to get them out to participants. I'm aware, though, that that only gives the weekend for people to look at this with respect to the panel that will be here on Monday. My recollection is that we have already undertaken to recall a senior DFO panel at the end, so, in fact, there will be a further opportunity, later in the hearings, to canvass things that simply couldn't be done because of lack of notice at this time, and we will certainly endeavour to prevent any sort of unfairness and recall people, if necessary, for that purpose.

THE COMMISSIONER: Well, thank you, counsel. And in particular, I want to thank the members of the panel for making themselves available yesterday and again this morning, thank you very much.

We are adjourned, I believe, until Monday morning at 10:00 a.m.

THE REGISTRAR: This hearing is now adjourned until Monday at 10:00 a.m.

(PROCEEDINGS ADJOURNED AT 12:36 P.M. TO NOVEMBER 1, 2010 AT 10:00 A.M.)

I HEREBY CERTIFY the foregoing to be a true and accurate transcript of the evidence recorded on a sound recording apparatus, transcribed to the best of my skill and ability, and in accordance with applicable standards.

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Karen Hefferland