

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:

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Vancouver, B.C.

Thursday, July 7, 2011

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

le jeudi 7 juillet 2011

APPEARANCES / COMPARUTIONS

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No appearance	B.C. Public Service Alliance of Canada Union of Environment Workers B.C. ("BCPSAC")
No appearance	Rio Tinto Alcan Inc. ("RTAI")
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No appearance	Seafood Producers Association of B.C. ("SPABC")
Gregory McDade, Q.C.	Aquaculture Coalition: Alexandra Morton; Raincoast Research Society; Pacific Coast Wild Salmon Society ("AQUA")
Tim Leadem, Q.C.	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")
No appearance	Area D Salmon Gillnet Association; Area B Harvest Committee (Seine) ("GILLFSC")

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No appearance	Maa-nulth Treaty Society; Tsawwassen First Nation; Musqueam First Nation ("MTM")
No appearance	Western Central Coast Salish First Nations: Cowichan Tribes and Chemainus First Nation Hwlitsum First Nation and Penelakut Tribe Te'mexw Treaty Association ("WCCSFN")
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No appearance	Métis Nation British Columbia ("MNBC")

APPEARANCES / COMPARUTIONS, cont'd.

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No appearance	Musgamagw Tsawataineuk Tribal Council ("MTTC")
No appearance	Heiltsuk Tribal Council ("HTC")

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1 Vancouver, B.C./Vancouver
2 (C.-B.)
3 July 7, 2011/le 7 juillet 2011
4

5 THE REGISTRAR: Order. The hearing is now resumed.

6 MS. BAKER: Good morning, Mr. Commissioner.

7 THE COMMISSIONER: Ms. Baker.

8 MS. BAKER: Wendy Baker for the Commission, with Micah
9 Carmody. Just to bring us back in time, we're
10 completing our panel on gravel, with Ms. Julia
11 Berardinucci and Jason Hwang, and the questioner,
12 today, will be Brenda Gaertner, for the First
13 Nations Coalition, and then I think that will be
14 the completion of this evidence. Thank you.

15 THE COMMISSIONER: Thank you.

16
17 JASON HWANG, Recalled.

18
19 JULIA BERARDINUCCI, Recalled.
20

21 MS. GAERTNER: Good morning, Mr. Commissioner. Brenda
22 Gaertner, for the First Nations Coalition. And I
23 just wanted to take a moment, Mr. Commissioner,
24 there are many things and many challenges in this
25 inquiry, and I regret very much the tension that I
26 created in the room earlier this week during the
27 period of time of objections, and I appreciate
28 that I didn't hear correctly the hockey metaphor
29 that was going on, and so I overreacted, and so I
30 just wanted to extend my apology to this room and
31 to yourself for that reaction, and I'll do my best
32 to try to understand the hockey metaphors as we
33 move forward.
34

35 CROSS-EXAMINATION BY MS. GAERTNER:
36

37 Q I wanted to take us to Exhibit 1078. And Mr.
38 Commissioner, I thought this would be a good place
39 to start. I had a couple questions, but it will
40 help me to frame the questions that I have. This
41 is the present Management Committee and Technical
42 Committee structure that is being used for the
43 review and decision-making around gravel
44 applications; is that correct?

45 MS. BERARDINUCCI: Yes, it is.

46 Q Thank you. And I notice there are two chairs, and
47 I take it that those two chairs are actually

- 1 decision-makers in their own, respective
2 responsibilities; is that also correct?
- 3 MS. BERARDINUCCI: You're referring to what's labelled
4 currently as DFO --
- 5 Q Yes.
- 6 MS. BERARDINUCCI: -- and MOE chair, and they are two
7 co-chairs.
- 8 Q And they're also decision-makers with respect to
9 these applications?
- 10 MS. BERARDINUCCI: Under their own legislation, yes,
11 federal and provincial. And then --
- 12 MR. HWANG: Could I just offer a small clarification on
13 the DFO side, and I think I spoke to it during the
14 earlier portion. I signed the **Fisheries Act**
15 authorization for these works, but our decision
16 process is vetted up through the regional director
17 general and then back down for that kind of
18 approval, so there's more structure there than is
19 dictated by this org chart.
- 20 Q But in the context of this org chart, the two
21 bodies that are actually required to make a
22 decision are DFO and MOE?
- 23 MR. HWANG: Sometimes Transport has to make a decision
24 if there's a navigable waters-related issue.
- 25 Q Okay. That was exactly my question: Why was
26 Transport Canada there? So could you explain the
27 to us, Mr. Hwang?
- 28 MR. HWANG: It's pursuant to the **Navigable Waters**
29 **Protection Act**, and sometimes the works that are
30 proposed have structures like, say, a bridge
31 crossing or something like that, that may require
32 a permit under the **Navigable Waters Protection**
33 **Act**, so the purpose of these committees is to try
34 to get the agencies with the relevant legislation
35 together and coordinated so that the, I guess, the
36 activities are permitted in a bit more of an
37 organized way.
- 38 Q And Ms. Berardinucci, can you tell me why ILMB is
39 there?
- 40 MS. BERARDINUCCI: Yes. And I don't know if we'd like
41 to go back in time, but we have had organizational
42 change and new names, so for clarity's sake, I'm
43 happy to refer to the old labels, but ILMB is now
44 Forest, Lands and Natural Resource Operations, as
45 is MOE.
- 46 Q All right. And it's EMBC that's actually the
47 proponent, as distinct from the agency that is

1 making a decision; is that a fair
2 characterization?

3 MS. BERARDINUCCI: Emergency Management B.C. is a
4 proponent. And just returning to your question
5 regarding former ILMB, now FLNRO, that
6 representation on the committee is regarding Crown
7 lands and the **Provincial Land Act**.

8 Q So this is a question for both of you; I don't
9 know who best will answer this. It appeared from
10 the science panel, in particular questions that
11 were posed to Dr. Laura Rempel, that the fact that
12 these request were made -- are being made from the
13 province for public safety, weighed heavily in the
14 consideration not so much for "if" but "how" these
15 applications were going to be made. Who is
16 responsible within the province or the Department
17 of Fisheries and Oceans for assessing whether
18 they're actually necessary for public safety?

19 MR. HWANG: Within Fisheries and Oceans, we consider
20 that under the habitat side of our program, so the
21 piece that I'm involved with and that Laura is
22 involved with, and we evaluate the proposal as it
23 comes forward, on the merit that it's brought to
24 us under. So in this circumstance, because the
25 project component is the provincial agency
26 responsible for emergency management, we take that
27 with a high degree of credibility and fairly
28 seriously. We do review the rationale for the
29 project, or the projects, as they're brought
30 forward, but the basis for our validation of that,
31 it's relatively limited. We tend to accept what's
32 brought forward by this provincial agency at face
33 value.

34 Q Has it -- sorry?

35 MS. BERARDINUCCI: Can I compliment that?

36 Q Yes, please.

37 MS. BERARDINUCCI: So in the responsibility for public
38 safety in relation to Fraser River and Flood
39 Hazard Management is provincial responsibility.
40 The funding for delivering the program lies with
41 Emergency Management B.C., and the river
42 engineering hydrology expertise, as well as
43 biologists and environmental impacts expertise
44 lies with the Ministry of Forest, Lands and
45 Natural Resource Operations.

46 Q Has there ever been an application by the province
47 for gravel removal that's been refused in the,

1 let's say, the last five years or 10 years, to
2 either of your knowledge?

3 MR. HWANG: To my knowledge, not in the last five.
4 Over the last 10, I'm more uncertain. I'm not
5 sure about that.

6 MS. BERARDINUCCI: My knowledge and memory is limited
7 to my direct involvement, and the whole committee
8 structure was really brought about in order to
9 look at the literature coming in regarding
10 potential sites and to select and move forward on
11 sites that met our criteria regarding flood
12 protection, and also minimizing impacts to the
13 environment, so the whole point of it was -- is to
14 try and have that discussion early so that we
15 don't have applications come in that at the end of
16 the day end up getting refused. So a lot of those
17 discussions happen before the applications are
18 actually finalized and submitted by Emergency
19 Management B.C.

20 Q So First Nations who are weighing the potential
21 implications of this, would like to assess, from
22 their own perspective, the pros and cons
23 associated with gravel removal, who's going to
24 provide them the information necessary as it
25 relates to public safety?

26 MS. BERARDINUCCI: Emergency Management B.C. has been
27 providing the information directly as a proponent,
28 but also working on behalf of the provincial
29 government agencies in order to try and begin
30 about some rationalization of all the
31 communication coming from different agencies to
32 First Nations, so they've been taking the lead in
33 providing that information at very early stages.

34 Q And we're going to dive into that a little bit
35 more.

36 Could I now go to Exhibit 1076, please. This
37 is the letter of agreement that, as I understand
38 it, is presently with the extension more or less
39 in operation between the parties; is that correct?
40 I know you're presently working on a revision, but
41 do I have that correct?

42 MS. BERARDINUCCI: Can you please scroll down just a
43 little further? Thank you, kindly.

44 MR. HWANG: I'm not actually sure if that's the current
45 version or not. We are operating under a letter
46 of agreement that has expired, but still follow it
47 in terms of spirit and intent. I just don't

1 actually recognize this particular version of it,
2 but it's reflective of the content of the letter
3 of agreement as we understand it and follow it, I
4 think.

5 MS. BERARDINUCCI: I would concur with my fellow DFO
6 colleague. I'm struggling a little bit to place
7 this particular version in the -- in comparison to
8 the final, signed version.

9 MS. GAERTNER: Sorry, Mr. Commissioner, from the
10 evidence earlier, that's how this exhibit was
11 tendered, so that's my understanding of this
12 exhibit. So let's proceed with that, and if I'm
13 incorrect we'll try to correct the record on that.

14 Q I'd like to go to tab -- or bullet number 3 under
15 item number 1. And that bullet recognizes the
16 decisions on gravel removal must respect
17 regulatory and consultative requirements of the
18 federal and provincial government decision-makers,
19 correct?

20 MR. HWANG: Yes, from the federal side.

21 MS. BERARDINUCCI: Correct, yes, from the provincial
22 side.

23 Q Thank you. And you'll agree that that will
24 include obligations to consult with First Nations
25 who may have interests and impacts associated with
26 these gravel removals?

27 MR. HWANG: Certainly from a federal side, that's a
28 fairly standard expectation for any project that
29 we're reviewing that has a regulatory decision,
30 and this one's not treated particularly
31 differently.

32 Q And from the provincial side?

33 MS. BERARDINUCCI: Agreed, absolutely.

34 Q All right. So then can I go to Exhibit 1093.
35 This is the draft LOA, and it now says that EMBC
36 will lead the consultation on this program, if
37 I've read that right. And so I'm just trying to
38 understand, as between DFO and EMBC, who's the
39 primary lead agent for consultation with First
40 Nations regarding potential impacts of gravel
41 removal on s. 35 fishing rights? Who's the lead
42 agent?

43 MR. HWANG: I think, from the DFO perspective on this,
44 what we try to do is work cooperatively with the
45 province and the parties that are in consultative
46 exercises on this particular project, and we try
47 not to duplicate or overlap with consultation on

1 issues or specific subjects that are already being
2 attended to by the provincial government. So the
3 approach that we take on this particular file is
4 to understand what EMBC is doing in terms of their
5 consultative effort, and then we do a follow-up
6 before we issue our permit, presuming we're going
7 to issue one, to make sure that the issues that a
8 First Nation would have, have been adequately
9 considered, and if there is something that has not
10 been addressed to that point, that's our
11 opportunity to hear that and to do our best to
12 attend to it.

13 Q Do you have anything to add to that?

14 MS. BERARDINUCCI: Certainly. Yes from the provincial
15 perspective there is a consultative framework for
16 all the natural resource agencies that the
17 province has brought forward. It's been in effect
18 about one to two years, at this point, and it's
19 available on the internet, as well, for all to
20 see, and Emergency Management B.C. is working
21 under that framework and has taken the lead on
22 behalf of the provincial agencies in ensuring
23 First Nations are communicated with on the
24 applications and further discussions.

25 That doesn't preclude any of the individual
26 agencies from attending meetings or participating
27 in order to provide more information or drilling
28 down and dealing with specific issues and concerns
29 that are raised by the First Nations. So we're
30 really taking a collaborative view, but -- or
31 collaborative approach to the consultation, but
32 having one lead contact to simplify the process
33 for all the parties.

34 Q So who is that one lead contact for First Nations;
35 is it EMBC?

36 MS. BERARDINUCCI: It's Emergency Management B.C.,
37 correct.

38 Q So that's the proponent?

39 MS. BERARDINUCCI: Correct.

40 Q Not the decision-maker?

41 MS. BERARDINUCCI: Correct.

42 Q Okay. So then, now, can you explain for the
43 Commissioner and for myself, which of the agencies
44 determines the list of First Nations that are
45 going to be consulted and the basis on which it
46 will consult?

47 MS. BERARDINUCCI: From the provincial perspective,

1 there is a standardized list of all First Nations
2 and mapping of all the areas of interest that the
3 First Nations - different First Nations have put
4 forward for your consideration in ensuring that we
5 consult with them in certain areas of interest to
6 them. So that list is, again, it's available for
7 the public to see. Emergency Management B.C., MOE
8 and FLNRO are all referring to the same list, so
9 the list is determined at a, I guess -- or
10 clarified at a corporate level, and we deliver on
11 that by ensuring that all the First Nations that
12 have expressed an interest in that area are
13 consulted with.

14 Q Expressed an interest --

15 MR. HWANG: And on the DFO side, I think we generally
16 align with that, but there have been times when
17 there have been representations by different First
18 Nations entities that are reflected in the
19 provincial list, and DFO's approach is to
20 generally be open to whatever party wants to
21 represent themselves in that regard and hear what
22 their input is and attend to it as we're able and
23 as is appropriate.

24 Q Perhaps, then, we can go to Exhibit 1096, page 5
25 of 9. I just, when I was reviewing these
26 materials, I got concerned around - and if we go
27 to the section on First Nations considerations -
28 and where the concern was, and perhaps I'll just
29 raise the concern and you'll see it reflected
30 here, is are you using a determination of those
31 First Nations who have either reserves or fishing
32 sites, so geographical locations close to this, or
33 are you keeping in mind that the salmon are
34 migratory species and people, First Nations other
35 than those close to the geographic site, will have
36 an interest?

37 MS. BERARDINUCCI: Well, to speak from the provincial
38 perspective, the Ministry of Aboriginal Affairs --
39 Aboriginal Relations and Reconciliations, sorry,
40 have worked with all the First Nations and
41 obtained maps and determined their areas of
42 interest. In this particular area of the Fraser,
43 the First Nations that have an interest in this
44 area are also located on Vancouver Island.
45 Everyone who has been identified as having an --
46 who has self-identified as having an interest in
47 this area, and all the First Nations have been

1 contacted in order to create this database, are
2 contacted in the course of the referrals and the
3 discussions on these applications for gravel.

4 Q So if you then go to page 2 of 9 of the same
5 document, there's a list of the First Nations who
6 were consulted, as I understand it, and it seems
7 like quite a short list, very much located -- and,
8 for example, my client, the Chehalis First
9 Nations, is not listed there and, of course, they
10 have an interest in the migratory resources that
11 -- or migratory species that may be using these
12 gravel reaches. So could you help me understand
13 that?

14 MS. BERARDINUCCI: Can I request that it just be
15 scrolled down just a little bit further so I can
16 see the first page? And could I see further of
17 the complainants? Okay, thank you. If we could
18 please return back.

19 I'm sorry, I can't answer that question
20 directly. To the best of my knowledge and my
21 understanding, is that we've been consistent with
22 the list of First Nations that have expressed an
23 interest in this area as worked through by the
24 Ministry of Aboriginal Relations and
25 Reconciliation.

26 MR. HWANG: And from the federal side, while I can't
27 speak specifically to this particular document,
28 the approach that we take is a very inclusive
29 approach, and we recognize that there may be First
30 Nations' interests that are not immediately
31 proximal to where the gravel removal is happening
32 that could have some kind of ancillary effect from
33 these works. So I don't think we're sort of going
34 up and down the entire coast, or within the
35 provincial jurisdiction and asking everyone, but
36 where the door is open and where First Nations,
37 such as Julia mentioned, the Cowichan, have said,
38 "Hey, we've got some interest here. Can you tell
39 us what's going on? And we would like to be
40 engaged prior to decisions happening," that door
41 is open and we do our best to fulfil that
42 interest.

43 So I think we're reasonably comfortable that
44 any First Nation concern has an opportunity to be
45 presented and to be addressed through the process
46 that we have, and there's certainly no limitation
47 by way of the processes we undertake right now, so

1 no one's excluded intentionally.

2 Q And, in your view, Mr. Hwang, do you think the
3 existing processes and the timelines allow for
4 sufficient time to engage meaningfully with First
5 Nations?

6 MR. HWANG: To date, from the way we have seen concerns
7 brought forward, they seem to have been reasonably
8 addressed, the concerns that I'm aware of that
9 First Nations have tabled. They have largely not
10 been -- they've largely been addressed by way of
11 their engagement through the EMBC lead, but I
12 think, overall, whether it's First Nations or any
13 other interested party, the timelines are very
14 tight at certain phases of the permitting. But to
15 my knowledge, at this juncture, there hasn't been
16 a significant First Nations concern that has not
17 been able to be addressed to this point.

18 Q I wonder if I could go, now, to Exhibit 1094.
19 These are questions now for you, Mr. Hwang. This
20 is a memo that you prepared; is that correct?

21 MR. HWANG: Yes, that looks familiar.

22 Q Yes. And my reading of that memo was it was an
23 opportunity for you to gather context and some of
24 the challenges associated with this program and
25 make some recommendations around that; is that
26 correct?

27 MR. HWANG: Yeah, it was basically a snapshot of the
28 current status of the file for the basis of a
29 discussion I was having with the program director.

30 Q So I'm wondering if you could help me with a
31 couple of these bullets, or help us all with a
32 couple of the bullets, because in the first two
33 bullets you clearly recognize that there are late
34 applications coming in, there is not -- not have
35 been receptive to consultation with external
36 interests in the past, and significant levels of
37 concern regarding the lack of information, and
38 onward. And I wonder if you could explain to us
39 the nature of the concerns that you're having in
40 the context of this program?

41 MR. HWANG: Those bullets, in particular, are with
42 reference not to First Nations but to primarily
43 environmental non-government organizations, and
44 there has been an ongoing tension and difficulty
45 in terms of the - at least in my view - that the
46 provincial approach and the ambitions or
47 expectations of these non-governmental

1 organizations, and I think the Federal Government
2 and Provincial Government have agreed that we
3 won't necessarily be perfectly aligned on this,
4 and the points that are -- that these bullets are
5 speaking to are trying to raise that as an issue
6 of concern.

7 Because if DFO were to stand down and just
8 kind of leave the scope of engagement at the level
9 that the province is comfortable with, there would
10 be parties, in particular these non-governmental
11 organizations, that may not be as engaged as they
12 would like, and that may pose some problems for
13 DFO's regulatory decision-making. So in that
14 regard, DFO recognizes that there's a gap and we
15 do our best to, on our own accord, meet with these
16 parties that don't feel they're getting the
17 opportunities that they would like on the
18 provincial side.

19 So that's the essence behind those points.

20 Q But perhaps you might agree with me that if you're
21 getting late applications and there's challenges
22 associated with the consultative process between
23 you and the province in the exchange of
24 information, that's only going to compound the
25 consultative process with First Nations in a
26 timely manner?

27 MR. HWANG: Certainly anything that constrains the
28 timelines does make the consultative process more
29 difficult. Again, I think, on the First Nations
30 side, as far as we're aware, there has been a
31 fairly active engagement from the province,
32 particularly led through EMBC and, to date, we
33 have not seen significant problems or unreconciled
34 issues come about through the course of the
35 projects.

36 Q Now, in this memo, you also - and for some reason
37 my note doesn't have this - but you also make a
38 note about that "this file" and by that I mean --
39 I'm assuming you mean this gravel process, "may
40 follow new track for future EA's," and I want to
41 just pick up on that, because I think that's
42 important, given the best practices information we
43 had during the science panel on gravel. And
44 perhaps you can just briefly talk about the
45 potential new track for future EAs that you're
46 referring to?

47 MR. HWANG: The current EA, or environmental

1 assessment, pursuant to **CEAA**, it is -- the
2 approach that is being taken is to take the site-
3 specific sediment removal projects at EMBC tables
4 and look at those essentially as one-off, or as
5 they come, year by year, independent projects, and
6 one of the considerations that we have been
7 evaluating is, are there more effective and more
8 comprehensive ways to do those environmental
9 assessments, recognizing there's a linkage between
10 any individual sediment removal project and the
11 other sediment removal projects that will happen
12 within that reach and the projects that have
13 happened before and the projects that will happen
14 into the future, assuming that this work
15 continues.

16 So we've been contemplating things like a
17 more accumulative kind of environmental
18 assessment. My counterparts in Ottawa, who we
19 sought some advice on this, called it something
20 like a -- I think they called it a super-**CEAA**, or
21 something like that, that would be -- it would be
22 -- or super-screening, that's what it was. It
23 would be a screening that looked more
24 comprehensively at a plan to remove sediment
25 removal that may not have all the detail of any
26 given year populated, but would provide more of a
27 full context in terms of time, scope and scale of
28 the works.

29 And we haven't arrived at a landing spot for
30 that idea, at this point, but that's the concept,
31 is to take the single site-specific current
32 approach that these environmental assessments are
33 done on, and try to make it more comprehensive to
34 the timeline and the cumulative scale of these
35 projects.

36 Q So in the science panel, we heard that there were
37 suggestions by Mr. Church and otherwise in written
38 form, and Dr. Rempel endorsed these, that a
39 longer-term period for review and consideration of
40 these gravel applications would be useful. In
41 fact a minimum 10-year period was talked about.
42 And I'm wondering whether or not this super-**CEAA**
43 or some kind of approach like that, would help us
44 as a way in to develop a more tenure or longer-
45 term plan that included better baseline data,
46 measures for effectiveness, all of the kinds of
47 things that have been talked about as a best

1 practices. Is this the way through it so that we
2 can look at more cumulative and comprehensive
3 ways?

4 MR. HWANG: It may be. And the points that you
5 describe are the concepts behind considering that
6 approach. Those are the kinds of advantages or
7 benefits that not only DFO but, I think, EMBC and
8 many of the stakeholders - I use that term
9 generally - as well as First Nations, I think it
10 would address points that a number of parties have
11 raised over time in the context of this sediment-
12 removal file.

13 Q And it would help in the consultative process so
14 that we're not dealing with annual applications,
15 would actually see -- well, we probably will have,
16 still, some annual things to do, but we would see
17 the overall picture and be able to have an
18 understanding of the overall picture in a much
19 more comprehensive way; is that correct?

20 MR. HWANG: I think that's the whole -- or that's the
21 idea, if we were to land this that way, is there
22 would still be site-specific project information
23 to review on a year-by-year basis, but it would
24 come nested in a more comprehensive plan framework
25 that would have an evaluation based on a longer
26 time scale and broader sort of reach level
27 consideration of effects and impacts.

28 Q All right. I just have a couple more questions on
29 this. Would you agree that in that context, and
30 perhaps given the earlier comments this is already
31 more clearly happening, it's the proponent that
32 would be responsible for putting together the
33 materials and ensuring that First Nations have a
34 proper basis of being able to review a longer-term
35 project? So it would be EMBC that would be doing
36 that type of work?

37 MR. HWANG: Well, from DFO's end, I think they would be
38 the primary starting point for that. It's not to
39 say that that would be the entirety of that kind
40 of information exchange, but they would be the
41 first place, and probably the majority of
42 information would start with them.

43 MS. BERARDINUCCI: And to add to that, I would say,
44 again, that Emergency Management B.C., as an
45 agency of the province, is doing that work,
46 wearing the provincial agency hat and following
47 the guidelines and so it -- and meeting those

1 requirements on the behalf of the agencies that
2 are making decisions. So while Emergency
3 Management B.C. is taking the lead on providing
4 that information, they're certainly getting
5 guidance from decision-makers as to where more
6 information is required, or any other requirements
7 that we need to meet as part of the decision-
8 making process.

9 Q To the extent that DFO and EMBC and others are --
10 and other agencies are developing technical and
11 monitoring committees to consider and review
12 these, would it be useful to have First Nations
13 representatives sitting on these committees
14 directly, so that we have their input at the
15 source and while you're considering these
16 applications as distinct from responsive to
17 applications?

18 MR. HWANG: From the federal side, it's an option that
19 has been considered, and I don't think it's been
20 ruled out as a possibility. I think until we
21 develop the thinking further around what that
22 framework would look like and how it would link
23 into regulatory decision-making, I don't think
24 we're in a position to make a final recommendation
25 in that regard. But it's something that certainly
26 it's easy to see the potential benefits and
27 advantages of that, but it would still be
28 necessary to do more thinking and work before we
29 could decide if that was a viable approach or not.

30 Q And from the provincial perspective?

31 MS. BERARDINUCCI: It's one of a number of options that
32 we're considering. Where we're going to land on
33 that really needs to be an ongoing discussion with
34 the First Nations. As you can see from the
35 referrals, there's a considerable list of First
36 Nations to engage, and even represent -- going
37 back to the question that you asked regarding one
38 particular nation, I failed to note that Sto:lo
39 Tribal Council and the Sto:lo Nation represents,
40 again, a number of nations under those umbrellas.

41 We've been having, and the EMBC has been
42 having ongoing dialogue with the First Nations as
43 to how best to engage and involve them in that
44 process, and there's different ways that we could
45 do it, and that's still under discussion.

46 Q So you're open to having them sitting on these
47 monitoring and technical committees?

1 MS. BERARDINUCCI: I'm not altogether sure that these
2 committees will continue on in their present form.
3 That's part of the discussion, within the context
4 of a longer-term plan. So that why I'm not saying
5 definitively First Nations should be on those
6 committees. We're not even quite sure that those
7 are the right committees to bring us forward into
8 the future in the longer-term plan, and we're
9 discussing that, and also having that dialogue
10 with the First Nations.

11 Q All right. I just have one final question, and
12 it's a question related to Exhibit 1093. This is
13 that draft letter of agreement, again. We've had
14 it -- I was just curious about a line in this
15 letter of understanding, and I'm not going to ask
16 you for a legal opinion on it, but you'll see that
17 at the last paragraph -- sorry, first page --
18 you're right. The sixth paragraph in, there's a
19 suggestion that:

20
21 ...this agreement will fetter or impair the
22 statutory responsibilities of either agency,
23 nor abrogates or derogates from any
24 Aboriginal, treaty or other rights of
25 Aboriginal People.
26

27 As people that have been working on this letter of
28 intent and thinking -- what was your goal on that?
29 What were you -- what was the concern or the goal
30 that you were trying to achieve in that clause?

31 MR. HWANG: Well, as I can recall, it's been a while,
32 but as --

33 MR. DICKSON: Mr. Commissioner, I'm going to object to
34 that question. I think the statement speaks for
35 itself, as to what it's about.

36 MS. GAERTNER: Well, then I'll have to pursue it, then.
37 Again, this is a letter of agreement between the
38 Federal and Provincial Crown as it relates to
39 gravel applications, that have the potential for
40 impacting First Nations' rights, so what was the
41 goal in that clause?

42 MR. DICKSON: But Mr. Commissioner, the basis of the
43 objection is that this is a legal opinion with
44 respect to this agreement. It just speaks for
45 itself.

46 MS. GAERTNER: No, I appreciate --

47 MR. DICKSON: Nothing in the agreement --

1 MS. GAERTNER: -- that the legal issue may speak for
2 itself, but I'm trying to figure out what the
3 concern were from the agencies' perspectives who
4 were drafting this letter of intention between
5 them and what they were hoping to achieve, not --
6 I can appreciate that there's a legal issue there,
7 but they know they have to consult, they've
8 already talked about that, and they know they may
9 -- it may have an impact, and so I'm not sure how
10 -- what they were trying -- what you were trying
11 to do in this. I mean, if you don't know, and
12 this was recommended to you by lawyers, then fine,
13 we'll sit down, but if there's a concern that they
14 were trying to address, I think it would be useful
15 for First Nations to know that.

16 THE COMMISSIONER: Mr. Timberg, that's how I took the
17 question, was not that they were being asked to
18 give any legal view, but simply whether there was
19 something that they were directly involved in that
20 would have given rise to that clause, or their
21 understanding of that clause in terms of their
22 activities. But I'm not sure whether they were
23 involved or they have any knowledge about that.
24 But I do agree that they ought not to be giving an
25 opinion on that clause. But let's see, first of
26 all, if they have any foundation for giving an
27 answer.

28 MR. HWANG: From my recollection, Ms. Gaertner, the
29 point that we were trying to reflect here was just
30 to ensure that by way of pursuing this kind of
31 agreement, and it's important to recognize this is
32 a draft, it's never been sort of vetted through
33 the respective, you know, legal reviews and other
34 parts of the organization, but the point was not
35 to fetter or impair or compromise the statutory
36 obligations, the consultative obligations or
37 standards that any of the participating parties
38 would have.

39 So, you know, if EMBC wanted to go one way
40 and that just didn't meet the Federal Government's
41 scope of how we needed to pursue things, we were
42 free and would not be restricted by way of this
43 agreement to go and do what we thought we had to
44 do.

45 MS. GAERTNER: Thank you. That's very helpful.
46 Q Is there anything that you'd like to add from the
47 provincial perspective?

1 MS. BERARDINUCCI: Yes. I don't recall any concerns
2 that specifically led us to include -- to discuss
3 or include that clause. It's actually terminology
4 that I've seen before in other documentation when
5 you're using, again, probably suggested by legal
6 counsel at some point in drawing up these
7 documents, so that statutory decision-makers have
8 a point of reference, should there be any concerns
9 regarding fettering in any way in their decision-
10 making.

11 Q Just before I sit down, I -- the most sort of
12 useful thing, in some ways, is this possible way
13 through of looking at a 10-year plan, or looking
14 at something more comprehensive. Is there any
15 other options that are available, other than the
16 **CEAA**, that could get us there?

17 MR. HWANG: Yes, certainly. The **CEAA** is sort of a
18 component of the regulatory review process, and I
19 think the approach that we've been working on in
20 the background over the last, I don't know, eight
21 to 12 months or so, has been more of a planning-
22 based approach where the proponent, EMBC, would
23 develop this longer-term plan and then we would
24 review it under whatever the appropriate
25 regulatory frameworks and mechanisms existed so it
26 didn't necessarily require a specific tactical
27 approach under **CEAA**, the plan would just come
28 forward that way.

29 So it doesn't restrict the opportunity, only
30 within the bounds of what **CEAA**'s organization is.
31 There's other ways to approach it more
32 comprehensively.

33 Q And does the province see the value in approaching
34 it more comprehensively in developing the longer-
35 term plan?

36 MS. BERARDINUCCI: Certainly we've been trying to work
37 towards that for a number of years

38 Q And what are the limiting factors?

39 MS. BERARDINUCCI: Time. There's "X" number of staff
40 that have been assigned to the portfolio, and we
41 do the best that we can on a yearly basis, and
42 we've been struggling to find the time to plan the
43 longer-term plan in the context of also working on
44 the annual applications.

45 MS. GAERTNER: All right. Those are my questions, Mr.
46 Commissioner.

47 THE COMMISSIONER: Thank you very much, Ms. Gaertner.

17
PANEL NO. 51 (cont'd)
In chief by Ms. Baker (cont'd)

1 MS. BAKER: Thank you. The Province advises they have
2 no re-examination. Does Canada? No. So we're
3 complete on questions, thank you very much.

4 THE COMMISSIONER: All right. Ms. Berardinucci and Mr.
5 Hwang, thank you very much for making yourselves
6 available this morning and to answer Ms.

7 Gaertner's questions. Thank you very much.

8 MS. BAKER: Thank you. And Mr. Commissioner, maybe we
9 could just stand down for five minutes --

10 THE COMMISSIONER: Sure.

11 MS. BAKER: -- and come right back? Thank you.

12 THE COMMISSIONER: Thank you.

13 THE REGISTRAR: The hearing will recess for five
14 minutes.

15

16 (PROCEEDINGS ADJOURNED)

17 (PROCEEDINGS RECONVENED)

18

19 THE REGISTRAR: The hearing is now resumed.

20 THE COMMISSIONER: Thank you.

21 MS. BAKER: Thank you, Mr. Commissioner. Wendy Baker
22 again and Maia Tsurumi now with me for the marine
23 portion. We have again the witnesses, Dr.

24 Beamish, Dr. McKinnell and Dr. Welch from

25 yesterday. When we left off, I was speaking with

26 Dr. Beamish and we had Exhibit 616A on the screen.

27

28 EXAMINATION IN CHIEF BY MS. BAKER, continuing:

29

30 Q And Dr. Beamish, you indicated that you don't have

31 a great memory of this time period for reasons you

32 explained yesterday and so if we could turn to

33 page 2 of this document and it may be helpful for

34 you to see it in writing, it may not, so I won't

35 focus too much on the document. But the question

36 I just want to identify here is you'll see at the

37 -- in this document that -- under the first

38 bullet, there's a number 4, "Low food abundance in

39 the Strait of Georgia", is listed under a category

40 described as:

41

42 The following factors are unlikely to have
43 contributed to the poor 2009 returns.

44

45 Has there been a change of view then within the

46 Department as to the likely contribution of low

47 food abundance in the Strait of Georgia?

July 7, 2011

- 1 DR. BEAMISH: Well, I guess I can't speak for the
2 Department. Has there been a change? If this was
3 the Department's view, when I read that, I
4 remember that the beginning of this briefing note
5 said that the Department of Fisheries and Oceans
6 did not know what the cause was. I'm doing this
7 from memory. And if I remember that correctly
8 then the rest of this note then speculates on what
9 might have happened. So I would interpret the
10 note to indicate that they didn't have a decision
11 or they didn't know and then they made some
12 speculations. If these speculations then
13 represented the belief of someone, I think that
14 certainly there has been a change and that's
15 indicated by the workshop that was done, I
16 believe, in June of 2010. So my answer is, I
17 can't speak on behalf of the Department but I can
18 say I hope that the Department of Fisheries and
19 Oceans now accepts that there was this
20 catastrophic failure of the prey for all species
21 in the Strait of Georgia. Sorry for the long
22 answer.
- 23 Q The workshop you referred to in June of 2010, was
24 that the Pacific Salmon Commission organized
25 workshop?
- 26 DR. BEAMISH: Yes.
- 27 Q Okay. And then on this same page at the third
28 bullet down, it identifies "factors which could
29 possibly have led to a sockeye mortality". And in
30 there at number 2, it says, "Low food abundance in
31 the Queen Charlotte Sound". I take it that's not
32 been ruled out by the Department; that's still a
33 possible factor?
- 34 DR. BEAMISH: Again, I can't speak for the Department
35 but I hope that that is a recognized impact, yes.
- 36 Q Okay. I understand that there was another
37 workshop held this year on the issue of declining
38 productivity in April of 2011; is that right?
- 39 DR. BEAMISH: Yes, I think so, yeah.
- 40 Q All right. Were any research or priority
41 decisions made at that workshop following advice
42 that was discussed then?
- 43 DR. BEAMISH: Decisions made by whom?
- 44 Q The Department for research on --
- 45 DR. BEAMISH: You know, I honestly can't answer that.
46 I attended that workshop, I made a presentation
47 but everyone knew I was retiring so I was left

1 alone. I don't know what happened.

2 Q When did you retire?

3 DR. BEAMISH: May the 27th.

4 Q Okay.

5 DR. BEAMISH: Not that I'm counting.

6 Q All right. Thank you. I'd like to move now to
7 some other --

8 THE COMMISSIONER: My apologies. The document on the
9 screen --

10 MS. BAKER: Yes?

11 THE COMMISSIONER: -- is that already an exhibit?

12 MS. BAKER: It is already an exhibit. It's Exhibit
13 616A.

14 THE COMMISSIONER: Thank you very much.

15 MS. BAKER:

16 Q At Tab 18 of the Commission documents is a
17 document prepared under the North Pacific
18 Anadromous Fish Commission. That Fish Commission,
19 you've been involved in that for sometime, is that
20 right, or you were?

21 DR. BEAMISH: Yes.

22 Q I don't know if you still are.

23 DR. BEAMISH: Since 1977.

24 Q Okay. And you were involved in the creation of
25 this special publication, which describes a long-
26 term research and monitoring plan for Pacific
27 salmon; is that right?

28 DR. BEAMISH: Yes.

29 Q I think just in the interests of time I'll ask you
30 if you can turn to page 11 of this document. And
31 the text at the bottom under the photograph
32 describes at the bottom of the first column
33 paragraph:

34

35 However, the intermediate steps linking
36 salmon to climate are rarely measured
37 simultaneously. Thus, it will be necessary to
38 conduct integrated ecosystem research in
39 which physical, chemical and biological
40 components are measured together. While
41 ecosystem modelling may help to identify
42 critical processes regulating salmon
43 production, a strong emphasis should be
44 placed on data collection, as ecosystem
45 models will require large quantities of data
46 to generate realistic scenarios and
47 predictions.

1 Do you still agree with that proposition?

2 DR. BEAMISH: I sure do, I wrote it.

3 Q Okay. Can you elaborate what further research you
4 think needs to be done and how Canada can
5 participate?

6 DR. BEAMISH: How much time do we have, would you like?

7 Q If you can give us a summary, an overview, I
8 guess.

9 DR. BEAMISH: There's a number of things that I think
10 we need to do and recognizing that this all costs
11 money. This was written because there had been an
12 initiative a number of years ago that was called
13 BASIS and I can't quite remember what BASIS stands
14 for, Bering Sea something or other. And what
15 happened as a result of that initiative was that
16 salmon researchers all around the Pacific began to
17 cooperate, I say, almost like a family. And since
18 the development of that program, we all worked
19 together in a cooperative way that I think is
20 remarkable. If I want some data from a Russian
21 colleague out at sea, I can email them and they'll
22 make a measurement for me. So this provides the
23 opportunity, in my opinion, to finally understand
24 the processes that regulate salmon abundance.

25 To begin with, we proposed something in
26 addition to BASIS. BASIS was an integrated study.
27 Canada didn't really participate because we didn't
28 have ships that would go into the Bering Sea but
29 Russia, Japan and the United States participated.
30 And the attempt was to begin to understand exactly
31 what Pacific salmon are doing on the high seas in
32 terms of what regulates their abundance and
33 specifically where the particular stocks are or
34 where Canadian stocks are.

35 So one of the initiatives that we would like
36 to see is what I call an International Year of the
37 Salmon. And I know other countries would support
38 this and this is would be an integrated effort,
39 which would allow us to focus on some of the key
40 issues that we need to know about what regulates
41 salmon on the high seas. As part of an integrated
42 effort, each country would also have an integrated
43 science plan that would look at specific issues in
44 the coastal area and it wouldn't rule out
45 freshwater research. But in my opinion, it is now
46 time to do that. We have the technologies that we
47 didn't have just a few years ago. We can apply

1 DNA stock identification. We have tags such as
2 some of the things that Dr. Welch is doing. And
3 we have the ships and we have the satellite
4 support that we need. I think we have everything
5 in place to finally resolve the issues that we
6 need to know that would regular Pacific salmon
7 abundance. And that all leads to more accurate
8 forecasting.

9 Q Thank you. Dr. Welch, do you have any comments on
10 the program that's been described by Dr. Beamish,
11 whether you think that's useful and needed?

12 DR. WELCH: I generally agree with everything Dr.
13 Beamish said. The caveat that I'd put is that I
14 don't think we know the areas along the coast or
15 the offshore where the survival problems are
16 primarily occurring. So we need to bound these
17 issues because, as you've seen through the
18 testimony, we can spend an enormous amount of time
19 and money spent collecting data without
20 necessarily knowing that it's in the location
21 where it is affecting the survival of the fish.

22 So that needs to bound the problem so that
23 while those data collections are occurring, we
24 also need to make sure that we do know where the
25 survival problems are primarily being manifest so
26 that those have to go hand-in-hand if we're going
27 to be able to interpret the results. Otherwise,
28 we get into the long-term problem that we've had
29 for centuries of people picking amongst the
30 various pieces of data and putting together an
31 interpretation of what's happening without knowing
32 that it actually is where the survival problem has
33 occurred.

34 Q Okay. And Dr. McKinnell?

35 DR. MCKINNEL: I think in spirit, I support what's
36 written in the text in this paragraph although, in
37 some sense, I think that the ecological models
38 that are developed, they actually formalize or
39 quantify the state of knowledge. And so I see
40 them as being a useful adjunct to the data
41 collection system working sort of together. Two
42 comments I would like to make is that in my review
43 of the state of knowledge of Fraser sockeye at
44 sea, I came to the understanding that we need some
45 new approach to estimating salmon abundance at
46 sea. I agree with Dr. Beamish that we have made
47 remarkable steps forward in salmon science on the

1 genetic front and that has helped us tremendously
2 in trying to understand the composition of stocks.

3 The reasons that the tagging work was done in
4 the early days is that that was the way to
5 determine where the stock came from. By tagging
6 it on the high seas and then having it recovered
7 later in some fishery, you could at least
8 approximate where it was coming from.

9 So that would be my first comment is that I
10 believe there is a new area of science that needs
11 to open up about estimating abundance of salmon on
12 the high seas. I don't think boats and nets, as
13 they currently are operating, are going to be
14 adequate to do that. I had a second point and if
15 I think a minute I might recall what it is. Oh,
16 yes, it refers back to something I said yesterday,
17 that under an umbrella like this, there needs to
18 be a way to highlight what the key question is and
19 how you propose to answer it. And I think before
20 monies are invested in what will ultimately be
21 relatively expensive research, I think that you
22 need those two steps, the good question and how it
23 will be answered. Those are my two main comments.

24 Q Thank you. Dr. Beamish, did you have anything you
25 wanted to add before we move to the next topic?

26 DR. BEAMISH: No, I don't think so. We have to
27 remember that countries such as Russia and Japan,
28 but Russia, in particular, have been doing high
29 seas salmon research for 20 or 30 years or maybe
30 30 years. And I think they're very good at it and
31 they publish a lot of material. So the procedures
32 that they use, which include making abundance
33 estimates, which they use for forecasting and
34 which, in recent years, have been very accurate.
35 So I think that our ability to actually make
36 abundance estimates using ships on the high seas
37 obviously can be improved but I think it's still
38 pretty good.

39 Q At page 35 of this report in the conclusion
40 paragraph, it's identified that:

41
42 The NPAFC Science Sub-Committee should
43 determine what would be required to implement
44 the contents of this report, including
45 planning of simultaneous trawl surveys in the
46 winter. The timing, location, cost and
47 expected outcomes of these surveys need to be

1 determined.

2

3 What has happened now with that recommendation or
4 that conclusion? Has the Science sub-committee
5 begun any of that work?

6 DR. BEAMISH: Now, I think the short answer is that the
7 Science sub-committee has not done that.

8 MS. BAKER: Okay. I'd like this document marked as the
9 next exhibit, please.

10 THE REGISTRAR: Exhibit 1311.

11

12 EXHIBIT 1311: North Pacific Anadromous Fish
13 Commission Special Publication No. 1

14

15 MS. BAKER: Could I have Exhibit 47 brought up, please?
16 This document that's being brought up is the
17 Ecosystem Science Framework Policy from the
18 Department of Fisheries and Oceans. And if we
19 could just turn to page 9.

20 Q The second paragraph on the left-hand column says,
21 "Operationalized regime shifts" and it talks about
22 the need to do that:

23

24 Operationalize the concept of ecological
25 shifts to deal with large-scale shifts, such
26 as climate change.

27

28 And I wanted to know what has been done in that
29 respect by Canada to operationalize regime shifts?
30 I'm asking you, Dr. Beamish.

31 DR. BEAMISH: Well, again, I'm not always the best
32 person to be speaking on behalf of Canada or DFO.
33 This is an area of research that I've been
34 involved with myself for a number of years and the
35 difficulty in operationalizing the regime shifts,
36 which are abrupt changes in climate and ocean
37 conditions, and there are other definitions, but
38 the difficulty is that we cannot identify when a
39 regime shift changes until after a period of time.
40 And some people think maybe two, three years or
41 longer.

42 So there are two problems, in my opinion.
43 One is that we still have some question about a
44 regime, what a regime shift is, and sciences still
45 debate that issue. And the second is while a
46 large number of scientists do accept that regime
47 shifts are real, the issue of actually being able

- 1 to identify when one occurred in time to
2 operationalize the management, I don't think that
3 exists just yet. So the short answer is we have
4 not operationalized regime shifts, as far as I
5 know. And then the longer answer I gave you,
6 thanks.
- 7 MS. BAKER: Thank you. Just trying to wrap things up
8 here. This is Exhibit 1294. And pages in this
9 document. I think just if we can have the front
10 page pulled up.
- 11 Q And perhaps I can just identify that this is a
12 PowerPoint prepared for the April 2011 workshop
13 that we talked about earlier today. Is that
14 right, Dr. Beamish?
- 15 DR. BEAMISH: The April 2011 workshop?
- 16 Q That was how it was identified to me, yeah.
- 17 DR. BEAMISH: I've seen this before but I assume that's
18 right, yes.
- 19 MS. BAKER: Okay. We went to page 34 of this document
20 earlier and I'd like to move further into it
21 another, say, ten pages or so. Why don't we see
22 where that puts us? After the "new data" tabs so
23 further, another couple pages, further, further.
24 The heading we're looking for should be right
25 after this. One more. There, "Next Steps".
26 Thank you. So that's page 50.
- 27 Q This document identifies "next steps", I take it,
28 in terms of where the Department wants to focus
29 answering some questions; is that right. Dr.
30 Beamish?
- 31 DR. BEAMISH: I think so, yes.
- 32 Q Okay. So with that up on the screen, it may be
33 helpful to people, it may not be. I just wanted
34 to ask what the marine research priorities are and
35 I want to ask each of you this question. And here
36 are the two questions I want to ask all of you.
37 What are your own personal speaking marine
38 research priorities? Where would you think we
39 should be focusing research? And then secondly,
40 is there a particular location where you think the
41 research should be prioritized in the marine side?
42 So I'll start with you, Dr. Beamish.
- 43 DR. BEAMISH: For sockeye salmon?
- 44 Q Yes.
- 45 DR. BEAMISH: Looking at these items here, I agree that
46 we do need to have an estimate of the smolts
47 leaving the Fraser River. And yesterday, we

1 talked about that and I think we agreed that a
2 count at Mission that included DNA would be a very
3 useful way of doing that. There's no question
4 that we need to know how long the average juvenile
5 sockeye remains in the Strait of Georgia. That's
6 useful information. So I think that's a priority.
7 But I would put the third item as a second
8 priority. I mean we have literally hundreds of
9 millions of juvenile salmon of all species enter
10 the Strait of Georgia with large mortalities
11 occurred daily. And I think it's fair to say that
12 after a hundred years of research on Pacific
13 salmon, we still don't know what causes that
14 mortality. And I personally am convinced that we
15 can identify what causes that mortality and when
16 we do that it will make a significant difference
17 to our ability to manage salmon and particularly
18 to forecast.

19 And I guess that item that I just mentioned
20 is consistent with the fourth item, which is
21 "What's killing salmon?" And the standard
22 interpretation is the predators kill salmon but
23 certainly I think that it goes beyond predators.
24 In other words, there has to be some other
25 mechanism that results in such large mortalities
26 even in very good years. And then following up in
27 the Gulf of Alaska would be a lower priority but
28 still an important one because, as Dr. Welch has
29 already mentioned this morning, it's important to
30 know where the particular stocks are in the Gulf
31 of Alaska. I think that's it. Thank you.

32 Q Thank you. Dr. Welch?

33 DR. WELCH: I would prioritize it as a sequence of
34 areas along the coastal shelf because we know the
35 smolts migrate north so the Strait of Georgia for
36 obvious reasons that have been raised here,
37 Discovery Passage, Broughton Archipelago, Queen
38 Charlotte Strait is the second because of all of
39 the issues around potential impacts of
40 aquaculture, Queen Charlotte Sound and Hecate
41 Strait. And this gets into bilateral negotiations
42 with the U.S. but we should really look at
43 southeast Alaska as well because stocks of salmon,
44 for example, hatchery salmon where we know that
45 the survival's gone from 15 percent in the Strait
46 of Georgia for British Columbia coho in the 1970s
47 is now down to 1 percent. So an order of

1 magnitude change, an enormous change. But up in
2 Alaska, they're still up at 15 percent. So
3 there's been a very large change or reduction in
4 survival in British Columbia.

5 It's not clear. I would disagree with Dr.
6 Beamish as to how much is in the Strait of Georgia
7 versus outside, but I would phrase it as that's a
8 priority issue because we actually can't
9 discriminate between the opinions of experts as to
10 how much of the mortalities happen in the Strait
11 of Georgia. So being able to look up in southeast
12 Alaska where they have much more abundant salmon
13 stocks but much continuingly high salmon survival
14 is a very important aspect because it gives us an
15 ability to contrast with an area of good survival
16 and try to identify these issues.

17 So for the coastal phase, I would identify
18 all four of those areas as important. And then
19 the offshore and the subsequent years of life, I
20 would rank that of lower priority because it may
21 be very important but it's going to be very
22 difficult to address that and we'd want to exclude
23 the coastal zone as being of major importance
24 first. So I would put the emphasis there.

25 And I would agree also with the issue about
26 defining what is killing salmon in the marine
27 environment but you can't do that unless you
28 actually know where they're dying and have a
29 quantitative sense of that.

30 Q And Dr. McKinnell?

31 DR. MCKINNELLS: I think this is a pretty good list. To
32 start with, there's how many smolts leave the
33 Fraser? I would also add how many smolts leave
34 Georgia Strait because that's been one of the key
35 areas of debate. I would also focus not just on
36 the smolt numbers but also on the smolt quality.
37 The idea is to look at the physiological state of
38 the fish either by looking at the energy in
39 individual smolts just to what shape they're in as
40 they emigrate out of the regions.

41 Of course, we have interests in the amount of
42 time. I think that the focus on the amount of
43 time they're in Georgia Strait has been a
44 highlight right now simply because there are
45 disagreements over Dr. Beamish's sampling about
46 how representative they are and so that's why that
47 one, I think, is highlighted right now. In the

1 long-term, I'm not sure that it would be that much
2 of a highlight.

3 Where and when significant mortality occurs
4 in the marine environment I think this is key.
5 And this comes back to the point I was making
6 earlier about having a life table that includes
7 more than just total survival, that includes
8 survival at various life history stages. And that
9 would certainly help to target our research
10 efforts on some particular stage that has the
11 highest mortality.

12 What's killing salmon in the marine
13 environment? Pathogens, predators, starvation. I
14 think under this point I want to bring up an error
15 that I caused yesterday. I said that there wasn't
16 much appearance of inter-specific density-
17 dependent growth effects on maturing fish. But in
18 fact, my report was right, you see that there is
19 an effect of pink salmon abundance in the Gulf of
20 Alaska on all maturing stages, whether they're
21 jacks, age one dot twos or age one dot threes,
22 four-year-old fish or five-year-old fish on the
23 sockeye. So the pink abundance in the Gulf of
24 Alaska appears to affect the size at return of
25 Fraser River sockeye.

26 There is also an effect on the post-smolt
27 growth in the first year but I won't get into that
28 here. I've mentioned energy density.

29 I think I'd like to make a couple of general
30 recommendations. And one is an issue that I think
31 was shared by a number of researchers, who were
32 attempting to create the Commission's technical
33 reports. And that has to do with the data
34 collection management and delivery of information
35 that the Department of Fisheries collects. It was
36 very difficult to get some datasets, particularly
37 those datasets that relate to salmon biological
38 data. The oceanographic data appeared to be well-
39 managed and easy to get at. But there were
40 challenges for all of us, I think, in how the
41 Department delivers the salmon biological data
42 that it collects. And I want to point out that in
43 1903 when Charles Gilbert was hired to get some
44 understanding about sockeye returns to British
45 Columbia, he was essentially one person contracted
46 by the Province of British Columbia and he was
47 able to write annual reports on the mean size,

1 mean length, at age, for fisheries in four major
2 rivers in British Columbia. And this was a
3 contract that one person with his technician plus
4 samplers at the canneries of that era. And each
5 year a report describing all of these statistical
6 summaries was provided in printed format by the
7 Province of British Columbia.

8 If I looked at the stock assessment documents
9 that are currently on the DFO website looking for
10 information about abundance and recent assessments
11 of sockeye salmon stocks along the coast of
12 British Columbia, I think one of them was one I
13 created 12 years ago, is the most current one.
14 I'm not sure. But certainly there isn't an up-to-
15 date assessment of abundance and histories that
16 are served on the DFO website that are available
17 to researchers outside of the Department anyway.

18 I'd like to make a comment that I think there
19 needs to be some technological developments that
20 will bring salmon biology into the 21st century.
21 There are some aspects of the work of a salmon
22 biologist, such as collecting fish scales and
23 determining the age and measuring its growth from
24 scales that are very, very labour intensive. And
25 I think that science generally would be enhanced
26 by, for example, having a machine that would age
27 and determine the growth of a fish, to have 10,000
28 of them done in a day. I think it's technically
29 possible. But at least some efforts in
30 technological development need to be made. And
31 the point that Dr. Welch made about the coast-wide
32 view, it's hard.

33 In 1924 when Dr. Beamish's predecessor, Dr.
34 Clemens took over as the first paid director of
35 the Biological Institute, he attended a meeting of
36 coast-wide researchers on salmon biology,
37 recognizing that to learn some things, it's not
38 possible for Canada to do it in isolation because
39 the fish migrate between the different
40 jurisdictions. So some method of having the
41 coordination of research is certainly essential.
42 And there are some aspects of that that are now
43 being done informally by scientists along the west
44 coast but it would be nice to have some formal
45 mechanism for that to occur.

46 I think those are all of my comments.

47 MS. BAKER: Thank you. Because we're pressed for time,

1 I wanted to ask Dr. Welch about some comments Dr.
2 Beamish made on the length of time that the fish
3 were in the Strait of Georgia. But I understand
4 Canada will be going to a document that deals with
5 that. So I'm going to sit down now and let Canada
6 start its questions. Thank you.

7 MR. TIMBERG: Yes, and for the record, Tim Timberg and
8 my colleague, Geneva Grande-McNeill, for Canada.
9 Mr. Commissioner, I have 90 minutes allotted to
10 me. If we could have Exhibit 1285 - that's Dr.
11 Beamish's *curriculum vitae*, please.

12 MR. LUNN: Sorry, Mr Timberg, one more time.

13 MR. TIMBERG: Exhibit 1285.

14 MR. LUNN: Thank you.

15
16 CROSS-EXAMINATION BY MR. TIMBERG:

17
18 Q And Dr. Beamish, this is your c.v. that you
19 identified yesterday?

20 DR. BEAMISH: Yes.

21 Q And just for the record, I just wanted to clarify
22 from 1980 to 1993, you were the director of the
23 Pacific Biological Station and in 1983 you were
24 the chief scientist for Canada at the
25 International North Pacific Fisheries Commission;
26 is that correct?

27 DR. BEAMISH: Yes.

28 Q And then you were appointed in 1985, president of
29 IRIS, an organization that provides focus for
30 international recruitment studies in the sub-
31 Arctic Pacific?

32 DR. BEAMISH: Yes, and I'll just add that that was our
33 attempt to establish an organization that's now
34 called PICES. Not many people know that but
35 that's how we got started with PICES.

36 Q And PICES is where Dr. McKinnell is presently
37 working?

38 DR. BEAMISH: Absolutely. So we helped him get a job.

39 Q Thank you. And then in 1983, you were appointed
40 senior scientist, Pacific Biological Station. And
41 can you comment on the statement relationship
42 between climate and Pacific salmon abundance are
43 linked?

44 DR. BEAMISH: Yes.

45 Q Okay. And over the page. You were appointed to
46 represent Fisheries and Oceans on the new Pacific
47 Fisheries Resource Conservation Council in 1998?

1 DR. BEAMISH: Yes.

2 Q And then you were appointed a Member of the Order
3 of Canada in 1999?

4 DR. BEAMISH: Yes.

5 Q And elected to the Royal Society of Canada in
6 2001. And you became chairman of the North
7 Pacific Anadromous Fish Commission.

8 DR. BEAMISH: Chairman of the Science Committee, yes.

9 Q Okay. Thank you for that clarification. And
10 2007, you were recognized by the international
11 panel on climate change for contributing to the
12 Nobel Peace Prize for 2007?

13 DR. BEAMISH: Yeah.

14 Q And then in 2009, you were awarded an honorary
15 doctorate of science degree from Vancouver Island
16 University?

17 DR. BEAMISH: That's right.

18 Q Thank you.

19 DR. BEAMISH: Now, somewhere there I got the order of
20 British Columbia. I can't remember where.

21 Q 2004.

22 DR. BEAMISH: Okay.

23 Q Thank you.

24 DR. BEAMISH: I like the Order of British Columbia, by
25 the way. I'm sorry.

26 Q Okay. How long have you been working on studying
27 the ocean in Georgia Strait?

28 DR. BEAMISH: When I started at the Pacific Biological
29 Station, I think in '74, that's when I first
30 started working on the Strait of Georgia. And in
31 those early days, we actually did study juvenile
32 salmon. I had a colleague, Mike Healy, who still
33 publishes and he and I, although most of the work
34 was his, we did collect juvenile salmon beginning
35 in the early '70s. And then on and off up until
36 the early '90s and then a concentrated effort on
37 juvenile salmon from the early '90s to the
38 present.

39 Q And can you describe the fish surveys that you've
40 done so we can understand the work you've done on
41 boats?

42 DR. BEAMISH: This started in the late 1980s when I was
43 the director and we had a scientist who was in
44 charge of the salmon program. I think Dr.
45 McKinnell was in that program at that time,
46 although I'm not sure; I can't remember all this.
47 And one of the concerns that we had was it was

1 difficult to sample salmon with the equipment that
2 most people were using. And very quickly what
3 that means is that we needed to develop new gear
4 and the new gear we developed were these trawls
5 that everyone uses now. Dr. Welch also helped
6 develop those trawls but the Russians had been
7 using the trawls for years and I can't quite
8 remember where we got the idea from. I usually
9 the credit the Russians and say that we used a
10 scaled-down version of their trawl net. Anyhow,
11 that allowed us, including Dr. Welch and a number
12 of colleagues in the United States, to carry on, I
13 think, a much more rigorous study of juvenile
14 salmon in the ocean.

15 Q And what's the importance of collecting scientific
16 data from boats?

17 DR. BEAMISH: Oh, you know, I think one of the famous
18 Canadian oceanographers was John Tully. Not many
19 people remember this anymore. I believe it was
20 Tully that used to say that we go to sea to see.
21 And you can do only so much in your laboratory and
22 he didn't have the computers at the time but it's
23 absolutely essential that we spend time on the
24 ocean looking at the animals that we're going to
25 study. And I can tell you from my experience, and
26 I suspect Dr. Welch's and McKinnell's is the same,
27 is that every day that you spend at sea you
28 actually understand new things and see things that
29 you hadn't thought of or think of things you
30 hadn't thought of. And again, I'll go back to my
31 Russian colleagues who, for 20 or 30 years, have
32 been sending three vessels out for three to six
33 months at a time to study juvenile salmon in the
34 ocean. It's absolutely essential to understand
35 how they survive in that marine habitat.

36 Q And can you comment on the relative importance of
37 collecting data against the role of computerized
38 modelling in trying to figure out?

39 DR. BEAMISH: Well, you know, this is an interesting
40 issue. There's a saying that all models are
41 wrong, some are useful. I have colleagues, Rick
42 Thomson who thinks that I shouldn't use the word
43 "wrong" and he's probably correct. So models are
44 extremely useful and eventually the models will be
45 very reliable. But between now and then, we have
46 a lot of work to do. And so it's essential to
47 combine both the modelling and the observations

1 out at sea. I'll tell you it's rare to find an
2 individual who is good at both of those tasks.
3 Q And can you comment on what you see the role of
4 DFO and the role of universities and the role of
5 contractors in finding data and modelling? What
6 do think those different institutions should work
7 together?

8 DR. BEAMISH: I've written about this and I categorize
9 government research as being directed research,
10 which I strongly support. And properly managed
11 research in government has strong leadership that
12 identifies the key issues that need to be solved
13 essentially. And then the researchers focus on
14 those particular issues over a particular
15 timeframe. University research, again, I'm
16 generalizing, but university research is more
17 generalized, sorry, is more curiosity-based. And
18 both types of research end up, in my opinion, can
19 produce good research.

20 It's just that in government, we have a
21 responsibility to deal with commercial fisheries
22 and a number of environmental issues and I think
23 it's absolutely essential that government maintain
24 a strong research program because you need that
25 directed effort. But again, you work very
26 cooperatively with universities. Remember that
27 universities are producing the students that
28 eventually get the government jobs. So the two
29 should work closely. We do, on individual
30 projects, have improvements, I think, to be made
31 on large-scale integrated research.

32 MR. TIMBERG: Thank you. Mr. Lunn, if we could have
33 Tab 5 from Canada's binder? It's the document
34 entitled "Bottom-Up Ecosystem Trophic Dynamics
35 Determine Fish Production in the Northeast
36 Pacific", the authors being Daniel Ware and Rick
37 Thomson.

38 Q Could you identify this document for us, Dr.
39 Beamish?

40 DR. BEAMISH: Well, this was published sometime ago, if
41 I remember. I can't see the date there but maybe
42 in the '90s somewhere.

43 DR. McKINNELL: 2005.

44 DR. BEAMISH: 2005. So sorry about that. And Dan Ware
45 is no longer with us, a really good ecologist.
46 And he and Rick Thomson produced this paper. If
47 I, again, remember it correctly, it's strong

1 documentation of the importance of essentially the
2 bottom of the food chain, as we say, or the
3 production of food controlling the overall
4 abundance of fish that are higher up in the
5 trophic level. It's a well-cited document and a
6 very nice piece of research.

7 MR. TIMBERG:

8 Q So how does that theory relate to Fraser River
9 sockeye salmon of this bottom-up theory?

10 DR. BEAMISH: Well, my interpretation of how that would
11 relate is that the production of food, and you
12 know, I'll always argue that the critical time is
13 that first four-to-six weeks or four-to-eight
14 weeks. And what happens, of course, is that
15 there's several processes. This could be a very
16 long answer but I'll keep it short. And that is
17 that you have to have the optimal conditions for
18 plankton production and that's what this document
19 is talking about. And so if the optimal
20 conditions for plankton production occur in that
21 early marine period and in other areas, that's
22 reasonable, too, but in that early marine period
23 and if that production matches when the juveniles
24 enter the area where the production is, then you
25 end up with very good survival. And whether it's
26 sockeye salmon or other species, we generally
27 relate this ability of prey or food to be produced
28 at the time and in the quantity that these
29 juveniles need it in the ocean, that is the basis
30 for the overall variability that we see in the
31 overall production or abundance of, in this case,
32 juvenile sockeye.

33 MR. TIMBERG: Thank you. If that could be marked as
34 the next exhibit.

35 THE REGISTRAR: Exhibit Number 1312.

36
37 EXHIBIT 1312: Sciencexpress Research Article
38 - Bottom-Up Ecosystem Trophic Dynamics
39 Determine Fish Production in the Northeast
40 Pacific
41

42 MR. TIMBERG:

43 Q And Dr. Beamish, yesterday we heard from Dr.
44 McKinnell and Dr. Welch with respect to their
45 reports and we heard about your four expert
46 reports. Could you describe how your four expert
47 reports fit with the reports of Dr. McKinnell and

1 Dr. Welch?

2 DR. BEAMISH: Will they get a chance to rebut?

3 Q Not during my time.

4 DR. BEAMISH: Okay. Here's what I think. Even though
5 it may sound like we are far apart on some issues,
6 I'm not so sure we are. I'll start with the
7 physical side of things. We heard from Dr.
8 McKinnell that he and his colleagues identified
9 conditions in Queen Charlotte Sound that we would
10 normally associate with poor food production or
11 poor prey production. And we, in the Thomson
12 paper, found the same thing. And I think that we
13 agree that the fish that made it into Queen
14 Charlotte Sound would experience generally
15 unfavourable conditions for growth and survival.
16 Now, I'm going to put words in Dr. Welch's and Dr.
17 McKinnell's mouth there but that's what I think we
18 would agree with that. We, in the Thomson paper,
19 identified, if I remember, five variables and some
20 of which were not in the Dr. McKinnell and
21 colleagues' paper. For example, the freshwater
22 discharge from the smaller rivers.

23 I think I forgot to mention yesterday that in
24 2007, those of you that can remember that winter,
25 there was a lot of press about the lack of
26 sunlight and I think it went for months and I
27 don't think it was a record but it wasn't very
28 good. And I'd like to point out that that was the
29 year, the winter, that the trees blew down in
30 Stanley Park. And so we had these anomalous
31 conditions in the Strait of Georgia. We did have
32 low salinity. There was a bit of a break in the
33 winter of 2007, and that's in the Thomson report,
34 that provided conditions that for a very early
35 period might have produced plankton but that was
36 very short-lived.

37 So Dr. Thomson and Dr. McKinnell, they work
38 only just a hundred yards or so apart, and I
39 suspect after this exercise that the two of them
40 might find a lot of common ground in their
41 interpretations of the physical conditions. I
42 believe Dr. McKinnell used a term that footprint
43 of what he thought happened in Queen Charlotte
44 Sound would have also been in the Strait of
45 Georgia. We think that that footprint might be
46 larger than he thinks; in other words, it might be
47 a snowshoe rather than a foot. But I think that

1 the two of them might come to common ground on the
2 interpretation that this was just a dismal year
3 for the survival of sockeye and the other species
4 in the Strait of Georgia and those that moved into
5 Queen Charlotte Sound.

6 The timing is an issue because the issue
7 where the sockeye long enough in the Strait of
8 Georgia to essentially experience the poor
9 conditions in a way that would eventually lead to
10 their mortality. And so Dr. Welch has a shorter
11 time than we do, although I point out to him that
12 he does have a paper in which he, for 2007, has
13 about the same length of time that we have.

14 Q And I'll take Dr. Welch and yourself to that paper
15 shortly.

16 DR. BEAMISH: So while we seem to disagree on that and
17 we have reasons for disagreeing on that, I know
18 this year DFO is out making those measurements
19 right now and they have purse seines and a trawl
20 survey and I actually know what the data are right
21 now. And I know that we do now have been much
22 data about residence time in the Strait of
23 Georgia. So I think that those issues will also
24 be resolved but here's the bottom line, is that
25 there's variability in the survival of all species
26 of salmon, of all fish. And what we said in our
27 four papers is that the year 2007, the ocean entry
28 year 2007, was a year which we would categorize as
29 the extreme negative survival or the worst
30 survival in what I like, a hundred-year storm.
31 And it was extremely poor survival and we reported
32 for all species but it was extremely poor survival
33 because of these extreme physical conditions.
34 Now, we did not have plankton measurements but we
35 had the evidence of extremely poor conditions.

36 At the beginning of their ocean residence in
37 the Strait of Georgia and then as they continued
38 on their migration through Queen Charlotte Sound
39 and then into the Gulf of Alaska in the winter.
40 So I really don't think that the three of us would
41 disagree too much on what I just said. In other
42 words, 2007 was an absolutely dismal year for
43 juvenile salmon trying to earn a living in the
44 ocean.

45 Q Thank you.

46 DR. BEAMISH: I think we would agree with that. We
47 have some disagreements on parts of that

1 explanation.

2 Q Okay, thank you. I think I should permit Dr.
3 Welch and Dr. McKinnell to comment on that. Dr.
4 Welch, do you agree with that summary, that you're
5 not too far apart?

6 DR. WELCH: Partly but not fully. The issues that I
7 would have some still disagreement with that I'd
8 highlight here are three-fold. The first is that
9 whether the Fraser sockeye primarily died in the
10 Strait of Georgia or Queen Charlotte Strait/Sound
11 or somewhere else, is critical to the decision
12 about where the research should be focused from
13 this point forward, if there is going to be
14 additional research. I certainly don't disagree
15 with continuing the research in the Strait of
16 Georgia. The strategic concern I would have is
17 that focusing the effort there before we actually
18 know that that's where the problem is, is
19 essentially a recipe for continuing the study for
20 a hundred years if, in fact, the survival problem
21 did not happen in the Strait of Georgia because
22 there's no way to bound that study and say at what
23 point do you give up and say the focus isn't
24 correct.

25 Q If you could just answer the question. I only
26 have 90 minutes. With respect, if you could just
27 keep on track, if you could, in your answer to Mr.
28 Beamish's --

29 DR. WELCH: Well, that was the first part of the
30 comment about that.

31 Q Okay, thank you.

32 DR. WELCH: The second part Dr. McKinnell should
33 address it in more detail. But in his report, he
34 showed very high freshwater runoff in Queen
35 Charlotte Sound. So the extreme conditions also
36 occurred outside the Strait of Georgia, as well as
37 inside. So it's an interpretational issue about
38 where the survival problem happened.

39 And then finally, 2007, Dr. Beamish is
40 correct that it was a dismal year for Fraser
41 sockeye but we also had west coast of Vancouver
42 Island sockeye had a reasonable return in 2009.
43 And in 2009, we had a spectacular return of
44 Columbia River sockeye that migrated up the west
45 coast.

46 Q But you will agree they did not swim through the
47 Georgia Strait, the Columbia River smolts or

1 juvenile salmon or the west coast Vancouver Island
2 salmon?

3 DR. WELCH: They likely did not.

4 Q Right. And Dr. McKinnell?

5 DR. MCKINNEL: I would just like to point out with the
6 reference that you have on the screen right now,
7 Ware and Thomson, that they excluded migratory
8 fish like salmonids from their analysis. You'll
9 see that they talk about resident fish, which are
10 the fish that live in the coast. But in essence,
11 it was a very good piece of work that showed the
12 linkage from plankton production up through
13 zooplankton up to fish production. And so it's a
14 landmark piece of work.

15 Dr. Beamish mentioned that Queen Charlotte
16 Sound was a region for poor prey production, that
17 conditions there were associated with conditions
18 that would give rise to poor production of prey.
19 The other factor that needs to be mentioned is
20 because, as I pointed out yesterday, it was the
21 most extreme summer temperatures in the record,
22 that has a metabolic cost. A fish swimming
23 through warm surface water uses up more energy
24 just to run its metabolism than a fish swimming
25 through cold water. And so that was a point that
26 I think needed to be added to what Dr. Beamish had
27 said.

28 As for the Georgia Strait and the potential
29 for my agreement with Dr. Thomson on the nature of
30 the physics in Georgia Strait and Queen Charlotte
31 Sound, I think what I would like to do is just
32 highlight that yesterday Dr. Beamish was saying a
33 snowshoe and I'm saying a footprint. I would like
34 to point out that in some work that I did after
35 preparing the report, the rivers that were
36 discharging into the coast of British Columbia,
37 all of the ones that ranked either first or second
38 in 2007 were from Rivers Inlet north, actually
39 from Queen Charlotte Strait north, the Klinaklini,
40 the Whonnock, the Bella Coola, the Bulkley, Nass
41 and Skeena. All of those rivers had the highest
42 peak five-week discharge in the spring of 2007,
43 whereas in the Georgia Strait the Cowichan River
44 was 11th highest, the Fraser River was 17th
45 highest in the record and the Puntledge River was
46 51st highest in the record.

47 And so the point I'm making is that the

1 extremes, in my view, are not equally distributed
2 between Georgia Strait and Queen Charlotte
3 Sound/Queen Charlotte Strait region. I can use
4 the word extreme for physical conditions in Queen
5 Charlotte Strait and Sound. I cannot use that
6 word for anything that I found looking at Georgia
7 Strait.

8 Q Okay. Thank you. Do you have anything further to
9 add to that, Dr. Beamish, or I'll move on?

10 DR. BEAMISH: It's coming. We're making progress.

11 MR. TIMBERG: All right. If we could then move to
12 Exhibit 1309.

13 Q This is your paper, Dr. Beamish.

14 MR. TIMBERG: And if we could move to page 17. And
15 there's a comment here with respect to -- I think
16 I might have the wrong paper here. I think I'm
17 supposed to be in -- I'm going to leave this and
18 I'll come back after the break. I'm a bit off my
19 topic here. Could we turn, Mr. Lunn, to Canada's
20 Tab 7?

21 Q And Dr. Beamish, could you identify what this
22 document is?

23 DR. BEAMISH: I think I mentioned this yesterday. In
24 one of our papers, we refer to this in the text
25 without providing this document. This is the diet
26 composition of juvenile chinook salmon in the
27 Strait of Georgia going back to about 1998. I
28 can't actually read the bottom. So it goes back a
29 number of years and through to maybe around 2009
30 perhaps. But here's the point. This is, I think,
31 a very relevant set of data.

32 So these are juvenile chinook salmon that we
33 sample for stomach contents. And our sample sizes
34 are extremely large. We sample the fish when we
35 catch them and the person that has been doing the
36 sampling is the same person that's been doing it
37 for the entire survey. And this is in July of
38 2007 and the grey represents fish in the diet of
39 juvenile chinook salmon. And it's commonly known
40 that juvenile chinook salmon prey heavily on fish
41 in that early marine period. And of the fish that
42 they eat, and you can see that the percentage in
43 some years can be very high, 80 percent perhaps in
44 some years, but on average, 60 percent of the fish
45 that they eat are juvenile herring. Look at 2007.
46 Q Just for the record, 2009 is the far right column
47 and then 2008, 2007, so it's the third over.

1 DR. BEAMISH: All right. Thank you. So 2007 is the
2 year that these juveniles went to see and so they
3 were there, that this is the year that we're
4 talking about in the Strait of Georgia. And it's
5 yesterday I reported that there was a synchronous
6 response of all these juvenile fish in the surface
7 waters to these extremely poor conditions, unique
8 conditions. First of all, you see that it's the
9 lowest percentage of fish period in the diet and
10 no herring at all. So herring are completely
11 absent from our samples of chinook salmon. And to
12 me, that indicates that by middle of July most of
13 the juvenile herring in the Strait of Georgia were
14 dead. That's extremely important information, in
15 my opinion.

16 MR. TIMBERG: Thank you. If we could then turn to
17 Exhibit 1305. Oh, can I have that marked as an
18 exhibit, please, before we move on?

19 Q And Dr. Beamish, can you clarify that you're the
20 person who created this chart?

21 DR. BEAMISH: This chart here?

22 Q Yeah.

23 DR. BEAMISH: No, I didn't create it.

24 Q Oh, okay.

25 DR. BEAMISH: Dr. Sweeting created it.

26 Q Okay, thank you.

27 THE REGISTRAR: Exhibit Number 1313.

28 MR. TIMBERG: Thank you.

29
30 EXHIBIT 1313: Diet (% volume) for juvenile
31 chinook salmon captured in July surveys in
32 the Strait of Georgia
33

34 MR. TIMBERG: If we could then look at Exhibit 1305?
35 And this is the residence time paper. If we could
36 turn to page 14, there's a recommendation there
37 I'd like to look at.

38 Q And could you comment on the recommendation here
39 in the middle paragraph? It says:

40
41 Future research could be increased to sample
42 the migrating juveniles as they enter and
43 exit the Strait of Georgia.
44

45 Could you just sort of summarize what that
46 recommendation is there?

47 DR. BEAMISH: Well, this is similar to what we've

1 already been talking about. We said the north end
2 of the Strait of Georgia. Yesterday, I said
3 Johnstone Strait so that's where I would think
4 would be the easiest. What the recommendation is,
5 is exactly what we've been talking about this
6 morning and yesterday, is that we do need to get a
7 better understanding of essentially the timing
8 and, as Dr. McKinnell said, the abundance of
9 juvenile sockeye salmon that are leaving the
10 Strait of Georgia. And I don't think it's all
11 that difficult to do.

12 MR. TIMBERG: Okay, thank you. If we could then move
13 to Exhibit 1307? And if we could go to page 18?

14 Q This is the paper on late entry. And the last
15 sentence there recommends:

16
17 It would seem to be a valuable contribution
18 to future management to determine if there
19 are changing trends in plankton production in
20 the Strait of Georgia ecosystem.

21
22 DR. BEAMISH: This is a statement or a recommendation
23 that I've been making for a long time. And just
24 like we routinely will measure salinity and
25 temperature in the Strait of Georgia, I think it's
26 absolutely essential that we combine those routine
27 measurements with a measurement of plankton. And
28 again, we have in place, we have the vessels and
29 we have the people that can do this. There might
30 be an issue with money but even that would not be
31 all that expensive. So one of the things that I
32 think we need to do to improve our understanding
33 of not just sockeye production but all salmon
34 production is to have this ongoing plankton
35 sampling, as a routine component of what we do in
36 DFO. Now, Dr. McKinnell mentioned in his report
37 the value of making horizontal tows, which would
38 be in the top 15 or 30 metres. And I would add to
39 this statement that as well as doing the
40 traditional plankton tows in terms of
41 understanding the prey that's available for
42 juvenile salmon, sockeye in particular, you would
43 add the horizontal tows. This wouldn't cost very
44 much money.

45 MR. TIMBERG: Okay. Thank you. Before the morning
46 break, if we could just move to Exhibit 73? And
47 this is the document, "Synthesis of Evidence from

1 a Workshop on the Decline of Fraser River Sockeye
2 June 15th to 17th, 2010", that was prepared by
3 Pacific Salmon Commission and DFO.

4 Q Did you participate in this Pacific Salmon
5 Commission workshop regarding the causes of
6 decline of Fraser River sockeye salmon?

7 DR. BEAMISH: Yes, I did. And may I just point out, if
8 you look at the contributors to this report,
9 without going through the names, what's important
10 about that list is that those are recognized
11 scientists or scientists that recognized
12 contributions to salmon and from a variety of
13 locations, including the United States, and that's
14 a good selection of people in this business.

15 MR. TIMBERG: Okay. And if we could turn to page 9 of
16 this document to Table E-1?

17 Q Can you describe for the Commissioner, this is, as
18 I understand it, the table of hypotheses of likely
19 causes of the decline of Fraser River sockeye
20 salmon? And if we look at 3a, it seems like the
21 major cause there is:

22
23 Ocean conditions (physical and biological)
24 inside Georgia Strait are important overall
25 Fair indicators of contributors to the Fraser
26 sockeye situation.

27
28 Can you describe for the Commissioner your
29 understanding of how that conclusion was reached?
30 DR. BEAMISH: I mean, obviously I like this conclusion,
31 right? But in addition to my preference, this was
32 the preference of the people that participated in
33 this workshop. And they're very good scientists.
34 And they had two or three days after the papers
35 were presented, and a number of papers were
36 presented, and then this group met for several
37 days and they digested the material and discussed
38 the merits of the various interpretations and they
39 concluded that the reasons for the poor return in
40 2009 were because of the ocean conditions inside
41 the Strait of Georgia. Now, you know from our
42 papers that this concept of the critical
43 size/critical period hypothesis that conditions
44 outside of the Strait of Georgia also would have
45 contributed. But the principal problem, if you
46 want, originated within the Strait of Georgia and
47 that's what this workshop agreed to.

42
PANEL NO. 51 (cont'd)
Cross-exam by Mr. Timberg (CAN)

1 MR. TIMBERG: All right. And just while we're here, if
2 we could just turn to the next page, Mr. Lunn?

3 Q And so there were the nine hypotheses that were
4 discussed there?

5 DR. BEAMISH: Yes, and you can see that they're
6 categorized as "very likely", "likely",
7 "possible", whatever.

8 MR. TIMBERG: All right. And Mr. Commissioner, this is
9 time for the morning break.

10 THE COMMISSIONER: Thank you.

11

12 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)

13 (PROCEEDINGS RECONVENED)

14

15 THE REGISTRAR: The hearing is now resumed.

16 MR. TIMBERG: Yes, and it's Tim Timberg and Geneva
17 Grande-McNeill for Canada, continuing. Mr. Lunn,
18 could we have Exhibit 1305, and if we could go to
19 page 13? And if we could look at the second
20 paragraph there?

21

22 CROSS-EXAMINATION BY MR. TIMBERG, continuing:

23

24 Q And so, Dr. Beamish, yesterday you were talking
25 about the paper by Preikshot on the Residence Time
26 of Juvenile Fraser River Sockeye Salmon in the
27 Strait of Georgia. And you were saying that you
28 referenced a Welch *et al* paper reported that the
29 average residence time of the tagged fish and his
30 study was 26 to 34 days, which is only slightly
31 shorter than our estimate for the average
32 residence time of 35 days, that's what you were
33 referring to yesterday?

34 DR. BEAMISH: Yes, it was. I mean that's in our paper
35 and we wrote that because I considered that to be
36 very close to what his estimate very close to
37 ours.

38 MR. TIMBERG: All right. Thank you. And you cited the
39 document and last night we circulated the actual
40 source document, which we've circulated this
41 morning. And Mr. Commissioner, you should have a
42 hard copy somewhere there.

43 Q And Dr. Beamish, do you have a hard copy there of
44 Dr. Welch's paper?

45 DR. BEAMISH: I do now.

46 Q And I just note under the "Abstract", it says:

47

July 7, 2011

1 Average exit time from the Fraser River was
2 4.0-5.6 days after release, and average
3 residence time within the Strait of Georgia
4 was 25.6-34.1 days.
5

6 DR. BEAMISH: Yes.

7 Q Okay. And Dr. Welch, you can identify this
8 document?

9 DR. WELCH: I can.

10 MR. TIMBERG: And if this could be marked as the next
11 exhibit?

12 THE REGISTRAR: Exhibit Number 1314.

13 MR. TIMBERG: Thank you.
14

15 EXHIBIT 1314: Freshwater and marine
16 migration and survival of endangered Cultus
17 Lake sockeye salmon smolts using POST, a
18 large-scale acoustic telemetry array
19

20 MR. TIMBERG: If we could then turn to Exhibit 1309?
21 And if we could turn to page 18?

22 Q And at the very bottom paragraph, again, Dr.
23 Beamish, there's a discussion there with respect
24 to:
25

26 The tagged fish were about 50% larger than
27 the average smolt produced throughout the
28 drainage...
29

30 Can you just briefly explain what the significance
31 of the fact that tags are placed on larger fish is
32 to the timing issue?

33 DR. WELCH: Who are you asking the question of?

34 Q Dr. Beamish.

35 DR. BEAMISH: Sorry. Just ask me that again, please.

36 Q Oh, does tagging large fish make a difference with
37 respect to the time that they spend in Georgia
38 Strait?

39 DR. BEAMISH: We proposed that that was the case, that
40 the larger fish would probably migrate faster than
41 the average size fish and we pointed out that with
42 Dr. Welch's estimate of residence time and the
43 fact that they were larger fish, that we said that
44 that probably indicated that we were talking about
45 the same residence time.

46 Q Okay, thank you. I'd like to now switch and move
47 away from the four expert reports and ask you some

1 general questions about international science
2 organizations, Dr. Beamish.

3 MR. TIMBERG: And Mr. Lunn, if we could then move to
4 Tab 12 of Canada's binder?

5 Q And this is a document from the web describing
6 what the NPAFC is. And Dr. Beamish, could you
7 describe what the NPAFC is and what they do?

8 DR. BEAMISH: NPAFC stands for the North Pacific
9 Anadromous Fish Commission. And this is the most
10 recent organization that initially was INPFC,
11 which was the International North Pacific
12 Fisheries Commission, which I believe started in
13 1953, but I'm never a hundred percent sure of
14 dates. So NPAFC, if I remember correctly, started
15 in 1992 and it essentially was just the same
16 organization. But the organization now included
17 Russia. And then eventually, in the late '90s, if
18 I remember, then Korea joined. So it's an
19 organization now of five countries and it does two
20 things. When NPAFC was created, by agreement, all
21 of the participants agreed not to fish salmon on
22 the high seas and it's enforced. And we're very
23 good at enforcing the illegal fishing on the high
24 seas. I tell people that who don't believe this,
25 I say that if a ship is fishing illegally on the
26 high seas, they better hope that they get caught
27 by Canada or the United States because if they get
28 caught by Russia, they fire a shell through the
29 bridge first. So it's an organization that hasn't
30 completely eliminated it but is very close to
31 eliminating the high seas fishing of salmon.
32 That's the enforcement side.

33 The other side is the scientific side. And
34 this is the organization that accumulates the data
35 that Dr. McKinnell was talking about. And in
36 fact, Kate Myers, who is an author on his paper,
37 is a long-time participant in NPAFC. And in
38 addition to accumulating the catch statistics or
39 the fishery statistics for all Pacific salmon on
40 the high seas, we also carry out research. We
41 have research plans and we exchange that
42 information annually every year.

43 MR. TIMBERG: All right. Thank you. If that could be
44 marked as the next exhibit?

45 THE REGISTRAR: Exhibit Number 1315.

46
47

1 EXHIBIT 1315: North Pacific Anadromous Fish
2 Commission - About the Convention
3

4 MR. TIMBERG: If we could move to Canada's Tab 16?
5 Q And this is, again, a document from the web about
6 the Pacific Fisheries Resource Conservation
7 Council. And Dr. Beamish, could you identify this
8 document and describe what the PFRCC is?

9 DR. BEAMISH: Well, the Pacific Fisheries Resource
10 Conservation Council was established, again I
11 can't remember the date, but it's similar to the
12 organization on the east coast. It has a
13 different function than the Pacific coast because
14 it's a focus on Pacific salmon. The first
15 chairman was John Fraser. Now, isn't this
16 interesting? I'm the DFO representative on the
17 Council. Don't tell anyone, all right? And I
18 still go to the meetings. Oh, well, they'll now
19 know. The Council has produced a number of
20 reports and it's an excellent focus for Pacific
21 salmon. It's an independent council and I'm
22 pretty sure that even though the funds come from
23 the Pacific region, that the Council, technically,
24 if I remember, reports to the minister. So we are
25 an advisor to the federal minister. We were
26 initially to advise both the federal and
27 provincial ministers but I don't know if that
28 happens regularly. Anyhow, the Council is
29 diminished now, we don't have as many members and
30 there's decisions to be made about the future of
31 the Council. But they produce some excellent
32 reports and the members over the years are people
33 that are well-known in the community around here,
34 not just in Science but in First Nations and in
35 industry.

36 MR. TIMBERG: All right. Thank you. And I note for
37 the record this is their terms of reference that
38 set out their mandate and their scope. And if
39 this could be marked as the next exhibit?

40 THE REGISTRAR: Exhibit Number 1316.
41

42 EXHIBIT 1316: Pacific Fisheries Resource
43 Conservation Council Terms of Reference
44

45 MR. TIMBERG: And if we could go to Canada's Tab 8?
46 And this is a document titled "Plan for NPFC
47 Bering-Aleutian Salmon International Survey

1 (BASIS) Phase II 2009 to 2013". And then it's
2 "BASIS Working Group". And I note it's submitted
3 to the North Pacific Anadromous Fish Commission
4 and it's dated April 2009.

5 Q Earlier, Dr. Beamish, you spoke about the BASIS
6 program. And I'm wondering if this document
7 assists you to describe what the BASIS program is?

8 DR. BEAMISH: Again, I mentioned previously that BASIS
9 was a more recent work plan.

10 MR. TIMBERG: Perhaps we could move to the third page,
11 pdf? There's a project summary there.

12 DR. BEAMISH: What I'm going to say is that this is a
13 collegial commitment amongst investigators that is
14 supported by the country that they belong to. And
15 so I also forgot to tell you that in NPAFC, it's a
16 government organization, and it's run by
17 Commissioners that are actually called
18 representatives. And so everything that's done
19 within the Commission has agreement by the
20 country. So it's a formal process of agreeing to
21 the work of the Commission and to any reports.
22 For example, that report on the long-term research
23 and monitoring plan was a report that was agreed
24 to by all five countries.

25 So BASIS is a program that's supported by the
26 member countries. But BASIS is also the
27 mechanism, if you want, for scientists to
28 integrate the work that they're doing on the high
29 seas. It's a little bit tenuous in recent years
30 because of some of the financial difficulties
31 among the various member organizations. But we
32 still maintain BASIS in the sense that we have
33 symposia where we talk about the work that's going
34 on within the Bering Sea related to salmon. And
35 as I said, we have a commitment within the
36 participants to try to support each other's
37 research.

38 Q And this document here talks about research that
39 BASIS is doing on climate change and the impact on
40 salmon-carrying capacity in the Bering Sea was
41 discussed at the November 2008 symposium. And do
42 you have any update on this project?

43 DR. BEAMISH: Well, all projects like this have a
44 theme, if you want, and the theme for the recent
45 period is looking at the impacts of climate change
46 on Pacific salmon. And of course, that theme is
47 now persistent and, in fact, I think Dr. McKinnell

1 might have mentioned something about that
2 yesterday. But that's a persistent theme in just
3 about everything that we do with Pacific salmon
4 now simply because the oceans are warming. And
5 these are cold-blooded animals and they're going
6 to be affected by that warming.

7 In reality, while that's the overall theme of
8 the recent work plan or research plan, the plan
9 itself is a continuation of the work that we have
10 been doing for a number of years.

11 MR. TIMBERG: All right. Thank you. If this could be
12 marked as the next exhibit?

13 THE REGISTRAR: That'll be Exhibit 1317.

14
15 EXHIBIT 1317: Plan for NPFC Bering-Aleutian
16 Salmon International Survey (BASIS) Phase II
17 2009 to 2013 - BASIS Working Group
18

19 MR. TIMBERG: If we could go to Canada's Tab 8, please?

20 MR. LUNN: I think that's what we just marked.

21 MR. TIMBERG: Oh, sorry, I said 8; I meant 10.

22 Q And this is a document titled "American Institute
23 of Fishery Research Biologists" and it's dated
24 September/October 2010. And I note that the
25 president's message has your name "Dick Beamish,
26 November 2010". Could you identify what this
27 newsletter is, Dr. Beamish?

28 DR. BEAMISH: Well, this is an organization called the
29 American Institute of Fishery Research Biologists
30 or AIFRB. It's an old organization that I think
31 started in Seattle, Washington Fisheries, School
32 of Washington Fisheries. And about 600 members,
33 mostly in the United States, a few in Canada, and
34 I happen to be the president. The president is
35 elected so I wasn't just appointed. But we have a
36 newsletter that we send out six times a year. And
37 as president, I write about things. And this
38 particular message, one of the things that we want
39 to do is we want to initiate public debates on key
40 issues in fisheries science and, in this case,
41 fishing down the food chain. And unfortunately,
42 money rules but we now have sponsors for this and
43 we are getting close to being able to have our
44 first public debate on key issues in fisheries
45 science, probably in Washington, D.C., either this
46 year or early next year.

47 MR. TIMBERG: Thank you. If this could be marked as

1 the next exhibit?

2 THE REGISTRAR: Exhibit Number 1318.

3

4 EXHIBIT 1318: American Institute of Fishery
5 Research Biologists
6

7 MR. TIMBERG: If we could go to page 7 of this
8 document?

9 Q And there's an article here, "Sparks Fly Over
10 Theory that Volcano Caused Salmon Boom". And on
11 page 7 here, there's a statement here. I think,
12 Dr. Welch, you were involved in this interview
13 here. Are you familiar with this article here,
14 Dr. Welch?

15 DR. WELCH: Actually, it's the first time I've seen it
16 so I'll have to take a moment to read it.

17 Q Okay. This is one, two, three, four paragraphs
18 down. It says:

19

20 One way to check the idea, says David Welch
21 of Kintama Research Corporation, a marine
22 science consultancy in Nanaimo, British
23 Columbia, would be to check the scales of
24 salmon that returned in 2010 to see if they
25 experienced an unusual growth burst in the
26 autumn of 2008.

27

28 Do you recollect --

29 DR. WELCH: I wasn't aware of it being in here but,
30 yes, these are my comments.

31 Q All right. And then at the bottom of this
32 article, the second-to-last paragraph, it says:

33

34 Salmon don't eat phytoplankton: they eat
35 zooplankton and small fish, which in turn
36 feed on phytoplankton. Zooplankton take
37 months to a year to reproduce, so a single
38 big burst of food for them over 3-4 weeks
39 doesn't necessarily boost their numbers much,
40 says Welch.

41

42 Do you agree with that summary?

43 DR. WELCH: As a general statement, yes.

44 Q Okay. And over the page at the end there, this
45 article discusses that:

46

47 Some companies formed with the controversial

1 intent --

2

3 I'm on the "all this could spur", if we could have
4 that perhaps enlarged? It says:

5

6 All this could spur some to think of
7 intentionally seeding the ocean with iron to
8 boost fish numbers.

9

10 Dr. Walters is asked, "Is this a good idea?" He
11 says, "Good God, no." I'm wondering what your
12 opinion is of that idea.

13 DR. WELCH: Sorry. Give me a moment to organize my
14 thoughts simply because I've been contacted by
15 people on both sides of the debate and I need to
16 see how to think a bit about how to frame this for
17 the court. Sorry. So let's repeat your question
18 first. What are you asking me?

19 Q Well, I'm just wondering if you agree with Dr.
20 Walters' comments when asked about sea
21 fertilization. He says:

22

23 Good God no. Our experience with fertilizing
24 things is it's way too easy to fertilize the
25 wrong thing. In general, it's a pretty
26 dangerous thing to do.

27

28 DR. WELCH: All right. So no, I wouldn't agree with
29 that. First, on the freshwater side, it's been
30 common efforts for 50 years to try fertilizing in
31 freshwater to boost salmon production. So if it
32 can be done with fertilization in freshwater, then
33 there's no reason to think that we can't also at
34 least consider it on the marine side. It's a much
35 more controversial idea to fertilize using iron in
36 the Gulf of Alaska than it is to fertilize with
37 nitrate or phosphate fertilizer in the lakes,
38 however.

39 Q But this article is about fertilizing the ocean,
40 not lakes. I'm asking you about your opinion
41 about fertilizing the ocean.

42 DR. WELCH: And my opinion is that it should certainly
43 be looked at or debated but not necessarily
44 actioned without a full discussion. And as I've
45 stated, it's a much more controversial idea to do
46 in the ocean what's being routinely done in
47 freshwater.

1 MR. TIMBERG: All right. Thank you. We'll have a
2 debate on this tomorrow so I'm going to move on in
3 the interests of time. If we could move to
4 Canada's Tab 17?

5 Q Dr. Beamish, can you identify this newsletter of
6 the AIFRB dated March 11, 2011?

7 DR. BEAMISH: Well, this is another newsletter, a more
8 recent one.

9 Q And on page 1, there's a comment that you make
10 about -- I don't have the reference here but in
11 here you state that:

12
13 In the North Pacific, we are getting historic
14 high catches of Pacific salmon.

15
16 And I'm wondering if you can comment on that.
17 DR. BEAMISH: Well, you know, particularly maybe in
18 British Columbia, Washington and Oregon, the
19 popular press repeats the concern that we have for
20 salmon. There's no question that we have issues
21 with salmon in terms of their abundance and
22 survival. But in terms of the commercial catch,
23 the catches in Canada, Washington, Oregon and
24 B.C., are roughly 1 or 2 percent of the total
25 commercial catch in the Pacific. In the Pacific,
26 the total commercial catch by all countries set a
27 record high in 1995 and then it was broken again
28 in 2007 and then broken again in 2009. Pacific
29 salmon catches in the North Pacific are at
30 historic high levels and increasing. So Pacific
31 salmon, as an aggregate, mostly pink and chum, are
32 doing extremely well in the North Pacific, not
33 nearly as well, of course, in British Columbia,
34 Washington and Oregon.

35 Q And then can you perhaps relate those high catches
36 back then to Fraser River sockeye salmon to help
37 us understand what's going on?

38 DR. BEAMISH: You'll have to ask it a little bit
39 differently. I'm not sure I can answer that.

40 Q Well, if we've got historic high catches of salmon
41 in the Pacific, I'm asking you to sort of make
42 that statement and tie it back to our Fraser River
43 sockeye salmon.

44 DR. BEAMISH: So if we're getting historic high catches
45 in the Pacific, why are Fraser River sockeye
46 salmon not at historic abundances perhaps?
47 Excluding what happened in 2010 but I think the

1 issue is that pink and chum are the species that
2 make up 80 to 85 percent of the total commercial
3 catch in the North Pacific. And they are doing
4 very well. And I think most of us feel that pink
5 and chum are doing well because they are the first
6 salmon to really enter the ocean and we think that
7 the timing is more appropriate for their survival.
8 And then we have chinook and coho at the other end
9 that enter later and we are seeing trends over the
10 years that chinook and coho, in general, in, say,
11 British Columbia, are not doing as well as they
12 used to. And sockeye from the Fraser are
13 somewhere in between.

14 If you ask me my interpretation, I always say
15 that it's just very difficult to explain why
16 sockeye are performing the way they are in terms
17 of their production. But I could also suggest
18 that we're looking at sockeye from the Fraser
19 River being at the southern end of their
20 distribution and perhaps being more sensitive to
21 the variability that's associated with a changing
22 climate or changing ecosystems. But you know,
23 what I just said is speculation.

24 MR. TIMBERG: All right. Thank you. If we could then
25 move to Exhibit 553? And we'll move to page 54 of
26 that. This is Technical Report number 9.

27 MR. LUNN: Page, sorry?

28 MR. TIMBERG: Fifty-four.

29 MR. LUNN: Thank you.

30 MR. TIMBERG: Okay. And here we have the
31 recommendations from Technical Report number 9.
32 And perhaps we could just scroll through these
33 briefly so that Dr. Beamish can have a review of
34 them. And if we could just keep going down to the
35 bottom till we're finished? There's just a few
36 recommendations. And so going back --

37 DR. BEAMISH: If you could just do that one more time.
38 You can go backwards. That would be fine.

39 MR. LUNN: Thank you.

40 DR. BEAMISH: Yeah, okay.

41 MR. TIMBERG:

42 Q And have you reviewed these recommendations?

43 DR. BEAMISH: I've read them, yeah. I just wanted to
44 make sure.

45 Q And do you have any comments for the Commissioner
46 with respect to the benefit of these
47 recommendations?

1 DR. BEAMISH: Well, these are interesting
2 recommendations. They obviously will produce some
3 interesting science. They wouldn't be my top
4 priorities. We have discussed already on this
5 panel here, we've already discussed some of the
6 priorities and I think I've identified my
7 priorities already. These are interesting but
8 they're not the highest priorities, in my opinion.

9 MR. TIMBERG: All right. If we could then perhaps move
10 to Exhibit 748, which is Technical Report number
11 10? Technical Report number 10 is Fraser River
12 Sockeye Production Dynamics. And this is Randall
13 Peterman and Brigitte Dorner. If we could go to
14 page 4? And here, Peterman suggests five
15 recommendations. If we could just go through
16 those slowly.

17 Q You've reviewed this report before?

18 DR. BEAMISH: I remember these, yes.

19 Q Yeah. And what are your comments on these
20 recommendations?

21 DR. BEAMISH: Well, my comments are that, well, first
22 of all, they're nicely written. It's nice to see
23 a recommendation followed by an explanation. It's
24 nice to see a short number of recommendations.
25 Having said that, recommendation number 1 made my
26 brain hurt. I can't understand that. So I just
27 gave up on that and then I went to the other ones,
28 which I think are good. I support them all.

29 MR. TIMBERG: All right. If we could turn to page 2 of
30 this document? And if we could just scroll down?
31 Here in the bold here, we've got Peterman's sort
32 of conclusion that there's been a decrease in
33 productivity for most Fraser and many non-Fraser
34 sockeye stocks starting in the late 1980s or early
35 1990s.

36 Q Do you care to comment on how Peterman's
37 conclusion fits or connects to your four expert
38 reports?

39 DR. BEAMISH: This is a big issue. Our reports, our
40 four reports, are focused on really two years and
41 they're focused on the return years of 2009 and
42 2010. The conditions that we identified that
43 caused the extremely poor return and extremely
44 good return, we think certainly the extremely poor
45 return are virtually unique. So our papers
46 probably don't relate directly to this. Having
47 said that, I have published a paper along with

1 colleagues that identified regimes or trends in
2 sockeye stocks.

3 Now, I'll point out for everyone's benefit
4 that Dr. McKinnell has also published a paper that
5 doesn't agree with our paper. But you know,
6 that's life in the scientific community. But of
7 course, I do believe in the paper that we
8 published. And I'm mentioning this because in
9 that paper we identified that the regime or the
10 period beginning in the '90s was a period of
11 decreasing productivity of Fraser River sockeye.
12 And those decreases in productivity are
13 incremental so they occur over a period of time,
14 let's say, ten years or more. So each year, you
15 get a little bit less.

16 And my interpretation of something that's
17 incremental like that means that you're looking at
18 a climate ocean impact where you're gradually
19 seeing something change the population. So that
20 paper in a sense relates a little bit to this but
21 this is Dr. Peterman pointing out that there are
22 these trends, these natural declining trends. And
23 that's how I'd answer that.

24 MR. TIMBERG: All right. Thank you. If we could then
25 move to Canada's Tab 37? And this is a book
26 titled, "The Future of Fisheries Science in North
27 America". We have some excerpts from it. And
28 actually I want to go to Tab 38, which is the next
29 Tab 38 and for the assistance of the Commissioner,
30 Chapter 1 is a chapter by Dr. Beamish and Chapter
31 29 is an article that Dr. Beamish co-authored with
32 Dr. Brian Riddell.

33 Q And so Dr. Beamish, could you perhaps identify
34 this chapter and perhaps just provide the
35 Commissioner with a brief overview of this book?

36 DR. BEAMISH: Okay. Well, this actually was an effort
37 of the American Institute of Fisheries Research
38 Biologists with a large number of sponsors so that
39 we could have it. We invited Fisheries scientists
40 from across North America to a conference in
41 Seattle and then we had a publisher inviting us to
42 publish our presentations. And I think there was
43 34 scientists that contributed to the book.

44 The concept was to speculate on where
45 fisheries science on a diversity of topics in
46 fisheries science, where fisheries science might
47 be, say, 30 years from now. I was the editor of

1 the book, along with a person named Brian
2 Rothschild, who is a stock assessment type. I
3 think he's in Massachusetts right now. And then
4 one of the chapters was this chapter written by
5 myself and Dr. Riddell. Now, this is speculation.
6 Now, you're going to ask me questions about this
7 so I brought a copy of my book.

8 MR. TIMBERG: All right. Mr. Commissioner, this
9 chapter identifies ten issues that the authors
10 think will drive fisheries science on Canada's
11 Pacific coast over the next few years.

12 Q Before we get into those ten issues, if you could
13 just comment on the abstract with respect to this
14 chapter, as to the goal. You talk in the abstract
15 about the connection between human population
16 growth and marine aquaculture. You say:

17
18 We also know that human populations will
19 continue to grow and increase the demand for
20 seafood. Expansion of marine aquaculture and
21 ocean ranching is the only way to meet this
22 demand.
23

24 Could you comment on that statement?

25 DR. BEAMISH: Well, I think that this is generally
26 accepted. In fact, we finished the chapter with
27 ten issues that we think represent the key topics,
28 if you want, or the key issues in fisheries
29 science in British Columbia. And one of them is
30 aquaculture. And we all know that, again, I'm
31 doing this from memory, I should probably check
32 and see. Let me just check and see and so I won't
33 guess.

34 MR. TIMBERG: I'm just trying to be efficient here.
35 Why don't we just jump right through then to the
36 ten issues? It starts at page 579.

37 DR. BEAMISH: Why don't I just do aquaculture since
38 I've flipped through it?

39 Q Okay, sure. And what are you looking at?

40 DR. BEAMISH: I can just read a few sentences and I
41 just highlighted a few sentences that represent
42 these issues.

43 Q And just for the record, are you then at issues 6,
44 "Aquaculture and Ocean Ranching"?

45 DR. BEAMISH: Issue 6, page 584.

46 Q Thank you.

47 DR. BEAMISH: And I know that some people know this but

1 I'll just read a few sentences.
2

3 Approximately half of all fish consumed by
4 humans is now raised on farms. Within 25
5 years, the world population is expected to
6 consume about 83 million tons of farmed fish,
7 up from 46 million tons in 2004. A
8 limitation to the growth of aquaculture and
9 the aquafeeds industry is the virtually fixed
10 supply of fish oil and fish meal.
11

12 Now, I mentioned that this is speculation, okay?
13 And so we speculated that that production of fish
14 meal and fish oil that would be developed to
15 genetically engineer plants so that the proteins
16 that currently make up diets could be produced
17 cheaply just simply by genetically engineering
18 plants.
19

20 This technological advance will reduce the
21 cost of aquaculture resulting in a supply of
22 inexpensive seafood that is certified as safe
23 to eat and safe for the environment. With an
24 affordable and plentiful food supply of safe
25 seafood, management agencies will be able to
26 reduce fishing rates and thus rebuild
27 overfished stocks in British Columbia.
28

29 Now, again, that's speculation. But we also add
30 that British Columbia is perfectly positioned to
31 be involved in aquaculture. We have a reputation
32 for pristine waters and we have the technologies
33 and the abilities to improve our aquaculture
34 capabilities. So we think that not only will
35 aquaculture continue to increase and be a major
36 source of food on the planet, we think British
37 Columbia will be perfectly positioned to develop
38 that industry here.

39 MR. TIMBERG: All right. I'll just ask if we could
40 move to page 579.

41 Q The document speaks for itself but perhaps we
42 could go through each of the ten issues and you
43 could simply provide your highlighted comments for
44 the assistance of the Commissioner. So page 579,
45 just for the record, it says:
46

47 We selected ten issues that we think will

1 drive fisheries science on Canada's Pacific
2 coast over the next few decades.
3

4 And if you could perhaps just talk about the first
5 issue, "climate change", if there's anything
6 specific you wanted to highlight.

7 DR. BEAMISH: Well, again, we consider that climate
8 change is the major issue in fisheries science.
9 It's the underlying issue. And again, it's
10 because we are experiencing a warming of our
11 aquatic environments. It's cool for the last few
12 years but most of us think that that trend that
13 we've seen, say, for the last 40 years is going to
14 continue. Strait of Georgia, for example, has
15 warmed by about a degree in the last 30 or 40
16 years. So everything that we speculated would
17 happen in fisheries science in the future was
18 associated with the expected impacts of climate
19 change.

20 Q Okay. Thank you. I'm just cognizant of the time,
21 Dr. Beamish.

22 DR. BEAMISH: I understand.

23 Q The second issue, you talk about the Wild Salmon
24 Policy and its importance. What do you see is the
25 long-term impact on the implementation of the Wild
26 Salmon Policy, or the future impact?

27 DR. BEAMISH: I'll just read a sentence here:
28

29 While the WSP required nearly a decade of
30 drafts and public consultations, its
31 completion is timely and its effective
32 implementation is likely --
33

34 Now, we published this book before it was
35 implemented.
36

37 -- to dominate the management of Pacific
38 salmon for the next decade.
39

40 Again, there's no question that the implementation
41 of the policy is going to change how we manage
42 Pacific salmon. But we noted in the last sentence
43 of this issue that implementation of the policy
44 requires a significant commitment to better
45 monitoring and support for science. Under the
46 conditions of reducing budgets, this is a major
47 issue.

1 Q Okay. And then you comment on Issue 3, Pacific
2 Salmon Hatcheries.

3 DR. BEAMISH: Well, this is an interesting issue
4 because, as again some people know that we started
5 our hatchery program officially in 1977. And
6 overall, the hatcheries have not produced the
7 doubling of salmon catch, which was proposed. But
8 hatcheries are extremely important. First of all,
9 they have strong public support. I'm just going
10 to read a little bit again. No, I won't; I'll
11 just summarize it. Our view is that we need to
12 rethink how we use hatcheries in the overall
13 management of salmon. I personally think that
14 hatcheries can be used to enhance the production
15 of, say, chinook or coho, or species for the
16 recreational fishery, and one of the ways of doing
17 that would be to release fish later in the year
18 like we see for South Thompson chinook. So we
19 think that if hatcheries are more experimental,
20 that we probably would find overall that we would
21 see a benefit that everyone could appreciate.

22 Q And can you comment about Issue number 4, the
23 issue of certification?

24 DR. BEAMISH: Well, certification developed a few years
25 ago and this is this Marine Steward Council where
26 fisheries have to be certified as being safe
27 essentially. And we're well into that process
28 right now. But we speculated that we'll see a
29 peak in the requirement to have fisheries
30 certified. And we think that the requirement to
31 have fisheries certified served a very useful
32 purpose, or is serving, I should say, a very
33 useful purpose and it's requiring that governments
34 deal with the problem of overfishing, which, by
35 the way, is a very hard term to define. But we
36 see that governments are beginning to take this
37 issue of overfishing seriously and I think that
38 the Marine Stewardship Council deserves a lot of
39 recognition for that. But we think that with
40 time, as it becomes clear, that fisheries are
41 being better managed, that this requirement will
42 diminish or it will change into some other form.

43 Q Okay. And can you comment on Issue number 5,
44 **Species At Risk Act?**

45 DR. BEAMISH: Well, again, the **Species At Risk Act** is a
46 very important way of protecting species that
47 can't protect themselves. I have two species that

1 I've been dealing with that have been listed in
2 the Act, maybe not in the Act but have been listed
3 as needing protection. They're lamprey. No one
4 cares about them but I do. But I'll just read the
5 end of the **SARA** paragraph:
6

7 In the medium term, however, we expect that
8 SARA will be rethought and revised. An
9 ecosystem approach that establishes marine-
10 protected areas could be integrated into
11 SARA. For example, instead of establishing
12 small areas for protection, larger areas,
13 such as the entire Strait of Georgia, could
14 be a marine-protected area but with fishing
15 allowed in specific areas. A species needing
16 protection would simply not be made available
17 and would then respond naturally to the
18 changing ecosystem.
19

20 And why we wrote that is that we recognize that,
21 as the climate changes, some species are going to
22 do better and some are not and some are simply
23 going to disappear because of the changing
24 environment. And so it's not possible to protect
25 species that are essentially evolving out of the
26 system. So some of these things, well, it's an
27 excellent way of protecting animals; we think that
28 there will be some rethinking of the **Species At**
29 **Risk Act**.

30 Q And we've discussed Issue 6. Issue 7, "Ecosystem-
31 Based Management Will Lead to Regional
32 Management".

33 DR. BEAMISH: This is an issue that Dr. Riddell really
34 -- he wrote this section. And I'll just again
35 read the end of this.
36

37 A movement towards more regional management
38 structures and processes (e.g. Strategy 4 of
39 the Wild Salmon Policy) will need to ensure
40 that there are broader overall policies to
41 resolve the trade-offs between resources and
42 between users. The improved awareness of
43 what we actually know and do not know
44 probably would have the consequences of
45 reducing the amount of fishing to account for
46 uncertainty. However, as previously
47 mentioned, we anticipate a substantial added

1 value to the price of wild fish that are
2 properly handled and processed with the net
3 result of less spent on fuel and more on
4 sustainable exploitation rates.
5

6 And really what this means is that most likely, if
7 we move to a regional management, that there would
8 probably be reduced fishing effort but we're
9 expecting that the added value of providing good
10 quality wild fish would make up for that reduced
11 fishing.

12 Q All right. I think we've discussion international
13 cooperation already so I'll leave that.

14 DR. BEAMISH: Yeah.

15 Q Can you briefly just describe what the "Watson
16 Effect" is under Issue 9?

17 DR. BEAMISH: Very briefly, I'll deal with that. The
18 "Watson Effect", the name comes from Dr. Bill
19 Ricker, or the term comes from that. And Bill was
20 an avid Sherlock Holmes fan; in fact, wrote
21 Sherlock Holmes fictions. And he, if you remember
22 Sherlock Holmes' assistant, Watson, he said,
23 "Everything is simple once it's discovered." And
24 what we expect is that we will see some major
25 discoveries in the next ten to 20 years and those
26 discoveries will make some of the things that
27 we're talking about today appear to be very
28 simple.

29 Q Okay. And then Issue 10, "A New Approach to
30 Fisheries Science", and then you've got a proposal
31 for an independent board. Perhaps you could
32 briefly --

33 DR. BEAMISH: Well, this is my favourite. Now,
34 remember that this is speculation.
35

36 We suggest it's time to rethink how we do
37 fisheries science. Today, and in the past,
38 fisheries science was carried out mainly in
39 universities and governments.
40

41 We've already talked about that so I'm going to
42 skip a bit. And we talk about a new science
43 organization.
44

45 We think that the science organizations that
46 move faster and smarter in the future will
47 provide the best advice.

1 And we say that because we think that there's
2 greater variation in the issues and there's no
3 better example than the poor return in 2009 and
4 2010. And again, this is a reference of something
5 that Bill Ricker used to say about salmon, and
6 that was, that he expected to be surprised by what
7 happens to salmon. And we think those surprises
8 are going to increase in frequency. And so we
9 said that we think that the science organizations
10 that provide the best advice in the future will be
11 the ones that can respond fastest to these
12 surprises. And to do that we're suggesting don't
13 change anything. We're not suggesting we change
14 universities or government but we suggest that we
15 establish a small multidisciplinary board that
16 would be a fisheries science advisory board. And
17 it's a small board. I have a little figure here.
18 Do you have that, by any chance?

19 Q Yes, we do.

20 DR. BEAMISH: There it is, look at that. And Mr.
21 Commissioner, I don't know if you're going to
22 retire but there's a job for you on this board
23 right here. I think you would be a perfect person
24 for this board. So these are senior people in
25 business and in science, these are people that
26 have a recognized history of being able to make a
27 decision, they have no vested interest, they would
28 look and listen to the issues in fisheries science
29 that have priority and they would provide advice
30 to universities, to governments with the intent of
31 creating multidisciplinary teams that would work
32 together over a predefined period of time and they
33 would also be involved in evaluating the quality
34 of what came out of it.

35 MR. TIMBERG: Okay. Thank you. I'm over my time. I
36 have two final questions, Mr. Commissioner, and my
37 friend, Ms. Baker.

38 MS. BAKER: I'm looking strongly at him because we are
39 on a very tight schedule and Mr. Prowse is
40 scheduled to begin his questions now.

41 MR. TIMBERG: If I could be permitted to ask two
42 questions that would be appreciated.

43 DR. BEAMISH: I promise to be brief.

44 Q We've heard about salmon schooling in rivers on
45 their return. Do salmon school in the open ocean?

46 DR. BEAMISH: No, the belief is that they don't. A lot
47 of that comes from Russian science.

1 MR. TIMBERG: All right. And Mr. Lunn, if we could go
2 to Exhibit 1291, which is Technical Report number
3 4, page 177?

4 Q And Dr. McKinnell, this question is for you. You
5 state in your report that there were some peer
6 comments made but you state, at page 177:

7
8 No changes to the PICES Final Report were
9 made in response to comments by the
10 Commission's reviewers.
11

12 That's correct. You received feedback but you
13 didn't make any changes to your final report?

14 DR. MCKINNEL: That's true.

15 MR. TIMBERG: Okay. And those are my two questions.

16 Thank you.

17 MR. LUNN: Mr. Timberg, shall we mark Tab 38?

18 MR. TIMBERG: Yes, please.

19 THE REGISTRAR: Exhibit Number 1319.

20

21 EXHIBIT 1319: Chapter 29 - The Future of
22 Fisheries Science on Canada's West Coast Is
23 Keeping up with the Changes
24

25 MR. PROWSE: Yes, Mr. Commissioner, Cliff Prowse from
26 the Province of British Columbia. If we could
27 have the last exhibit?
28

29 CROSS-EXAMINATION BY MR. PROWSE:
30

31 Q There's a statement in the headnote or the
32 abstract here suggesting that climate change is
33 important but we don't understand the mechanisms,
34 is my summary. First of all, Dr. Beamish, if I've
35 paraphrased that correctly, is that your belief?

36 DR. BEAMISH: We understand portions of some
37 mechanisms. We're beginning to do that. But as a
38 general statement, I would suggest that we
39 basically don't understand the linkages between a
40 changing climate and the overall population
41 dynamics of the species that we have to manage.

42 Q And Dr. Welch?

43 DR. WELCH: Sorry, what's the question for me?

44 Q The question is whether you agree with the
45 statement that we don't understand linkages from
46 climate change to what's happening operationally
47 on the ground?

1 DR. WELCH: Yes, I agree with that.
2 Q And Dr. McKinnell?
3 DR. MCKINNELLS: I think that the details are certainly
4 unclear.
5 MR. PROWSE: All right. And Mr. Lunn, if we could have
6 a document that the Province circulated by Michael
7 Healey, "The Cumulative Impacts of Climate Change
8 on Fraser River Sockeye Salmon and Implications
9 for Management"? I think it's the link that we
10 need.
11 MR. LUNN: Thank you.
12 MR. PROWSE: So will that come up?
13 MR. LUNN: I don't think I have that document
14 available. I can see how quickly I can get it.
15 MR. PROWSE:
16 Q Perhaps I'll ask the panel, are any of you
17 familiar with Dr. Healey's 2011 paper?
18 DR. BEAMISH: I read portions of it.
19 Q And neither of the other two of you are familiar
20 with it?
21 DR. MCKINNELLS: I began reading it but when I found an
22 error in it on one of the climate aspects, I
23 stopped.
24 Q Dr. Welch?
25 DR. WELCH: And I've only skimmed it, not in detail.
26 Q First of all, Dr. Healey is a professor emeritus
27 at UBC. He's well-recognized, is he, as a
28 scientist who's interested in the ecology of
29 Pacific salmon?
30 DR. WELCH: Yes, he is.
31 Q And I think I'll come back to his article this
32 afternoon but he reaches some pretty dramatic
33 conclusions, and negative, with respect to the
34 Fraser River sockeye salmon. Perhaps, Dr.
35 McKinnell, you said you found an error in it. Do
36 you recall what that was and why you stopped
37 reading?
38 DR. MCKINNELLS: Dr. Healey described that the
39 thermocline in the Gulf of Alaska was shoaling
40 over time and cited Dr. Freeland. I visited Dr.
41 Freeland and asked him whether that was what he
42 said because it was not my recollection. And he
43 agreed that what he had said was that the mixed
44 layer depth was shoaling in the Gulf of Alaska.
45 MR. PROWSE: Here we have the article. Mr.
46 Commissioner, I would ask that this be marked as
47 the next exhibit.

1 THE COMMISSIONER: I'm going to do that, Mr. Prowse,
2 and then adjourn for the lunch break. But I'm
3 sorry, which article are you now referring to?

4 MR. PROWSE: It's "The Cumulative Impacts of Climate
5 Change on Fraser River Sockeye Salmon" by Michael
6 Healey, 2011.

7 THE COMMISSIONER: So this is the link that you had
8 mentioned earlier?

9 MR. PROWSE: Yes.

10 THE COMMISSIONER: Thank you.

11 THE REGISTRAR: 1320.

12 MR. PROWSE: Thank you.

13

14 EXHIBIT 1320: The cumulative impacts of
15 climate change on Fraser River sockeye salmon
16 and implications for management by Michael
17 Healey

18

19 THE COMMISSIONER: We'll take the break. Thank you.

20 THE REGISTRAR: The hearing is adjourned until two
21 o'clock.

22

23 (PROCEEDINGS ADJOURNED FOR NOON RECESS)

24 (PROCEEDINGS RECONVENED)

25

26 THE REGISTRAR: The hearing is now resumed.

27 THE COMMISSIONER: Mr. Prowse.

28 MR. PROWSE: Thank you, Mr. Commissioner. So could we
29 have Exhibit 1320, please, Mr. Lunn?

30

31 CROSS-EXAMINATION BY MR. PROWSE, continuing:

32

33 Q So, Dr. Beamish, I think I'll take you through
34 some of this article and see whether you agree or
35 disagree with some of the steps that are in it.
36 So the first sentence says that:

37

38 The species of Pacific salmon are
39 economically, culturally and ecologically
40 important throughout their North Pacific
41 range.

42

43 Do you agree with that?

44 DR. BEAMISH: Yes.

45

46 Q Because of this, the effects of climate
47 change in [North] Pacific salmon are of major

1 concern to resource managers.

2

3 Do you agree with that?

4 DR. BEAMISH: Yes.

5 Q

6 The freshwater and marine habitats of salmon
7 are expected to warm by 2-5 degrees...or more
8 over the next century, perhaps earlier.

9

10 What about that?

11 DR. BEAMISH: Oh, that's a model. I simply don't know
12 necessarily. I think it's probably possible.

13 Q All right.

14 DR. BEAMISH: Five may be a little bit high.

15 Q

16 This degree of warming will have uncertain
17 but potentially devastating effects on salmon
18 and their ecosystems.

19

20 Citing Beamish 2008. But perhaps mis-citing
21 Beamish in 2008. Anyway, what do you say about
22 that sentence?

23 DR. BEAMISH: The concern about that sentence is that
24 it lumps all species of salmon in one sentence,
25 and I don't think that's the best way of doing it.

26 Q And Fraser River sockeye salmon, as I understand
27 it, are particularly --

28 DR. BEAMISH: Yeah.

29 Q -- heat sensitive.

30 DR. BEAMISH: Yeah, I would agree with Fraser River
31 sockeye salmon.

32 Q Then turning to the next page, Mr. Lunn, which is
33 719 in the paragraph that starts, "The Fraser
34 River in British Columbia...". So the last couple
35 of sentences start:

36

37 Because of their commercial and cultural
38 importance, sockeye salmon in the Fraser
39 River are among the best studied of Pacific
40 salmon.

41

42 Is that correct?

43 DR. BEAMISH: Yes, probably.

44 Q The author then says that:

45

46 The wealth of information on this species
47 allows me to make relatively informed

1 judgments about the likely effects of climate
2 change.

3
4 And he says:

5
6 [The] Fraser River sockeye are thus a useful
7 model species for understanding the effects
8 of climate change.

9
10 What's your comment on those two propositions?

11 DR. BEAMISH: You could make informed -- I'm not so
12 sure the word is "judgments". It's more informed
13 speculations about the likely causes or the
14 possible causes. It's close. Dr. Healey is a
15 good scientist and he's studied salmon for a long
16 time. I think many of us are careful about being
17 categoric about the defining the responses. So,
18 in a general way, that's close to what I would
19 think, but I would be cautious about being
20 categoric.

21 Q And he, in the next paragraph, says he's
22 developing a qualitative model. So what's the
23 methodology around qualitative model? How does
24 that fit within a spectrum of scientific debate?

25 DR. BEAMISH: Well, it means he's not doing a
26 mathematical analysis or statistical analysis.
27 He's doing what most of us do. He's just thinking
28 this through.

29 Q All right. Sorry, so this is -- these are the
30 questions I didn't know whether I was going to get
31 anywhere with, so it's a natural segue.

32 MR. PROWSE: Mr. Lunn, can you pull up the second
33 article which I produced which is called, "Why
34 Most Published Research Findings are False" by
35 John Ioannidis.

36 Q So are you familiar with Dr. Ioannidis?

37 DR. BEAMISH: Well, I don't know the author.

38 Q Are you familiar with the article at all?

39 DR. BEAMISH: I did read the article. Not really
40 closely, but I did read it.

41 Q As I understand it, Dr. Ioannidis is in fact the
42 chair of Disease Prevention at Stanford University
43 and he does work in clinical research methodology
44 and evidence-based medicine with the challenges of
45 the current molecular medicine, genomics, and he
46 also is previously chair of the Department of
47 Epidemiology at medical school in Greece. So he

1 has a background in medicine and epidemiology and,
2 as I understand it, he has done 450 peer-reviewed
3 papers.

4 So part of the science of fish as we've
5 experienced in this inquiry includes the use of
6 statistics, and part of the science involves
7 epidemiology. How does that part of the science
8 fit together with the topics of climate change,
9 for example?

10 DR. BEAMISH: I'm sorry, I'm not quite clear on your
11 question.

12 Q It wasn't a very good one.

13 DR. BEAMISH: Well, I'm just not sure. You threw in
14 the word "statistics" and --

15 Q Yes.

16 DR. BEAMISH: -- when you use that word, I would pass
17 the microphone to my colleagues. I'm not a
18 statistician. I'm an old-fashioned biologist.

19 Q But you've done a chapter on the future of fishery
20 science research so --

21 DR. BEAMISH: Yes.

22 Q -- part of the future of fishery science research
23 does involve statistics and modelling, does it
24 not?

25 DR. BEAMISH: It involves modelling. Statistics is
26 commonly used in everything we do, but I'm not
27 quite sure where we're going here.

28 Q I've digressed and I think I'll retreat.

29 DR. BEAMISH: That's good.

30 MR. PROWSE: So in his article, if we can pull up page
31 729, Mr. Lunn. This is the article 1320.

32 MR. LUNN: Which article?

33 MR. PROWSE: This is the article 1320.

34 Q So he goes through what he calls cumulative
35 effects, and he's gone through the different life
36 stages and he's trying to think to build on each
37 life stage.

38 So, at number 5, we get to smolts. So I'd
39 like to take you through the points starting at
40 number 5. So he says:

41
42 Smolts will enter a warmer, less productive
43 coastal ocean where trophic relationships
44 have been disrupted by phenological changes
45 that will likely not match the phenological
46 change in smolt migration timing.
47

1 Can you comment on that sentence?

2 DR. BEAMISH: Well, yes, I think we actually mentioned
3 something about that earlier. That's simply
4 arguing that the food that's necessary for these
5 smolts to grow quickly will not be as well matched
6 with their ocean entry times. Consequently, they
7 will grow slower.

8 Again, I would agree with that, but we're
9 talking about sockeye now. I would think so.

10 Q All right. And again, he talks about zooplankton
11 and saying they'll be less suitable, and again, he
12 comes back to post-smolt growth being slower.
13 Then he builds, I think, by saying:

14
15 ...further compromising an already low
16 survival rate because of their small size at
17 ocean entry.
18

19 So his assumption is that, in the fresh water,
20 they've already got a small size at ocean entry.
21 On that assumption, do you agree with the concerns
22 about the dominant zooplankton in the warmer
23 waters causing growth problems for sockeye?

24 DR. BEAMISH: Yes, could be.

25 Q He then throws in a statement that:

26
27 Ocean acidification may also compromise the
28 abundance of important prey such as pteropod
29 mollusks.
30

31 I don't know if we talked about ocean
32 acidification.

33 DR. BEAMISH: I don't think it's been mentioned yet.

34 Q What can you tell us about ocean acidification?

35 DR. BEAMISH: I'm not an expert on ocean acidification;
36 maybe my colleagues are. But ocean acidification,
37 of course, is a consequence of global warming in
38 which we are already seeing -- and remember that
39 the ocean has a basic pH so it's not in the acid
40 range. But the pH, or hydrogen ion content is
41 increasing which is reducing the pH and we are
42 observing some acidification in the world oceans
43 and scientists are concerned about that.

44 Q Point 6 then, he moves on to say that:

45
46 Poor growth in coastal waters will carry
47 forward into the oceanic phase. Suitable

1 thermal habitats in the North Pacific will be
2 pushed north by global warming so that fish
3 will be concentrated into a smaller area of
4 ocean and feeding competition will be
5 greater.
6

7 I think we heard something about that in the last
8 couple of days.

9 DR. BEAMISH: Well, actually Dr. Welch is the expert on
10 it. He's been writing about that. Dr. McKinnell
11 also wrote about it. I don't think the two of
12 them necessarily agree, but they're beside me
13 here.

14 Q Dr. Welch, do you care to comment?

15 DR. WELCH: Could you rephrase the question again?

16 Q Well, the concern is that:

17
18 ...suitable thermal habitats in the North
19 Pacific will be pushed north by global
20 warming...
21

22 DR. WELCH: Yeah, I've reviewed a recent paper for one
23 of the journals where the authors looked at the
24 most recent group of global warming models and
25 they all indicate that projections from the
26 original models are still consistent. There might
27 be a 10- or 20-year difference in the time that a
28 temperature reaches into the Bering Sea instead of
29 the North Pacific, but they're not showing
30 anything qualitatively different from the early
31 models.

32 MR. PROWSE: Now at page 730, Mr. Lunn.

33 Q After going through another several steps in the
34 analysis, he says:

35
36 If global warming can be stopped before a
37 critical stage is reached, the Fraser River
38 system will eventually settle into a new
39 regime of production. However, on the basis
40 of present evidence, it seems doubtful that
41 the new regime would involve substantial
42 commercial production of salmon. Indeed, it
43 seems more likely that many Fraser River
44 sockeye populations will be extirpated, and
45 those that remain will be in a tenuous
46 position.
47

1 So, Dr. Welch, can you shed hopeful perspectives
2 on that statement?

3 DR. WELCH: Unfortunately no. I agree with him
4 completely.

5 Q Dr. Beamish?

6 DR. BEAMISH: The only issue here is the time frame and
7 that's relevant, but taken at face value, that
8 statement is fine. But the time frame is
9 extremely important and that's missing here.

10 Q Dr. McKinnell, as I understand it, weather effects
11 have contributed to the 2009 problems with Fraser
12 River sockeye salmon, that it's the subject of
13 Technical Report 4; is that correct?

14 DR. MCKINNEL: No, I would use the word "climate", not
15 weather, because climate is the average of weather
16 and this was an average over a period of time.

17 Q So it follows, then, that unusual climate
18 conditions affected 2009 sockeye salmon, the
19 abundance of it; is that correct?

20 DR. MCKINNEL: It created the conditions that could
21 potentially affect their mortality.

22 Q But don't we know that something did affect their
23 mortality?

24 DR. MCKINNEL: Yes.

25 Q And your evidence is that the warm surface layer,
26 the low salinity, the heated-up water, the fact
27 that the fish used up more energy when the water
28 is warm and that the mixed layer wasn't as deep
29 as with the low salinity all contributed to the
30 2009 failure; isn't that correct?

31 DR. MCKINNEL: They were conditions that could have
32 caused the 2009 failure, yes. But nobody saw the
33 fish die.

34 MR. PROWSE: All right. Apparently I was going to ask
35 about the volcano, but I'll have to leave that for
36 somebody else, Mr. Commissioner. Thank you.

37 MS. BAKER: The next counsel is Alan Blair.

38 MR. BLAIR: Mr. Commissioner, for the record, Alan
39 Blair, counsel for the B.C. Salmon Farmers
40 Association, and assisting me is Shane Hopkins-
41 Utter.

42

43 CROSS-EXAMINATION BY MR. BLAIR:

44

45 Q Gentlemen, I'm going to try to, to start with,
46 pick up where counsel for Canada, Mr. Timberg,
47 started this morning when he put a proposition to

1 the three of you really asking you to comment on
2 the evidence that some of you had given yesterday.
3 If I was a scorekeeper at a baseball game, I'd say
4 he got two out of three. Dr. Welch managed to
5 slip away and didn't maybe answer the question as
6 directly as I'd like to come back to (sic), so
7 I'll come back to you, Dr. Welch, and there's a
8 warning.

9 But just to set the scene for what I'm
10 getting at is yesterday we heard evidence from Dr.
11 Beamish, and I'm going to summarize it and I'll
12 invite Dr. Beamish to correct me if I'm wrong.
13 Then I'm going to summarize some evidence that I
14 think I heard from Dr. McKinnell and I'll invite
15 him to correct me if my summary is wrong.

16 My point of this exercise - and I wish to
17 draw Dr. Welch in as well if we can - is to find
18 the consensus or agreement around some basic
19 facts, because, of course, Mr. Commissioner's job
20 is to find some consensus around some basic facts
21 and ultimately make some recommendations to deal
22 with this issue that we're all examining.

23 Much of the tenor of the discussion that I've
24 been listening to for the last day and a half now
25 is three very highly qualified men who, in
26 aggregate, must have 400 years of experience,
27 given the number of scientific publications you've
28 all authored and co-authored, but to try to help
29 those of us who are not scientists understand
30 where you agree. So here's my basic premise:

31 Yesterday I heard Dr. Beamish indicate that,
32 in his work -- in particular I'm referring to the
33 summer of 2007. In his work in the summer of
34 2007, but also drawing upon his experience from
35 doing field work, trawls through the Strait of
36 Georgia. He sampled fish and across a wide
37 spectrum of species, herring as well as a number
38 of different species of salmon. He found fish
39 with empty bellies. He found fish that were
40 stressed from lack of food, and not only from the
41 empty bellies, but he gave some evidence yesterday
42 about some other indicia he saw when he examined
43 the fish closely.

44 Now, that summary - I'll invite Dr. Beamish
45 in a moment to correct me if I have that general
46 proposition wrong - wasn't, as I heard it,
47 contradicted by either of the other two members of

1 the panel.

2 I'm going to jump now to the other part of my
3 premise. Dr. McKinnell, both yesterday and then I
4 thought very well again this morning, when Mr.
5 Timberg asked the question, gave his evidence
6 again about the effect in the Queen Charlotte
7 Strait and Queen Charlotte Sound, and yesterday,
8 Dr. McKinnell, you used two words, "chemical" and
9 "physical", observations that you made in that
10 area sort of northeast, I guess, east of the north
11 end of Vancouver Island in the areas that I
12 referred to.

13 Of course, you notably didn't say
14 "biological" in part of that answer. You may
15 recall, but you were giving evidence with respect
16 to the chemical and physical properties that you
17 observed.

18 My premise to the three of you is that I
19 don't think anything that I heard Dr. McKinnell
20 say yesterday was contradicted by Dr. Beamish, and
21 I didn't think I heard anything that Dr. Beamish
22 said yesterday with respect to his trawls in the
23 Strait of Georgia was contradicted by Dr.
24 McKinnell. I just want to know whether the three
25 of you all agree with those basic premises; that
26 is, that Dr. Beamish's evidence around fish with
27 empty bellies in the Strait of Georgia was a sign
28 of some issues with respect to food and that they
29 were stressed. Dr. Beamish, have I caught the nub
30 of your 2007 trawls? They were hungry fish,
31 stressed by that event?

32 DR. BEAMISH: I like the term "hungry fish" better than
33 "empty bellies", but more or less, yes.

34 Q All right. And, Dr. McKinnell, did I capture the
35 essence of your summary when you said, showing
36 that exhibit with the three red dots showing those
37 three points of latitude and longitude, and the
38 summary we had you explain again this morning,
39 warm water not really conducive to young migrating
40 salmon, that you were discussing the chemical and
41 physical properties of that water? Did I
42 summarize that? Today, you used the example that
43 it was an extreme event.

44 DR. MCKINNEL: The only nature in which chemistry came
45 to play was if we consider salt, which is the
46 salinity issue, so, yeah.

47 Q It was mostly physical properties you were

1 speaking of?

2 DR. McKINNELL: Yes.

3 Q You did use the word "chemical" and "physical"
4 yesterday. You might recall that?

5 DR. McKINNELL: That's probably true, but the chemical
6 is salt.

7 Q All right. So my question for all of you is do
8 you all agree -- is there any reason to disagree
9 with your learned colleagues to your left and
10 right on those premises? In other words, I see
11 them as not competing theories. I'm not asking
12 you which most likely caused a reduction of fish,
13 just that do you accept the expertise of your
14 colleagues on the panel and find no conflict in
15 those basic conclusions?

16 I think -- I'm going to get back to you, Dr.
17 Welch, because I think Mr. Timberg got you most of
18 the way there. I think I heard Dr. Beamish say,
19 yes, I accept that summary of Dr. McKinnell, and I
20 think I heard Dr. McKinnell this morning saying,
21 yes, I understand what Dr. Beamish said and I
22 don't quarrel with that assessment. So firstly,
23 the doctors on the two bookends, is that fair?
24 Dr. McKinnell, you don't quarrel with the
25 conclusion reached by Dr. Beamish about his Strait
26 of Georgia trawl?

27 DR. McKINNELL: That's a rather broad question, and I
28 would like a specific point raised where I could
29 give a yes or no answer.

30 Q Okay. Dr. Beamish's evidence is that the fish
31 that he tested didn't have enough food in them,
32 that they were strained and stressed as a result
33 of that. That was his evidence as I understand
34 it. You've no reason to question that?

35 DR. McKINNELL: I think that's an inference.

36 Q Well, he --

37 DR. McKINNELL: No measures of the energy density in
38 the fish, the actual amount of energy that these
39 fish had, were ever made.

40 Q Well, let me come back to Dr. Beamish, because
41 this is a panel, and I intend to, at least at the
42 beginning, to treat you as a panel and we're going
43 to have some -- I think on CBC radio, they call it
44 the bare-knuckle round, but we'll try to do it
45 with gloves on.

46 Dr. Beamish, maybe we're splitting hairs, but
47 the fish that you looked at that you were

1 concerned about the state of the -- the physical
2 state of those fish and the amount of food that
3 they appeared to you not to have been able to
4 consume, correct?
5 DR. BEAMISH: The fish were small. Where we measured
6 condition, it was abnormally low, and yeah, so
7 that is -- and chinook and coho had the highest
8 percentage of empty stomachs in there, for coho,
9 chinook, except for one year. So you combine
10 those three things and the interpretation is
11 exactly what you said, is that they were stressed
12 in terms of their ability to grow normally. So I
13 agree with you.
14 Q Dr. McKinnell?
15 DR. MCKINNEL: In the Thomson et al paper, the authors
16 report the average weights of juvenile sockeye
17 salmon in the Strait of Georgia. The average
18 weight in 2007 was no different than the average
19 weight in 2008. The 2008 return was a record
20 return and the 2007 return was very poor survival.
21 Q Okay. Dr. McKinnell, I'll put the question
22 harder. Maybe we are getting close to a bare-
23 knuckle round. Are you suggesting that the
24 premise that Dr. Beamish entered yesterday, and
25 just again summarized very succinctly now is
26 wrong?
27 DR. MCKINNEL: No, he suggested that the average
28 lengths were smallest in 2007, and larger in 2008.
29 I'm just pointing out that if you use a different
30 measure of size, there was no difference between
31 2007 and 2008, and I don't know the reason for
32 this discrepancy.
33 Q You've read his reports?
34 DR. MCKINNEL: I'm sorry, this was Dr. Thomson's
35 report.
36 Q I'm sorry, you're aware of the conclusions that
37 Dr. Beamish reached as a result of his trawl work
38 in 2007?
39 DR. MCKINNEL: Yes.
40 Q And you're aware that he predicted, I think in
41 February of 2008, that 2009 would likely be an
42 extremely low return for sockeye?
43 DR. MCKINNEL: Yes, we've already discussed his
44 prediction skill.
45 Q Well, he was absolutely right in that regard,
46 wasn't he?
47 DR. MCKINNEL: And absolutely wrong in two other

1 years.

2 Q Okay, but he was absolutely right in terms of what
3 observations he made in 2007, predicting in 2008
4 the poor results in 2009 for Fraser River sockeye,
5 correct?

6 DR. McKINNELL: Yes. Yes.

7 Q And the premise for that prediction in February of
8 2008 was the work he's told the Commission about
9 yesterday and today, and we all heard it and you
10 were here. So do you agree that -- you're not
11 disagreeing with his conclusion that was based on
12 his work. You're not in a better position to form
13 any better conclusions about what observations he
14 made in the Strait of Georgia, are you, sir?

15 DR. McKINNELL: Perhaps we should take a little bit of
16 time to discuss how much opportunity the people
17 working on Chapter 4 had to examine these data.

18 Q There's a reason I think why we have three people
19 on a panel, and we have three of you here for all
20 of yesterday and all of today and part of
21 tomorrow.

22 DR. McKINNELL: Yes.

23 Q Together you're all recognized experts, and I'm
24 not trying to find conflict. I'm trying to find
25 out whether three intelligent people can show the
26 wisdom of acknowledging the wisdom of the people
27 on the panel.

28 Are you all just diametrically opposed to
29 solving this? Because from the lay person's
30 perspective, it looks to me this way: That the
31 fish that Dr. Beamish saw in the summer of '07 in
32 the Strait of Georgia were hungry and stressed,
33 and they went into, unacceptably for fish
34 migration purposes, hot water, when you gave your
35 chemical description of the observations that you
36 analyzed, and that's a one-two punch that maybe
37 many species of salmon, but in particular Fraser
38 River sockeye salmon outbound in 2007, had a tough
39 time in the Strait of Georgia and a tough time up
40 in Johnstone -- sorry, up in Queen Charlotte Sound
41 and Queen Charlotte Strait. Is that a premise
42 that's difficult for the three of you to agree to?

43 DR. McKINNELL: I think it's an inference that Dr.
44 Beamish chose to make from the observations he had
45 made.

46 Q And I'm asking you is that a fair and reasonable
47 inference?

1 DR. McKINNEL: It's a possible -- I mean, I'm not
2 going to say yes. I'm saying that it is a
3 possibility.

4 Q You have no evidence to confound that premise or
5 thesis, that opinion.

6 DR. McKINNEL: Well, other than what I've mentioned is
7 that the fish that came out in 2008 were the same
8 size as the ones that were there in 2007 at the
9 same time of year, so --

10 Q But you didn't do any competing studies similar to
11 Dr. Beamish's in the Strait of Georgia 2007.

12 DR. McKINNEL: No, I took these data from his report.

13 Q Dr. Welch, this morning when Mr. Timberg asked you
14 a similar kind of question to what I've just put
15 to your two colleagues, your answer -- I think it
16 was perhaps just a lack of communication -- but
17 you immediately went to research that should be
18 done as opposed to what I took to be a desire to
19 have a question answered about what do you think
20 about the conclusions of the gentlemen to your
21 left and right. And so I don't want you to talk
22 about research that should be done. I want you to
23 look at Dr. Beamish and say, "Yeah, I mean, he's
24 been around for 100 years and he's done this work
25 in Strait of Georgia for a long time and I respect
26 that he's in a position to draw the conclusions
27 that he's given, and I don't have any reason to
28 disagree with him."

29 Then you can turn to your left and look at
30 Dr. McKinnell, and I want to know whether you can
31 say the same thing.

32 DR. WELCH: Well, I'll disagree with two things. I
33 don't think Dr. Beamish has been around for 100
34 years, and we can take the data that's been
35 selected and each of us, as human beings, take
36 pieces of the data and make different inferences
37 from the same ingredients.

38 The Strait of Georgia survey is done in July.
39 It was primarily focused on coho, and most of the
40 sockeye had disappeared by the time the survey
41 occurs. So there's a question about the residual
42 less than one percent of the sockeye that's there
43 as to how relevant they are for inferring survival
44 for the group as a whole.

45 The broader issue that I take issue with is
46 not Dr. Beamish's excellent data, but the
47 inference that we know that the survival problem,

1 with very high likelihood, happened in the Strait
2 of Georgia. The reason for that's a policy issue,
3 that if you make that decision and conclude that
4 it happened, then you would focus all of your work
5 in the Strait of Georgia to better understand
6 those issues in the future. That's not reasonable
7 given the data.

8 In fact, over the last year or so, you've
9 seen a backing off from that position that was
10 summarized in the PSC report from June of 2010
11 which characterized the Strait of Georgia as being
12 the primary location.

13 We now see Dr. McKinnell's report showing the
14 same types of anomalous conditions, or highly
15 anomalous conditions happening to the area to the
16 north. So we now have a situation where I don't
17 think it's appropriate to conclude that we can say
18 where the survival problem happens. We know a lot
19 of things went -- "wrong" is the wrong -- isn't
20 quite the right terminology, but a lot of things
21 were in extreme conditions in 2007. But to infer
22 where the fish died and caused the crisis that we
23 see in 2009 and brought us all here, is not
24 appropriate, in my opinion, to draw from these
25 pieces of data.

26 Dr. McKinnell's point that -- Dr. Beamish and
27 Dr. McKinnell can both be correct. Dr. Beamish
28 has said that the length of these fish was very
29 small in 2007 from his survey, and Dr. McKinnell
30 can point to Dr. Beamish's own survey and say that
31 his weight data shows that the average weight
32 hadn't changed, apparently.

33 So these are highly qualified people, as you
34 say, that can still come with different syntheses
35 out of the same sets of data.

36 Q I'll put the question differently to you, then,
37 Dr. Welch. Dr. Beamish has given evidence which
38 suggests that the outgoing 2007 Fraser River
39 sockeye salmon were stressed, by his observations
40 and field work. You acknowledge that's what he
41 says?

42 DR. WELCH: Yes.

43 Q And you acknowledge that if his conclusion is
44 correct, that could be a significant cause of the
45 decline of the returns for 2009; could be.

46 DR. WELCH: With the greatest respect to my friend and
47 colleague to my right, Dr. Beamish, I don't agree

1 with the conclusion that you can draw that
2 conclusion from data collected in July, when the
3 vast majority of the fish had already left.

4 It's a valiant effort to take the data and
5 make it applicable to the sockeye issue. But just
6 as people appropriately raise questions about the
7 applicability of the fish that we've tagged with
8 acoustic tags which didn't show a survival
9 problem, the same thing is true of a survey that
10 happened after more than 99 percent of the smolts
11 had left. The same types of questions arise as a
12 result.

13 Q So what about Dr. McKinnell's suggestion that the
14 observations he was referred to yesterday and
15 again this morning, where he described the
16 physical conditions and the chemical condition of
17 the water being an extreme event. Is that a
18 likely cause, a possible cause, to use the same
19 language?

20 DR. WELCH: It's a likely cause.

21 Q Is it a likely cause, and Dr. Beamish is not a
22 likely cause?

23 DR. WELCH: Both are likely causes.

24 Q Both are likely causes?

25 DR. WELCH: Yeah. Likely contributors. And then the
26 question is how much weight would be assign to
27 each of those in contributing to the overall
28 decline and survival that was observed in 2009
29 when the adults returned?

30 Q Dr. Welch, I'll stick with you just for a second
31 because you said something just a few moments ago
32 which was interesting to me. You said that it's
33 difficult, from the information that we have, to
34 know what caused the fish to die or even when the
35 fish died, correct?

36 DR. WELCH: Correct.

37 Q You did, however, and perhaps in subsequent
38 drafting you corrected yourself, but you did draw
39 the inference from your own post studies that your
40 submission -- and submissions to the Commission,
41 Project 10 -- or, rather, I should say in -- you
42 were the first witness or the second witness early
43 on, so I can't recall what exhibit it was that you
44 entered. But your conclusion was that your post
45 studies showed that there was a mortality of fish,
46 but the mortality didn't show immediately after
47 passing through fish farms, but probably developed

- 1 several weeks later; paraphrasing generally what
2 you said. Do you recall generally saying that?
- 3 DR. WELCH: Yes. After passing out of Queen Charlotte
4 Strait, we were quite careful not to raise
5 anything about fish farms explicitly.
- 6 Q Well, you did say "did not die immediately after
7 passing through fish farms", but in fact the
8 reality is you have no idea whether the fish died
9 after they passed the array at the north end of
10 Vancouver Island, correct?
- 11 DR. WELCH: That's correct.
- 12 Q So the last time you had a signal on the fish that
13 passed was when they went over the array, and then
14 when they came back two years later.
- 15 DR. WELCH: Correct.
- 16 Q How many came back?
- 17 DR. WELCH: One percent. Two of the 200 fish.
- 18 Q Right. Right. So you can't conclude that they
19 died immediately or that they died at any time in
20 close proximity to their migration path up the
21 coast.
- 22 DR. WELCH: Correct.
- 23 Q And so also to say that a survival problem
24 probably developed several weeks later is also
25 complete conjecture?
- 26 DR. WELCH: Well, I suspect that my written reports
27 probably said "at least", but I'd have to review
28 my documents.
- 29 Q But the reality is you really can't put any time
30 parameter at all on their demise.
- 31 DR. WELCH: No, we report the results for the times in
32 the life history that we have.
- 33 Q So, then, to summarize, there's absolutely no
34 evidence from your post studies which suggest any
35 disease transfer from a fish farm. You have no
36 data or reference on that in your study?
- 37 DR. WELCH: The key points that we made is that seven-
38 eighths of the total mortality happened after -
39 for the fish that we had tagged - happened after
40 they passed Queen Charlotte Strait and the
41 detection sub-array that we had up there.
- 42 Q In other words, at some point after they left the
43 north end of Vancouver Island, 70 of the fish
44 died, but whether they died in a month or 16
45 months, you have no idea.
- 46 DR. WELCH: Correct.
- 47 Q Whether they were eaten by another fish or

1 succumbed to ocean pressure of some kind, you have
2 no idea.
3 DR. WELCH: All of those probably apply to some degree.
4 Q Do your transponders still work when they're on an
5 outbound salmon that's been eaten by another fish?
6 DR. WELCH: Yes.
7 Q So some of the successful outbound migrations
8 could in fact be quite dead fish inside the
9 stomach of a larger fish or other predator.
10 DR. WELCH: Well, to quote Leviticus, all things must
11 come to pass, counsellor, so you'd expect the tags
12 to stay in the predator for a few days and then be
13 evacuated.
14 Q Well, I certainly won't try to disturb those
15 findings.
16 You examined the issue of straying, I
17 believe, or at least you're familiar with the
18 term?
19 DR. WELCH: Yes.
20 Q And for those of us who are learning so many
21 terms, including those things which shall pass,
22 "stray" means that not all fish return to their
23 natal streams?
24 DR. WELCH: Correct.
25 Q And so, indeed, some of the fish that you tagged,
26 it is entirely possible that they may have strayed
27 and not come back to their natal streams?
28 DR. WELCH: That would be extremely unlikely because
29 DNA analyses don't indicate significant amounts of
30 straying between streams of any of the species of
31 salmon.
32 Q Straying was discussed as far back as at least the
33 1970s as a concern in trying to monitor what
34 escapement should be permitted?
35 DR. WELCH: Yes, but they're talking about levels on
36 the order of one percent or less of what would
37 come back, and in practice, it must be much less
38 than that.
39 Q Dr. Beamish, I'm going to provide a summary of
40 some points that I think I have understood in this
41 technical evidence, and maybe it's only of
42 assistance to me, but I hope it's of some
43 assistance to the Commissioner. If I get any of
44 these summary points wrong, please correct me.
45 None of you seem shy about that, and that's good.
46 Dr. Beamish, you concluded that the marine
47 environment inside and outside of the Strait of

1 Georgia has been changing with warmer surface
2 waters, lower discharges, change in timing of peak
3 flows, changing wind patterns, plankton bloom
4 timing, salinity and perhaps other changes as
5 well. You've made those observations over the
6 years?

7 DR. BEAMISH: In a general way, but not specific for --
8 did you mention plankton?

9 Q I did.

10 DR. BEAMISH: Yeah, we don't really have measurements
11 on that. So without dealing with exactly the
12 specific items, in general the concept that we
13 have seen changes in the Strait of Georgia is
14 correct.

15 Q And it's been your conclusion that changes to the
16 marine environment can result in less favourable
17 conditions for Fraser River sockeye, but perhaps
18 in some cases, more favourable conditions for
19 other species of salmon?

20 DR. BEAMISH: Yeah, that's a very interesting point.
21 Let's just take a minute there, okay, because when
22 you're dealing with 2007 ocean entry, our point
23 was that everything responded to the events that
24 caused extremely poor growth and survival. So, to
25 some extent, my colleagues can argue that we may
26 not have all the measurements we need for sockeye,
27 that's true. That may -- is true. But what we're
28 looking at is everything, every single thing,
29 almost every thing, 98 percent of the fish are
30 responding to this extreme anomaly.

31 We have the physical evidence for it and we
32 have the biological evidence in terms of the
33 growth and survival. We don't have the food
34 measurements of the prey, but that's why the
35 sockeye issue is -- that's why we use it, is
36 because, yes, we don't have as many measurements
37 for sockeye as we do for the other species -
38 herring in particular maybe - but everything is
39 responding that way.

40 So if you look at it in another way, let's
41 say that they're not stressed, okay? Then that
42 meant that these little salmon had absolutely no
43 stress, they were just behaving normally, and I
44 argue that they spend less time in Queen Charlotte
45 Sound, so these fish that are not stressed then
46 enter Queen Charlotte Sound and all of a sudden
47 they become stressed and die. To me, that makes

1 no sense.
2 I'm not sure I answered your question.
3 MR. BLAIR: Mr. Lunn, I'm going to direct the witnesses
4 to B.C. Salmon Farmers Tab number 3.
5 Q Dr. Beamish, this question is for you. This is a
6 document prepared by yourself as one of the
7 authors together with others.
8 DR. BEAMISH: Yes, it is.
9 Q And, in part, it concludes that you believe that
10 the long-term declining trends and the abundance
11 of several salmon species, including sockeye,
12 since the early 1990s, and the increased
13 production of pink and chum salmon, indicates that
14 the decline of the sockeye salmon production is a
15 consequence of general changes to the dynamics of
16 the Strait of Georgia ecosystem. Is that a fair
17 summary?
18 DR. BEAMISH: Yes.
19 Q Or part of that.
20 DR. BEAMISH: Could you just go down a little bit and
21 we'll see what -- a bit more. Yes, that's it.
22 You might have noticed that's draft number 20.
23 Q All right. There's a final, is there, after draft
24 20?
25 DR. BEAMISH: Yeah, the final is the four papers that
26 we submitted to the Commission.
27 Q All right. In any event, my conclusion -- or,
28 rather, the summary of the conclusion is stated in
29 your four papers?
30 DR. BEAMISH: Yeah.
31 MR. BLAIR: Mr. Lunn, could we see B.C. Farmers Tab 4?
32 Q Dr. Beamish, this article refers, in part, to a
33 conclusion that you and others have reached, that
34 you believe the poor returns of 2009 were
35 determined before the juveniles left the Strait.
36 Is that a fair summary of this?
37 DR. BEAMISH: Just can you help me and tell me where
38 this document came from?
39 Q I cannot, other than --
40 DR. BEAMISH: It has my name on it, but maybe -- do you
41 know where it came from?
42 Q No, I'm sorry, Dr. Beamish, I just see your name
43 is together with others. Obviously penned over
44 Pacific Biological Station.
45 MR. TIMBERG: Mr. Commissioner, the only information I
46 have is at the bottom of the document there's a
47 stamp which indicates where -- whose computer it

1 came from. So it looks like it's from Terry Davis
2 who's in Communications at DFO, and then it says
3 [as read]:

4
5 Fraser River sockeye judicial inquiry
6 documents for consideration for Commission.

7
8 I'm not sure what that means, to tell you the
9 truth.

10 DR. BEAMISH: Well, it's a little bit academic to know
11 where it came from. I guess I don't need to know
12 that. But it more or less summarizes what I
13 think. Not "more or less"; it summarizes what I
14 think. I just don't remember writing that, that's
15 all, in that format.

16 MR. BLAIR: I wonder if we could mark it as the next
17 exhibit, Mr. Registrar.

18 THE REGISTRAR: Exhibit 1321.

19
20 EXHIBIT 1321: Document entitled, "A possible
21 reason for the poor returns of sockeye salmon
22 to the Fraser River in 2009

23
24 MR. BLAIR: Could we go to Salmon Farm Tab 8, please.

25 Q Dr. Beamish, this is a question for you. Firstly,
26 are you familiar with this document?

27 DR. BEAMISH: That one I am.

28 Q Can you take a stab at summarizing what it stands
29 for, please?

30 DR. BEAMISH: Well --

31 Q If it assists you, I could direct you to --

32 DR. BEAMISH: This is a paper that Dr. Noakes published
33 and this was probably given at a North Pacific
34 Anadromous Fish Commission symposium, and then it
35 was published in what we call "Bulletin 2". So
36 it's a peer-reviewed document. The peer review is
37 a little easier than it is for major journals, but
38 it is still peer-reviewed. The abstract
39 identifies what the content is.

40 Q Dr. Beamish, if it assists you, perhaps we can
41 direct you to page number 7.

42 MR. BLAIR: Mr. Lunn?

43 Q And in particular there's a passage at page 7
44 dealing with the ecological consequences of
45 enhancement.

46 DR. BEAMISH: Well, the issue here, and some other
47 papers that we were writing about, was dealing

1 with the hatchery/wild interactions. This topic
2 is an issue that is a substantial issue in fishery
3 science, the hatchery and wild interactions. It
4 applies to a variety of species, pink salmon, chum
5 salmon, chinook and coho. There's an extensive
6 literature on the potential interactions.

7 I've participated in the debate, if you want,
8 and my interpretation is that there is evidence of
9 hatchery and wild interactions amongst the various
10 species, but in terms of the long-term harm that
11 might be caused, and "harm" being defined as maybe
12 a substantial reduction in production or
13 something, in terms of the long-term harm, that is
14 less clear amongst the scientific community.

15 So in this paper - and I'm doing this from
16 memory - is this is one of our contributions to
17 that overall debate, if you want, on hatchery and
18 wild interactions.

19 MR. BLAIR: And if we could mark this as the next
20 exhibit, please?

21 THE REGISTRAR: Exhibit 1322.

22
23 EXHIBIT 1322: Document titled, "Changing the
24 Balance: Interactions Between Hatchery and
25 Wild Pacific Coho Salmon in the Presence of
26 Regime Shifts"
27

28 MR. BLAIR:

29 Q And I just want to follow along, Dr. Beamish, on
30 the theme of the impact of hatcheries.

31 MR. BLAIR: Mr. Lunn, if we could go to our Tab 2.

32 Q Do you recognize this document, Dr. Beamish?

33 DR. BEAMISH: Yes, I do. Now I do, yeah. It took me a
34 minute.

35 MR. BLAIR: Could we, Mr. Lunn, please go to page 15,
36 the bottom left-hand column, page 15.

37 Q You see the paragraph that starts, "Disease in
38 hatchery fish is not uncommon...".

39 DR. BEAMISH: Yes.

40 Q Down about four lines, the document says:

41
42 We also suspect that a great many cases of
43 disease are not reported or investigated
44 because the hatchery fish do not [exist]
45 exhibit clinical signs of disease (or
46 hatchery staff may not recognize the clinical
47 signs of disease) despite one or more disease

1 pathogens being present.

2
3 You see that?

4 DR. BEAMISH: Yes.

5 Q Can you expand on what you mean by that?

6 DR. BEAMISH: No, not much beyond that. The issue is
7 that there is evidence that disease an occur in
8 hatcheries and that's that statement there.

9 MR. BLAIR: Could it be marked as the next exhibit,
10 please?

11 THE REGISTRAR: Exhibit 1323.

12
13 EXHIBIT 1323: Early Marine Survival of Coho
14 Salmon in the Strait of Georgia Declines to
15 Very Low Levels

16
17 MR. BLAIR: Salmon Farmers Tab 9, please.

18 Q Dr. Beamish, take a moment, if you need to, to
19 acquaint yourself with this document. Do you
20 recall being the co-author of this?

21 MR. BEAMISH: I think this is a book chapter that just
22 came out; isn't that correct?

23 Q Yes, 2011.

24 DR. BEAMISH: Yeah.

25 Q The questions that I have here really are with
26 respect to the carrying capacity of the North
27 Pacific. You've alluded to it - in fact other
28 members of the panel as well - the issue is that
29 in this work with Dr. Noakes, you helped to
30 explain the effect of the carrying capacity of the
31 North Pacific and the rapid expansion of salmon
32 production facilities around the North Pacific and
33 that they are related to the carrying capacity of
34 the North Pacific?

35 MR. BEAMISH: It's a little more complicated than that,
36 but more or less what you said is correct, yes.

37 Q Yes. So if we have Fraser River sockeye going out
38 into the North Pacific and they are competing
39 actively with the enhanced salmon production in
40 Russia or Alaska or other parts of the North
41 Pacific, it can have an impact on all of the
42 species. They're inter-related, the food and the
43 ocean and those types of issues.

44 DR. BEAMISH: There is a potential that - and
45 particularly for chum salmon that are enhanced in
46 Asia - there is that potential that our pink
47 salmon, say, in Alaska, could have an impact on

1 Fraser River sockeye, say in the Gulf of Alaska,
2 yes.

3 MR. BLAIR: Could that be marked as the next exhibit,
4 please?

5 THE REGISTRAR: Exhibit 1324.

6
7 EXHIBIT 1324: Document titled, "Shifting the
8 Balance: Towards Sustainable Salmon
9 Populations and Fisheries of the Future"

10
11 MR. BLAIR: B.C. Tab 7, please.

12 Q This question is for you, Dr. Welch. You're
13 listed there as a co-author with a number of
14 others?

15 DR. WELCH: Yes, I am.

16 Q You recognize the document?

17 DR. WELCH: I do.

18 Q The title is pretty descriptive, "Recent Salmon
19 Declines: A Result of Lost Feeding Opportunities
20 Due to Bad Timing?" Is that all we need to know?

21 DR. WELCH: Well, the question mark speaks about how
22 well we, as scientists, can actually answer the
23 question for you.

24 Q So can you explain this document in simple
25 language to us folks?

26 DR. WELCH: The key issue is that there may be a change
27 in the timing of the plankton relative to the time
28 that the salmon smolts come out and so survival of
29 those smolts may change depending on the feeding
30 opportunities because of those shifts.

31 Q And as it relates to -- perhaps you can explain
32 how it relates to post-release survival of
33 hatchery fish, the question of timing and food.

34 DR. WELCH: Well, the premise is that if they go out in
35 periods of higher productivity, more food, that
36 survival is better.

37 Q And the summary of that premise, that because of
38 the warming water, plankton bloom food production
39 can occur earlier and therefore perhaps there
40 ought to be adjustments to the timing of the
41 release of hatchery fish?

42 DR. WELCH: I think I'll quote from the second sentence
43 of the abstract.

44
45 Species and stocks [of salmon] that leave
46 natal streams earlier may be favoured over
47 late migrating fish.

1 Because there's evidence that associated with the
2 warming that we're seeing in the North Pacific and
3 the adjacent rivers that the plankton blooms are
4 coming earlier.
5 Q And is it your experience, then, sir, that if the
6 plankton blooms are coming earlier, those species
7 of fish that migrate out of the river systems and
8 up the coast demonstrate better survival rates
9 because of that, or is that still unknown?
10 DR. WELCH: That's still unknown. We'd have to
11 specifically measure the survival of early
12 emigrants versus later emigrants, and that really
13 hasn't been done.
14 Q Is that, the way I've described it, an active
15 theory of some people that perhaps --
16 DR. WELCH: Very active.
17 Q And as it relates to hatchery, then it suggests to
18 me that you might also then time the release of
19 your hatchery fish to release them earlier as well
20 since you can control that?
21 DR. WELCH: Yes.
22 MR. BLAIR: A moment, please. I wonder if the one we
23 have on the screen could be marked as the next
24 exhibit, please.
25 THE REGISTRAR: Exhibit 1325.
26
27 EXHIBIT 1325: Document titled "Recent Salmon
28 Declines: A Result of Lost Feeding
29 Opportunities Due to Bad Timing?"
30
31 MR. BLAIR: And if we could go to Commission Tab number
32 22, please, Mr. Lunn, and to the next page.
33 Q Dr. Welch, are you familiar with this document?
34 DR. WELCH: Yes, I am.
35 Q Thank you. In part, this document describes in
36 detail some of the points that have been made by
37 the panel earlier, in the last day or so, about
38 zooplankton and the effect of cooler water and
39 warmer water; is that correct? It covers that
40 issue?
41 DR. WELCH: It reports it, yes.
42 Q Yes. And again, for the lay people in the room,
43 cool water can produce zooplankton which have
44 higher energy values than warm water?
45 DR. WELCH: Correct. For salmon, yes.
46 Q I simplified it and I got it right. Dr.
47 McKinnell, any correction on it?

1 DR. MCKINNELL: No, no.

2 MR. BLAIR: Excellent. Making progress. If we stay
3 here till the end of the year, Mr. Commissioner --
4 I'm thinking back to my preparation for this panel
5 and I saw an article written in the *Nanaimo News*,
6 September of last year, where they predicted the
7 Commission would end its work December 31st, and
8 indeed it might. Just a year late.

9 Q The point of taking you, Dr. Welch, to this, and
10 to the Commissioner, is that the issue of food and
11 food values, cooler water can produce a benefit to
12 the fish that we heard from Dr. McKinnell, that
13 they will use less energy themselves than when
14 they're in warm water migrating. Dr. Welch, you
15 agree?

16 DR. WELCH: Correct.

17 Q And also the quality of the food of the
18 zooplankton is higher from a caloritic (sic)
19 perspective?

20 DR. WELCH: Correct.

21 Q So a double whammy if you have warm water.

22 DR. WELCH: Yes.

23 Q Fish need more energy and the food they're eating
24 doesn't have as much energy.

25 DR. WELCH: That's the general principle that we go
26 under as a scientific group. We're still working
27 on the linkages to understand it better, but
28 that's certainly the general premise.

29 MR. BLAIR: Thank you. Could that be marked as the next
30 exhibit?

31 THE REGISTRAR: Exhibit 1326.

32
33 EXHIBIT 1326: Document titled, "State of the
34 Pacific Ocean 2009"
35

36 MR. BLAIR: Just a moment, please. Mr. Lunn, could we
37 go to Commission Tab 23, please?

38 Q This question really is for all three of you.
39 Firstly, are you familiar with the document
40 generally, all of you? No one's saying no?

41 DR. WELCH: Yes, I am.

42 Q Thank you. I'll start with you, Dr. Welch. You
43 recall yesterday - and I'm not going to ask the
44 registrar to put it up on the screen just now -
45 but recall yesterday the temperature gradient
46 charts that Dr. McKinnell spoke to, and in
47 particular, the difference between the summer of

1 '07 and the summer of '08, and that the summer of
2 '07 was hotter, warmer water against the coast Dr.
3 McKinnell recalls. I'm sure that -- nodding.

4 So the question here is that in this article,
5 it does seem to identify that there is cooler
6 water on the west coast of Vancouver Island - in
7 other words, not the anomaly that Dr. McKinnell
8 spoke of at the northeast part of Vancouver Island
9 where we had the extreme high temperatures as was
10 evidenced in the other figure, but this document
11 supports the premise that there were records of
12 cooler water along the west coast of Vancouver
13 Island.

14 Now, are you gentlemen familiar both with
15 that as a fact and that this paper covers that
16 fact?

17 MS. BAKER: This is a very long document with a number
18 of research papers attached. I wonder if you
19 could take them to the paper.

20 MR. BLAIR: Yes, I'll try.

21 DR. WELCH: To be clear, which year are we referring
22 to?

23 MR. BLAIR: If I could just have a second, please? I'm
24 sorry, the question, Dr. Welch?

25 DR. WELCH: The question which calendar year are we
26 referring to when you're talking about colder
27 water?

28 MR. BLAIR: 2007.

29 DR. WELCH: The document in front of us here, CSAS
30 2010-053 refers to 2009. It will not be referring
31 to the prior years of data in a specific sense.

32 MR. BLAIR: I do have a quote. I'm must trying to find
33 the quote. Page 139, please.

34 We can't find it, I'm sorry. I wonder if we
35 could mark the document as an exhibit and we'll
36 try to find another time to direct the panel or
37 subsequent panel to the right page.

38 THE REGISTRAR: Exhibit 1327.

39
40 EXHIBIT 1327: CSAS Document, " State of
41 physical, biological, and selected fishery
42 resources of Pacific Canadian marine
43 ecosystems in 2009"
44

45 MR. BLAIR: Thank you. I have no further questions.
46 It's like a race. We're done. Thank you.

47 MS. BAKER: Mr. Commissioner, the next questioner is

1 Mr. McDade. I don't know if you want him to start
2 after the afternoon break or start now.
3 THE COMMISSIONER: Yes, maybe it might be more
4 convenient just to take the break now.
5

6 (PROCEEDINGS ADJOURNED FOR AFTERNOON RECESS)
7 (PROCEEDINGS RECONVENED)
8

9 THE REGISTRAR: The hearing is now resumed.

10 MR. McDADE: My name is Gregory McDade, and I am
11 counsel for Dr. Morton and the Aquaculture
12 Coalition, and I'll have a few questions for you.
13

14 CROSS-EXAMINATION BY MR. McDADE:
15

16 Q Let me start first with you, Dr. Beamish, and with
17 the papers that you've submitted. Could I first
18 have Exhibit 1303 on the screen, the "Anomalous
19 ocean conditions" paper that you wrote along with
20 Dr. Thomson and others. And as I understood from
21 your evidence yesterday, you formed the
22 conclusion, either before 2009 returns were in or
23 very shortly thereafter, that there was a problem
24 with prey abundance in the Strait of Georgia. And
25 you then went and recruited Dr. Thomson to try and
26 answer the question of why. Is that fair enough?
27

28 DR. BEAMISH: Yes.

29 Q You said you called him up and said "If you can't
30 figure out what's going on in the Strait of
31 Georgia, that you don't think the taxpayers are
32 getting their money," and you said he accepted the
33 challenge that you put to him. That was your
34 evidence yesterday.

35 DR. BEAMISH: I was kidding Dr. Thomson, but that's
36 what -- essentially what I said, yes.

37 Q So in fairness to Dr. Thomson, his focus on the
38 Strait of Georgia and on finding anomalous
39 conditions, and then focusing primarily on the
40 2007, 2008 and 2009 year were because of your
41 request.

42 DR. BEAMISH: Yes, that's true.

43 Q But you had, before getting any of this wind and
44 salinity and his MLD modelling done, you had
45 already formed the conclusion that the prey
46 abundance was the issue.

47 DR. BEAMISH: The issue was that we were observing this
synchrony in response, okay, and it was developing

1 at that time. Had I already concluded that it was
2 prey abundance? It was -- it was a possibility.
3 I don't think I would say that I had finalized the
4 conclusion, no.

5 Q But that's what you asked Dr. Thomson to go and
6 find the reasons for, isn't it?

7 DR. BEAMISH: No. I asked Dr. Thomson to take a look
8 at what was happening in terms of the physical
9 conditions in the Strait of Georgia. And in other
10 words, in particular, I asked him if he would take
11 a look at winds. That's how we started out,
12 because he has better wind data than we could get
13 through the looking at wind information that would
14 come, say, from -- either from Vancouver or from
15 Victoria Airport.

16 Q Well, maybe it would just help if I put up an
17 email on the screen, an email chain that you were
18 involved in. It's Conservation Coalition document
19 number 8. It's an email dated May 3rd. That's an
20 email chain between you and Dr. Thomson. Do you
21 recognize that?

22 DR. BEAMISH: That was probably it.

23 Q Yes. And if we could go to the second page of
24 that document. Yes, that large paragraph here is
25 an answer from Dr. Thomson to you saying [as
26 read]:

27
28 I like your attempt to bring in the winds,
29 but I think your interpretation is not
30 correct. It didn't make sense to me that
31 2007 would have such a thin MLD and strong
32 winds. That's impossible --

33
34 - he says -

35
36 -- irrespective of river runoff.

37
38 So what's he saying there?

39 DR. BEAMISH: Well, I have a rule, I'm not sure whether
40 I mentioned, I thought I might have yesterday, and
41 that is when Dr. Thomson and I disagree on
42 something, my rule is that he's right. This was
43 at the beginning of looking at what the physical
44 conditions were within the Strait of Georgia. So
45 we had looked at winds as we would be able to get
46 them, as I said, from Vancouver Airport or
47 Victoria Airport, but we knew that he had winds

1 that were measured within the Strait of Georgia,
2 and that's what this email most likely reports.
3 In other words, he's saying that he doesn't agree
4 that what I was exploring, and in terms of winds,
5 is right, that it had to be something else.
6 That's how I interpret that.

7 Q Well, if you see the interchange just below this,
8 if we could just go down the page a bit. So what
9 provoked this is you had actually written this
10 report, or a draft of it, and you'd sent it on to
11 him for comment; is that right?

12 DR. BEAMISH: Now, I'm not 100 percent sure what that
13 refers to. It says "Sockeye report". What's the
14 date on that, can you see?

15 Q It's April 30th of 2010.

16 DR. BEAMISH: April the 30th, 2010. January, February,
17 March, April, that's -- it's obviously I sent him
18 a report. That was -- the reason I'm hesitating a
19 little bit is that I wasn't necessarily back at
20 work at this time. All right? January, February,
21 March, April. That's -- I can't exactly remember
22 when I returned to work. Obviously I sent it from
23 somewhere, but -- yeah, I'd sent him something,
24 and but whether I was back at work fulltime or
25 not, I'm not sure.

26 Q All I'm suggesting here, there's nothing special
27 I'm suggesting, it's that he was commenting on a
28 report you sent him that had something in it about
29 strong winds, and he corrected you and said that
30 couldn't happen.

31 DR. BEAMISH: That's -- either it was in the report or
32 it was in a discussion, yes, that's more or less
33 correct. Yes.

34 Q And if we can go back to the top of the first
35 page, it says [as read]:

36
37 Dick, I'm working up the Strait of Georgia
38 winds for you. I think they were very weak
39 in 2007 in spring. But we need to look at
40 wind components, not just strength. Strong
41 winds normally deepen the mixed layer depth.

42
43 And he signs it:

44 Your fan, Rick.

45
46 So what was taking place in this time period is
47

1 that the facts were that absolutely 180 degrees to
2 what you thought they were, you thought there were
3 strong winds that caused this, and in fact he
4 comes back to you and says, no, actually, the
5 winds were weak. That's a fair interpretation,
6 isn't it?

7 DR. BEAMISH: Let me just think about what we're
8 talking about here. The -- what we were looking
9 at was a -- we suspected that there had to be an
10 issue with the prey production, and this could be
11 -- it could be freshwater, and it could be -- it
12 could be winds. One of the reasons that I was
13 exploring the possibility of winds was because of
14 the strong winds in the -- in Stanley Park
15 essentially, and but it didn't necessarily have to
16 be winds. I just wanted to make sure that we had
17 an appreciation of what the winds were. I don't
18 think it's correct to say that we had come to a
19 conclusion at this time about what caused -- what
20 was the physical change or changes that caused the
21 poor growth and survival of the fish.

22 Q Well, obviously prior to April 30th you had a
23 proposed model that depended on strong winds that
24 you felt explained that lack of prey production;
25 isn't that right?

26 DR. BEAMISH: No, I don't -- I don't think that we -- I
27 mean, it sounds like you're suggesting that we
28 looked at one parameter and said that's the reason
29 for all this to happen. I think the answer is
30 that we were looking at winds and looking to see
31 whether what the winds were. And I agree that if
32 you read this, if they were strong winds, there's
33 an issue there. All right? But we had to make --
34 I had to be sure that we had a reasonable
35 appreciation of what the physical conditions were
36 in the winter and spring of 2007, and that's what
37 we were exploring with this -- with this email.

38 And I was also getting caught up on some
39 scientific issues that I had been away from for
40 some months. And I think, it's hard to go back
41 exactly to May, but that's what was happening. I
42 basically stopped doing everything for over two
43 months, and it's about this time that I was
44 beginning to -- well, I'll be honest with you, I
45 was beginning to see whether I was going to be
46 able to come back to work.

47 Q Well, all I'm trying to establish is the process,

- 1 the scientific process. What I think I understand
2 here is that you had come up with the idea of poor
3 prey abundance first, and then you were trying to
4 establish a model that would be consistent with
5 your data that would confirm that.
- 6 DR. BEAMISH: I can only keep answering the question
7 the same way. I mean, this could have been a
8 disease, right? This could have been some
9 catastrophic event that was unprecedented. And I
10 used to say to people, "You know, maybe it's
11 aliens." Now, obviously, I don't believe it's
12 aliens, but the point is that something very
13 anomalous was happening and we were trying to
14 understand what it was. Winds was one of the
15 components that we were looking at, and Dr.
16 Thomson was a colleague who had very good wind
17 data.
- 18 Q All right. So can I come back to the report,
19 Exhibit 1303. So as I understand it, Dr. Thomson
20 is responsible for this portion of the report
21 dealing with the wind and the physical components,
22 but the biological parts are yours; is that fair?
23 Table 1 and Table 2 of this document come from
24 your trawl data?
- 25 DR. BEAMISH: Sorry, what's the -- where am I here?
- 26 Q So let me just take you to Table 1 and Table 2.
27 Table --
- 28 DR. BEAMISH: Yeah, I know what Table 1 and Table 2
29 are, and Table 1 and Table 2 are a combination of
30 data that Dr. Trudel and myself collected.
- 31 Q All right. And so Dr. Thomson depended on that.
- 32 DR. BEAMISH: Dr. Thomson incorporated our information
33 into the report, yes.
- 34 Q So could we go back to page 11. This section of
35 the report, you'll see the heading there, "Average
36 catches of juveniles...in the trawl surveys", that
37 section of the report would have been yours, not
38 Dr. Thomson's?
- 39 DR. BEAMISH: That's right, yes.
- 40 Q And over on page 13, the next section, "Size of
41 juvenile sockeye...in the trawl catches", that was
42 your section, not Dr. --
- 43 DR. BEAMISH: That's right, yes. Well, that's our
44 section, meaning Dr. Trudel and myself.
- 45 Q Yes.
- 46 DR. BEAMISH: He's an author and he participated in
47 producing this document.

1 Q If we go forward to page 21, the "Discussion"
2 portion that starts there relating to the
3 comparisons between years of the trawl surveys and
4 the conclusion that appears at the bottom of that
5 paragraph:
6

7 ...it does appear that the early marine
8 survival in the Strait of Georgia was
9 substantially greater in 2008 than in 2007,
10 resulting in larger catches in the Strait of
11 Georgia and in Queen Charlotte Sound...
12

13 That's your data that produced that?

14 DR. BEAMISH: Yes.

15 Q And the next section on the next page, "What was
16 unusual about juvenile fish...", that's your data?

17 DR. BEAMISH: Yes. Yes, it is.

18 Q And if we go -- that discussion goes forward to --
19 right to page 29, that's all basically you're
20 responsible for that portion of the report.

21 DR. BEAMISH: If you'll just scroll down and we'll see
22 -- hang on. Most likely, yes. I'm reading it
23 quickly, but most likely that's true.

24 Q Now, the model that Dr. Thomson was responsible,
25 which is the wind and salinity and the MLD, the
26 mixed layer depth, is simply a theory to support
27 the idea that it might have affected prey
28 abundance, right?

29 DR. BEAMISH: I'm sorry, say that again? I'm just
30 unclear what you're saying.

31 Q I'm suggesting to you that the data combined by
32 Dr. Thomson around wind, salinity, and mixed layer
33 depth produces a theory that could affect prey
34 abundance.

35 DR. BEAMISH: Yes, that's correct. Yes.

36 Q It's really just a model.

37 DR. BEAMISH: Yes, it's a type of model. Yes.

38 Q It's a type of qualitative model --

39 DR. BEAMISH: Yes. Yes.

40 Q -- as opposed to a statistical one.

41 DR. BEAMISH: Yes.

42 Q And it's an untested model.

43 DR. BEAMISH: Untested in what way?

44 Q Well, there's never been any experimental testing
45 of it?

46 DR. BEAMISH: I'm not sure how to answer that. I can't
47 think of how we would experimentally test that

1 kind of a model, to be honest with you.
2 Q All right. There's no peer review of that
3 particular model?
4 DR. BEAMISH: Oh, that's -- okay, I understand that.
5 Certainly this material has not gone through a
6 peer review.
7 Q And it's only been used for this particular
8 circumstance. It's not been applied to a number
9 of other years to see if it holds true.
10 DR. BEAMISH: Are we talking about the mixed layer
11 depth calculation?
12 Q Yes.
13 DR. BEAMISH: You know, it's too bad that -- it's
14 better that Dr. Thomson answer that, but I'm going
15 to tell you that I understand that he's published,
16 I think, several papers on it, so the concept has
17 passed peer review. And so his approach to making
18 that determination has been peer reviewed and
19 published.
20 Q The connection to prey abundance and in particular
21 any connection to the prey abundance for -- and
22 survival of sockeye salmon, that is merely
23 speculative, isn't it?
24 DR. BEAMISH: Yes, that's true.
25 Q There is --
26 DR. BEAMISH: The connection, it's speculation and I
27 think we - I hope we did - we made that clear,
28 that what we have is the physical conditions that
29 normally would lead to this -- to poor prey
30 production, and then we at the other end of that
31 scenario, if you want, we then look at the
32 biological conditions which we talked about
33 yesterday, and of course the -- you've heard this
34 several times now, that overall synchrony in that
35 response, all right, indicated to us that there
36 was something biological happening that was
37 unprecedented.
38 Q Yeah. No, but my connection is specifically with
39 sockeye salmon. Other than your trawl data that
40 you put in the paper there's no evidence that this
41 model has any impact on sockeye salmon at all, is
42 there?
43 DR. BEAMISH: No, no. The information on the mixing
44 layer depth is information that -- and the other
45 calculations, or the contributions of Dr.
46 Thomson's is material just like you heard about in
47 Queen Charlotte Sound from Dr. McKinnell, where

1 they looked at the physical conditions, and by
2 comparing those with normal conditions, they would
3 identify that -- they would come to the
4 conclusions that these were extremely anomalous.
5 That's what Dr. Thomson and his colleagues did for
6 this paper. They identified extremely anomalous
7 conditions that normally would lead to poor
8 production. That's what their contribution was.

9 Q But you've gone one step further in this paper.
10 You added the trawl data and the catch for 2007 as
11 if it had some relevance to establishing the
12 credibility of that model. Was that a fair
13 statement?

14 DR. BEAMISH: Well, not that it establishes the
15 credibility of the model. That would be
16 established through a different process. That
17 would be what I just reported, that the
18 credibility of the model is determined when he
19 publishes it. What we did was to show in this
20 paper, and in the other paper, that these physical
21 changes were associated with what I keep saying is
22 unprecedented synchrony in the response of
23 juvenile salmon and herring in the Strait of
24 Georgia, and the connection between the two, had
25 we had some ability to measure the productivity of
26 the prey that would have produced, of course, that
27 would have been other evidence that would have
28 been useful. We don't have that. So we have
29 either side of the explanation.

30 Q Well, you had available to you Dr. Peña's evidence
31 that the plankton was relatively similar in this
32 year than in other years. You chose not to use
33 that.

34 DR. BEAMISH: No, she didn't say that. All right?
35 That's -- as a matter of fact, if you look at this
36 report, I can't quite remember what page it's on,
37 maybe page 17, there is -- there is some issue on
38 plankton. And what we identified was that there
39 was the possibility that there could have been
40 some production, plankton production very early in
41 the year, but that plankton production was not
42 sustained through the period that the juvenile
43 salmon would be entering the Strait of Georgia.
44 And I can't remember exactly where that is. It's
45 too bad that Dr. Thomson isn't here to talk about
46 that, but that's in this paper.

47 Q But there's no plankton trawl that year.

1 DR. BEAMISH: That's true. There's no plankton
2 information available.

3 Q No direct evidence of prey abundance.

4 DR. BEAMISH: That's true. Yes.

5 Q And if I could go to Exhibit 1309, if we could go
6 to page 46. Now, that was the -- you were
7 referred to that yesterday, this is the chart from
8 your paper that refers to percentage of empty
9 stomachs. For sockeye you'd agree with me that
10 the percentage was relatively consistent with
11 other years.

12 DR. BEAMISH: Yeah, and we also reported that in
13 general those sample sizes are pretty small.

14 Q So that's what I understood you to do yesterday.
15 You took this fact that sockeye apparently has
16 absolutely normal stomach contents and you
17 dismissed your own finding by saying the sample
18 size was too small. Is that fair?

19 DR. BEAMISH: You'll have to explain to me what my own
20 finding was.

21 Q Well, wouldn't you say the finding is that the
22 stomach contents are normal?

23 DR. BEAMISH: But remember that what we were again --

24 Q Well, just answer that question, yes or no.

25 DR. BEAMISH: I can't answer it yes or no. You'll have
26 to --

27 Q Try.

28 DR. BEAMISH: You'll have to ask it in a different way,
29 then.

30 Q Okay, well --

31 DR. BEAMISH: You're asking me to say yes or no to
32 something that says "my finding", when I'm trying
33 to tell you that my finding was different than
34 what you're suggesting, and you're not allowing me
35 to explain what my finding is.

36 Q Well, let me ask you this. What do you mean by
37 the sample size is too small to draw conclusions
38 from?

39 DR. BEAMISH: Well, it's very small, all right? And if
40 you look at the sample sizes of chinook and coho,
41 all right, you'll see that they are larger.

42 Q So is it fair to say that --

43 DR. BEAMISH: And -- hang on, hang on, hang on, you
44 have to let me answer.

45 Q I have a limited time here.

46 DR. BEAMISH: Well then, then go to someone else then,
47 if you won't let me answer.

1 Q Go ahead, answer the question.

2 DR. BEAMISH: To allow me --

3 Q Can you explain why the sample size is smaller?

4 DR. BEAMISH: Yes, you see, the issue is this, that
5 when we looked at the message in these papers is
6 that the response to -- of the fish in the surface
7 waters in the Strait of Georgia is unprecedented.
8 We don't have all of the data that we want for all
9 of the species throughout the timeframe that we're
10 looking at these fish. So the key information
11 that indicates that prey production was
12 restricted, okay, or reduced, and I think
13 anomalously low, unique, if you want, comes from
14 these data that you're looking at now. And the
15 sample sizes there are good.

16 And you're looking at an indication that coho
17 and chinook, over this time series, synchronously
18 showed a very high percentage of empty stomachs,
19 along with all of the other information that we
20 provided, we interpreted this to indicate that
21 there was an issue with prey production. Also you
22 saw this morning the diet of chinook salmon and
23 you saw that herring were virtually absent from
24 the diet. That all indicates that the normal prey
25 of juvenile salmon in the Strait of Georgia in
26 2007 was basically minimal, or there was clearly a
27 problem with these fish, these juvenile salmon
28 finding prey. That's what the data show.

29 Q Sorry, maybe I've been mistaken, but I understood
30 that sockeye didn't eat herring. Their diet's
31 quite different than chinook, isn't it?

32 DR. BEAMISH: That's true. Sockeye don't eat herring,
33 but chinook do, neither -- and coho don't eat a
34 lot of herring, either. But in aggregate, when
35 you're looking at the four species of salmon plus
36 herring, and of course herring don't -- well, they
37 might eat a little bit, but all right. When you
38 look at that, and look at the synchrony of that
39 response, that was our interpretation that this
40 was an issue with them trying to find food.

41 Q But the fact that sockeye eat different food and
42 their stomach contents are not remarkable, you say
43 can be dismissed because the sample size is so
44 small for sockeye, isn't that right?

45 DR. BEAMISH: No. I'm saying that the sample size that
46 we had was small, and we have diet, by the way, of
47 what they were eating, but when you have sample

- 1 size of 50 or 60 fish, I'm reluctant to draw too
2 many conclusions about that. We --
- 3 Q It wouldn't be responsible --
- 4 DR. BEAMISH: Excuse me. We produced it because, you
5 know, people looking at this, like yourself, you
6 need to be able to see what these other species
7 were doing. And we identify that a small number
8 of salmon, of sockeye salmon were looked at, and
9 that's what we found. But I'm not drawing many
10 conclusions from that. I am saying that the small
11 sample of them, they were small in size, and we
12 also reported that they were small in size in the
13 Queen Charlotte Sound.
- 14 Q Well, why is the sample size of 65 fish too small
15 to rely upon for stomach contents, but big enough
16 to rely upon for the length?
- 17 DR. BEAMISH: Well, it's the same issue. The lengths
18 that we're using in 2007, we accept that that's
19 small. I'm reporting to you or reporting in this
20 paper, that those small samples that we had, had a
21 small size. The sample size that is in Queen
22 Charlotte Sound is a little bit bigger. It's not
23 much bigger actually, but a little bit bigger.
24 But still it's useful to know that they were --
25 they were small.
- 26 Q It would be irresponsible to draw conclusions from
27 a sample size that small, wouldn't it?
- 28 DR. BEAMISH: Would it be irresponsible? It would not
29 be something that I would do as a scientist to be
30 a -- to draw major conclusions from that, that's
31 true. I'm not so sure "responsible" is the right
32 word.
- 33 Q Well, if you did that in the paper, that would be
34 bad science, wouldn't it?
- 35 DR. BEAMISH: Pardon?
- 36 Q To the extent you --
- 37 DR. BEAMISH: No, I think if you, for example, if you
38 look at some of Dr. Welch's and others, even Dr.
39 McKinnell's, some of his drafts, the sample sizes
40 are extremely small. We have these small sample
41 sizes sometimes and we can't do much about it. So
42 we report them, and, you know, they are what they
43 are. People look at them and they know that it's
44 a small sample size and the fish are small, and
45 that's information to my colleagues, other
46 scientists can get some information from that, and
47 that's why those are reported.

1 Q Well, let's go to Table 2 of the first paper,
2 Exhibit 1303, if we could. Now, in that table,
3 you report the length of juvenile salmon as 107.9
4 millimetres in 2007 and 110.9 in 2008, right?
5 DR. BEAMISH: Yes, it looks like that.
6 Q And on that 3-millimetre difference you draw --
7 you say that's a significant difference?
8 DR. BEAMISH: I don't know. Is that what it said?
9 Q Well, the word "significant" appears in the last
10 line of the description of the table, just above
11 the table, "significantly smaller".
12 DR. BEAMISH: If it says that, I can't really see it
13 there, but we would have done a test on them. But
14 if -- I can't see where it says that, but if
15 you've looked at it, then it must --
16 Q There were --
17 DR. BEAMISH:
18
19 Lengths for fish caught in the Strait of
20 Georgia, Queen Charlotte Sound, and Hecate
21 Strait...were significant smaller than those
22 caught in 2008 and 2009.
23
24 What I'm puzzling over is whether that's the
25 aggregate of those lengths. In other words, it's
26 not -- I just can't remember that exactly, in
27 other words, when we took all of the lengths to
28 compare to the lengths in the other years.
29 Q Well, so would you agree with me, regardless of
30 what it says in the table, that the 65 fish caught
31 in 2007 were too small a sample to draw that
32 conclusion in comparison to 2008?
33 DR. BEAMISH: Well, I just told that I'm not quite
34 clear what that conclusion refers to, and that --
35 Q That they were smaller in 2007 in the Strait of
36 Georgia than in 2008. You had too small a sample
37 size to say that, didn't you.
38 DR. BEAMISH: To say that they were smaller in -- I'm
39 not sure that we actually said that. I don't
40 remember saying that they were smaller in 2007
41 than 2008, because I recall that they weren't.
42 Q All right. So --
43 DR. BEAMISH: All right? So I would have to take some
44 time to check the paper. But just from memory, I
45 don't think that they were significantly smaller.
46 Q So as far as you're concerned now, it's reasonable
47 to say the fish in 2007 and 2008 were the same

1 size?
2 DR. BEAMISH: In terms of length and weight?
3 Q Yes.
4 DR. BEAMISH: Yeah, they were similar in size. I
5 wouldn't say the same, but I think it's fair to
6 say they were similar, yes.
7 Q Can I take you to -- can we go to Table 5 of the
8 other report?
9 DR. BEAMISH: While you're saying that, I know you have
10 restricted time. Well, okay, never mind, I'll --
11 all right.
12 Q So I'd like to take you back to your synchronous
13 report, to Table 5, which is at page 34. Now, Dr.
14 Beamish, I understand this table is produced from
15 exactly the same trawl data as the Table 1 in the
16 first report.
17 DR. BEAMISH: You'll have to tell me what -- remind me
18 what Table 1 was.
19 Q Well, Table 1 and 2, which we've just looked at,
20 were the --
21 DR. BEAMISH: Well, this is trawl data for the Strait
22 of Georgia.
23 Q Right.
24 DR. BEAMISH: Okay? That's true.
25 Q But if we take the sockeye portion and we go under
26 2007, so that's four chunks of data down.
27 DR. BEAMISH: Yes.
28 Q And third-last row.
29 DR. BEAMISH: I've got it. Yes.
30 Q We see 107.9.
31 DR. BEAMISH: Yes.
32 Q And 65 fish.
33 DR. BEAMISH: Yes.
34 Q If we go to 2008 we see 106 as length and 11.9 as
35 weight, right?
36 DR. BEAMISH: Yes.
37 Q So it's clear that whether or not the difference
38 is significant, 2008 fish were smaller than 2007.
39 DR. BEAMISH: Well, there's -- I thought we just agreed
40 that they were similar in size. Isn't that what
41 we just agreed a minute ago, you and I?
42 Q They're similar in size.
43 DR. BEAMISH: Well, that's what we agreed, you and I
44 agreed to that, just a minute ago.
45 Q So you couldn't draw the conclusion that the fish
46 in 2007 were smaller than the fish in 2008.
47 DR. BEAMISH: We just agreed to that. Yes.

- 1 Q Right. So --
2 DR. BEAMISH: But I will point out one thing, all
3 right? I know this is taking time away from you,
4 but the difference in 2008 and 2007 is also the
5 abundance, all right? Is that the number of
6 juvenile sockeye in the Strait of Georgia in 2008
7 was extremely large. And you get into this issue
8 of -- and there was huge numbers of pink salmon,
9 all right? So you're dealing with this - I know,
10 I realize for these proceedings it's hard to get
11 into all the details - but you're dealing with a
12 very different situation in the Strait of Georgia
13 ecosystems. You're dealing with large abundances
14 of these juvenile salmon, including pink and
15 sockeye. And so those large abundances themselves
16 can influence growth, as well as restricted prey
17 production.
18 Sorry for taking a little bit of time, but
19 that's important.
20 Q Well, I thought -- when I started here, I thought
21 your thesis was based on the fact that in -- based
22 on the trawl data the fish you caught in 2007 were
23 fewer in number and smaller in size. Now I seem
24 to be incorrect about that. You agree they
25 weren't smaller in size?
26 DR. BEAMISH: Than what?
27 Q Than 2008.
28 DR. BEAMISH: That's agreed. I agree that they're
29 similar in size.
30 Q So now you want to say you drew some conclusions
31 about 2007 and 2008 because they were fewer in
32 number.
33 DR. BEAMISH: No, I said that -- well, that's partly
34 true. But what I'm saying is that I'm trying to
35 make the point that when you -- that the size in
36 2008 that they were smaller, the sockeye were
37 smaller, is in part, I think, a result of the
38 large abundances of lots more juvenile fish in the
39 Strait of Georgia, and that hasn't come out yet.
40 And now I'm telling everyone that in 2008 there
41 were large abundances of pink salmon. Remember
42 that in 2009 we got almost a record return of
43 pink. These juveniles are all in the Strait of
44 Georgia and they're all feeding at the same time.
45 Q Well, let me ask --
46 DR. BEAMISH: So that small size could -- could also be
47 related to this density effect that you've heard

1 about.

2 Q So the reason the fish were smaller in 2008 is
3 because there were more other fish; is that right?

4 DR. BEAMISH: No, we don't know that for sure. I
5 suspect that that's -- I don't know that for sure.
6 I suspect that that is related to it, yes.

7 Q Okay. Well, let's go to the abundance. The only
8 evidence you have about abundance is the fact that
9 65 fish were caught in the trawl in 2007 and
10 something over 1,000 were caught in 2008. That's
11 the only data point you have from which you're
12 drawing that conclusion, right?

13 DR. BEAMISH: Well, we don't actually use abundance in
14 this paper. I'm pretty sure it's not in there. I
15 do have abundance estimates. But they haven't --
16 I haven't talked about those yet.

17 Q Well, it would be completely inappropriate, would
18 it not, to draw any kind of conclusions about
19 abundance based on the trawl in July of 2007.

20 DR. BEAMISH: Absolutely not. It would be -- you could
21 draw -- I can make abundance estimates. I'll tell
22 you what they are. They're around 200,000 fish
23 for 2007. I'm just doing it from memory. We've
24 made those abundance estimates.

25 Q You're saying that it's appropriate to do an
26 abundance estimate on sockeye based on a trawl
27 that takes place from July 8th to July 15th.

28 DR. BEAMISH: I'm telling you that when -- even with
29 that small sample size we can make an abundance
30 estimate, yes, we can. The confidence limits are
31 extremely large but scientifically we can make an
32 abundance estimate. I have an abundance estimate.
33 I don't want to use it for the reasons that you're
34 suggesting, but I can make it. I can put
35 confidence limits on it.

36 And someone here estimated that was about one
37 percent of the surviving fish in 2007 in that
38 early July period, and that's probably true. But
39 that also means that of the 500 million or 450
40 million that were produced in the Fraser system,
41 only 20, 25 million were -- approximately, were
42 alive at that time. And these are very rough
43 estimates that we didn't put into these documents
44 because it's sort of information that you want to
45 be careful about, if you're going to, you know, if
46 you're going to draw important conclusions from.

47 But, no, I can produce abundance estimates

1 from this.
2 Q Wasn't the whole trawl survey designed for coho,
3 designed for species that you thought were
4 resident.
5 DR. BEAMISH: You'll have to explain that.
6 Q Well, I'll come back to that. Let me bring up a
7 document on the screen.
8 DR. BEAMISH: Yes.
9 Q A document that I believe you wrote, Dr. Beamish.
10 Aquaculture number 7.
11 MR. LUNN: (Indiscernible - away from microphone).
12 MR. McDADE: Aquaculture 7, Beamish, 2001, Persistence.
13 Yes.
14 Q This is your document, Dr. Beamish?
15 DR. BEAMISH: Yes.
16 Q Can we go to page 5?
17 DR. BEAMISH: Well, just first of all, this is --
18 remember what kind of document this is, right?
19 These are documents that we submit when we meet at
20 the North Pacific Anadromous Fish Commission, all
21 right? These are documents that report to our
22 colleagues what work we have done that year. So,
23 yes, these are documents that are available to the
24 public, but these aren't peer reviewed documents.
25 These are the equivalent of progress reports, just
26 so that everybody knows what this is.
27 Q Page 5, please. I want to take you to the last
28 sentence in the first paragraph:
29
30 Larger numbers of juvenile sockeye were
31 caught in 2001...than in 2000..., however, we
32 do not believe that the June/July survey is a
33 measure of relative abundance among years as
34 most juvenile sockeye leave the
35 Strait...before July.
36
37 That's your own words, isn't it?
38 DR. BEAMISH: Well, that's what we wrote at that time,
39 when I, whatever the date was for that, okay? But
40 here's the issue, all right? I just want to make
41 sure I read it correctly here. I'm trying to --
42 that's for June and July, right?
43 MR. McDADE: Can I just have that document marked as an
44 exhibit while the witness is reading.
45 THE REGISTRAR: Exhibit 1328.
46
47

1 EXHIBIT 1328: Beamish et al, Persistence of
2 the improved productivity of 2000 in the
3 Strait of Georgia, British Columbia, Canada,
4 through to 2001, October 2001
5

6 DR. BEAMISH: Okay. So remember that I just told you
7 that we can make abundance estimates. Now, this
8 was a while ago that we wrote this, and these are
9 progress reports. But what this is saying is that
10 these are abundance estimates. Now, are they
11 available -- I'm sorry, are they usable among
12 years? As we accumulated more information on
13 this, I began to change my interpretation of this,
14 all right? And you have evidence of that when Dr.
15 McKinnell and other people comment on our report
16 where we say that, look, we think the returns in
17 2009 are going to be very poor. And people, I
18 think, fairly say, "Well, you are fishing the tail
19 end of the survey and how do you know that that's
20 representative of the population?" The answer to
21 that is, well, we don't really know. We will only
22 know after we accumulate enough information and
23 see whether those predictions are usable. And
24 they require, you know, a continuous data series.
25 So at the time that we wrote that, yes,
26 that's probably the way I was thinking. However,
27 by the time I get to 2007 and '08 and '09 I'm
28 beginning to think that there's at least a
29 possibility that those abundance estimates are
30 usable. All right? And we did present that graph
31 that indicates that they might be usable in our
32 document that we submitted.

33 MR. McDADE:

34 Q You agree that the --

35 MR. TIMBERG: Mr. Commissioner, I note the time.

36 THE COMMISSIONER: The time, yes. We're going to have
37 to take our adjournment now. Thank you.

38 THE REGISTRAR: The hearing is now adjourned and will
39 resume again tomorrow morning at 9:00 a.m.
40

41 (PROCEEDINGS ADJOURNED TO JULY 8, 2011 AT
42 9:00 A.M.)
43
44
45
46
47

1 I HEREBY CERTIFY the foregoing to be a
2 true and accurate transcript of the
3 evidence recorded on a sound recording
4 apparatus, transcribed to the best of my
5 skill and ability, and in accordance
6 with applicable standards.
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10 _____
11 Karen Hefferland
12

13 I HEREBY CERTIFY the foregoing to be a
14 true and accurate transcript of the
15 evidence recorded on a sound recording
16 apparatus, transcribed to the best of my
17 skill and ability, and in accordance
18 with applicable standards.
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22 _____
23 Karen Acaster
24

25 I HEREBY CERTIFY the foregoing to be a
26 true and accurate transcript of the
27 evidence recorded on a sound recording
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34 _____
35 Diane Rochfort
36

37 I HEREBY CERTIFY the foregoing to be a
38 true and accurate transcript of the
39 evidence recorded on a sound recording
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41 skill and ability, and in accordance
42 with applicable standards.
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46 _____
47 Pat Neumann