

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



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

Public Hearings

Audience publique

Commissioner

L'Honorable juge /
The Honourable Justice
Bruce Cohen

Commissaire

Held at:

Room 801
Federal Courthouse
701 West Georgia Street
Vancouver, B.C.

Thursday, January 27, 2011

Tenue à :

Salle 801
Cour fédérale
701, rue West Georgia
Vancouver (C.-B.)

le jeudi 27 janvier 2011

APPEARANCES / COMPARUTIONS

Wendy Baker, Q.C. Maia Tsurumi	Associate Commission Counsel Junior Commission Counsel
Mitch Taylor, Q.C. Jonah Spiegelman	Government of Canada ("CAN")
No appearance	Province of British Columbia ("BCPROV")
No appearance	Pacific Salmon Commission ("PSC")
No appearance	B.C. Public Service Alliance of Canada Union of Environment Workers B.C. ("BCPSAC")
No appearance	Rio Tinto Alcan Inc. ("RTAI")
No appearance	B.C. Salmon Farmers Association ("BCSFA")
No appearance	Seafood Producers Association of B.C. ("SPABC")
No appearance	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")

APPEARANCES / COMPARUTIONS, cont'd.

No appearance	Southern Area E Gillnetters Assn. B.C. Fisheries Survival Coalition ("SGAHC")
No appearance	West Coast Trollers Area G Association; United Fishermen and Allied Workers' Union ("TWCTUFA")
No appearance	B.C. Wildlife Federation; B.C. Federation of Drift Fishers ("WFFDF")
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")
Brenda Gaertner	First Nations Coalition: First Nations Fisheries Council; Aboriginal Caucus of the Fraser River; Aboriginal Fisheries Secretariat; Fraser Valley Aboriginal Fisheries Society; Northern Shuswap Tribal Council; Chehalis Indian Band; Secwepemc Fisheries Commission of the Shuswap Nation Tribal Council; Upper Fraser Fisheries Conservation Alliance; Other Douglas Treaty First Nations who applied together (the Snuneymuxw, Tsartlip and Tsawout)
No appearance	Adams Lake Indian Band
No appearance	Carrier Sekani Tribal Council ("FNC")
No appearance	Council of Haida Nation

APPEARANCES / COMPARUTIONS, cont'd.

No appearance	Métis Nation British Columbia ("MNBC")
No appearance	Sto:lo Tribal Council Cheam Indian Band ("STCCIB")
No appearance	Laich-kwil-tach Treaty Society Chief Harold Sewid Aboriginal Aquaculture Association ("LJHAH")
Lisa Fong Benjamin Ralston	Heiltsuk Tribal Council ("HTC") Articled Student
No appearance	Musgamagw Tsawataineuk Tribal Council ("MTTC")

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1 Vancouver, B.C. /Vancouver (C.-B.)
2 January 27, 2011/le 27 janvier
3 2011
4

5 THE REGISTRAR: The hearing is now resumed.

6 MS. BAKER: Thank you, Mr. Commissioner. There's a
7 couple of little housekeeping things I wanted to
8 take care of. When we were dealing with Ms.
9 Grant's evidence yesterday, we dealt with two
10 exhibits which have now been marked as 340 and
11 352, and if you'll recall, we had a document from
12 Ringtail that was in black and white and as we
13 were talking to the witness, we realized that
14 colour was needed so Mr. Lunn was able to find a
15 PDF that was in colour and we used that, but
16 probably for the record, we should have the
17 exhibit containing both of those, the colour and
18 the black and white. The only reason to keep the
19 black and white is that it has the CAN reference
20 on it, which we did use in the questions.

21 So what I would like to do is, on Exhibit
22 340, which is the forecast for 2009, I'd like to
23 have the colour non-Ringtail document marked as
24 340A so they'd just be kind of together in the
25 record.

26 MR. TAYLOR: I have no difficulty with this. I'm
27 taking it from Ms. Baker that she's satisfied
28 herself they're the same document?

29 MS. BAKER: Yeah. I mean, we went through both with
30 the witness, in any event. We flipped between
31 them immediately so if that's acceptable.

32 THE COMMISSIONER: They'll be so marked.
33

34 EXHIBIT 340A: Colour non-Ringtail copy of
35 Pre-Season Run Size Forecasts for Fraser
36 River Sockeye and Pink Salmon in 2009
37

38 MS. BAKER: And the next one was Exhibit 352, which is
39 the 2010 forecast research document. And so the
40 same would be to have the colour non-Ringtail
41 document marked as 352A.

42 THE COMMISSIONER: So marked.
43

44 EXHIBIT 352A: Colour non-Ringtail copy of
45 Pre-Season Run Size Forecasts for Fraser
46 River Sockeye Salmon in 2010
47

1 MS. BAKER: Thank you. Thank you. So I'll begin again
2 with the witnesses.
3

4 MIKE LAPOINTE, resumed.
5

6 DR. BRIAN RIDDELL, resumed.
7

8 EXAMINATION IN CHIEF BY MS. BAKER, continuing:
9

10 Q Mr. Lapointe, we were talking yesterday about
11 species composition impacts on the numbers that
12 you are able to -- or the data that you're able to
13 receive at Mission Hydroacoustics. One thing I
14 wanted to just flag is when you were here much
15 earlier, still in 2010, you dealt with this in
16 cross, and an exhibit was marked, Exhibit 74,
17 which I just wanted you to confirm that the bias
18 through species composition issue is outlined in
19 that report, in Appendix 5?

20 MR. LAPOINTE: That's correct. That's the best
21 comprehensive review of the 2005 situation. So
22 it's a good place to refer to on this issue.

23 Q Okay. Thank you. And did you have any other
24 points you wanted to raise on the species
25 composition issue?

26 MR. LAPOINTE: Yeah, there was one I forgot to mention
27 yesterday that relates to one of the other
28 potential solutions to this, and it involves the
29 use of the DIDSON images. DIDSON images are quite
30 high resolution and you can actually get not a
31 perfectly accurate length, but a reasonably
32 accurate length of the fish targets that are seen
33 through the DIDSON. And so we've been exploring a
34 method to use the lengths of the DIDSON to
35 distinguish between pinks and sockeye. And
36 because pinks are so much smaller than sockeye,
37 there does seem to be quite a bit of potential in
38 this approach, and it was actually presented at a
39 conference, I think it was a pink and chum
40 workshop in Nanaimo. So that would help us for
41 the shore. We still don't have a routine DIDSON
42 operating in the mid-channel right now and so we'd
43 need to have that if we're going to implement it,
44 but it does look like there's a way that doesn't
45 involve test fishing that might actually hold some
46 promise.

47 Q Okay. Thank you. One other area I wanted to

1 cover with you in terms of potential interference
2 with the data at Mission is driftnet interference.

3 MR. LAPOINTE: Sure.

4 Q Are there problems, or can there be problems with
5 driftnet interference in the numbers that you
6 obtain from Mission?

7 MR. LAPOINTE: Sure. A bit of background. We've
8 actually had, from time to time, fishers fishing
9 near our site. It's not a bad spot to catch some
10 fish so we've actually had set nets that
11 occasionally have been actually anchored right off
12 this dolphin that we actually use as a reference
13 marker. And in those cases, in the past, we've
14 been pretty effective at being able to have a
15 conversation with the folks involved and explain
16 to them the impacts and, in fact, the nets would
17 just have been removed or moved to a different
18 location.

19 Beginning in about '04/05, something new
20 started happening, and this was drift gillnet
21 fishing, and at that time, I believe, and I'm not
22 clearly exactly on these dates, but I believe
23 there was a period around that time when drift
24 fishing above the Mission bridge became illegal,
25 and prior to that, it wasn't illegal activity, and
26 I don't know the exact dates there. But the
27 initial activity was actually at night. It was in
28 the middle of the night, our boat at Mission
29 transects 24/7 back and forth across this river
30 and so the transecting in this vessel would just
31 appear with a net with some fish in it sort of
32 drifting towards you. And there were a couple of
33 incidents of very near collisions associated with
34 that activity, and probably on the order of about
35 a dozen, or two dozen interactions on an annual
36 basis during that initial period. So subsequent
37 to that, and again, I'm going to need some help as
38 to the exact year, drift fishing became
39 illegalized activity and, actually, the night-time
40 activity stopped, which was a really good thing
41 from a safety perspective, but we did have folks
42 drifting through during the day as part of their
43 normal, authorized fishing activities, you know,
44 communal-licensed activities at the site.

45 And so the initial activity, the night-time
46 activity seemed to involve from conversations with
47 some of those folks and subsequent multiple

1 groups, it seemed like there were multiple groups
2 involved. The daytime activity seems to be
3 primarily one group, and it's primarily the Sumas
4 First Nations. So the drifting seems to be more
5 prevalent, more of an issue when there's more
6 abundance. And what I mean by that is that in our
7 dialogue with Sumas, and we have an ongoing
8 dialogue on this issue, we try to get -- have sort
9 of an informal agreement that folks should try to
10 get their nets and their fishing activity
11 completed before they get to our site. But when
12 there's a lot of fish in the river, it's hard for
13 them to get all the fish out of their net before
14 they get to the site. It's just physically
15 difficult.

16 So we have on the order of, you know -- well,
17 for example, in 2010, you know, basically every
18 weekend, we had activity, the fishery was open and
19 activity going through the site. And you know,
20 it's been a source of ongoing dialogue, I would
21 say.

22 Q You've described a safety issue, but is there an
23 issue in terms of how the drift fishing can impact
24 the actual data that you're collecting at Mission?

25 MR. LAPOINTE: Yes, it basically disrupts the
26 distribution of the migration so I think as I
27 described yesterday, but perhaps I could review it
28 briefly again, the most robust part of our
29 estimation scheme at Mission is the shore-based
30 part of it. That's the part that seems to be the
31 most reliable. The vessel is a significant
32 challenge. So what happens with the drifting
33 activity is it tends to put more of the estimate
34 into the vessel part of the estimate, which is the
35 least robust. So the challenge is on the
36 distribution site.

37 Now, I cannot provide to you a quantification
38 of the impact. I think I want to be clear about
39 that. It's a very difficult thing to quantify.
40 You'd have to try to do something with fishing and
41 without fishing and kind of see how it affects the
42 estimates, but it just probably creates a
43 significant amount of additional uncertainty in
44 the estimates, and that would be the main concern
45 that we have.

46 As I've said, we've had a very constructive
47 and positive dialogue with the Sumas First Nation

1 on this issue, and it's ongoing, and we will
2 continue to participate as needed.

3 Q Is that the primary reason why this is an issue
4 for the Salmon Commission, is that there's an
5 additional uncertainty in the data collected at
6 that site which arises from that fishing activity?

7 MR. LAPOINTE: Yeah, it relates to protecting the
8 integrity of the data collection scheme.

9 Q Okay. And there's a memo that you prepared in
10 July 2008 dealing with this issue; is that right?
11 An Email?

12 MR. LAPOINTE: Yeah, you might have to refresh my
13 memory on it.

14 Q Yeah, it's in Tab 8 of the binder in front of you.

15 MR. LAPOINTE: Okay.

16 Q And it's document CAN204994.

17 MR. LAPOINTE: Sure, so -- yeah, this --

18 Q And if you've turned, really, over to the second
19 and third pages, that's an outline of the issue
20 and where things were at that time, I guess, in
21 trying to resolve it.

22 MR. LAPOINTE: Yeah, so one of the roles that we've
23 played in this discussion is that over the course
24 of these events, there's been, I think, three
25 different area directors in the Lower Fraser and
26 so the context of this email was that Mel was the
27 new area director and so I was trying to brief Mel
28 on where we were at from, you know, PSC
29 perspective, but trying to have all the issues so
30 he would know. And I guess, you know, perhaps
31 that would come internally, but I thought if I
32 could do that, it would help him understand what
33 was going on.

34 Q Okay. Has the situation changed since the state
35 of the issue as described in this email?

36 MR. LAPOINTE: Not substantially. This is '08. So we
37 have tried to engage Sumas First Nations in a test
38 fishery at our site to deal with the species
39 composition issue. I think I mentioned that
40 yesterday. But in terms of a resolution, it's
41 still unresolved. I don't know if this memo
42 mentions it, but there is a boundary. It's about
43 a 300-metre buffer zone. So there's actually two
44 little markers on the side of the Fraser, and that
45 boundary is intended to protect the site, but we
46 have had, of course, some events occur. And this
47 year, you know, for example, early in the season,

1 I think we did call Conservation Protection once,
2 and they responded and removed a set net that was
3 actually inside the boundary. So you know, it's
4 still ongoing and unresolved, but like I say,
5 we're still trying to be in a very positive
6 dialogue and constructive dialogue about -- you
7 know, I think we understand, each side understands
8 each of our perspectives. Like, I think, Sumas
9 understands the importance of the site, and I
10 think we understand some issues from the Sumas
11 side that I won't speak to, because I can't speak
12 for Sumas, but they're kind of laid out in this
13 memo, or this email to some extent.

14 Q Okay. Does the interference created by this site
15 pose any challenges to the data? Like, can you
16 use the data from Mission, or is this such a
17 problem that it creates a significant uncertainty
18 in that data? Or is it more just you're flagging
19 it as a concern that needs to be resolved?

20 MR. LAPOINTE: Well, we obviously still operate. I
21 mean, we have to deal with the data that we have,
22 but it's probably the timeliness. The time that
23 it occurs is a little bit, you know, unfortunate
24 in some ways because it occurs on the weekends so
25 typically, in our sequence of meetings, the
26 important decisions are made on Friday and they
27 might be made based on some sort of test fishing
28 projections for some of those days. And then when
29 we get the data on the weekend, if that's
30 significantly different, and if that is different
31 because of the interference, and I've already said
32 I can't quantify this, then it could create a
33 disconnect in the meeting process.

34 So we still work, we still do our best, but
35 because I can't quantify the exact impact, I'm not
36 sure how, you know, having it or not having it
37 would affect things.

38 Q All right. And just to put it in really simple
39 terms, if there's fishing before Mission, when you
40 collect the data at Mission, it may create an
41 artificially low run size based on, you know, your
42 extrapolations from the test fishing site?

43 MR. LAPOINTE: Yeah, this is not fishing before
44 Mission, this is actually drifting a net right
45 through the actual site.

46 Q Okay.

47 MR. LAPOINTE: And so the actual direction of bias will

1 depend upon the impact on the fish behaviour. It
2 could be low, it could be high in some cases,
3 depending upon the impact on behaviour, but that's
4 the idea is that there's some impact on certainty
5 of potential direction that is unquantifiable at
6 this point, that we're concerned about in terms of
7 that assessment.

8 Q Okay. And we've talked yesterday and today about
9 different potential biases in the data collected
10 at Mission. Some of those include the species
11 composition, uncertainty, fishing interference,
12 uncertainty, sampling design challenges, boat
13 interference and bias.

14 Given those uncertainties, first of all,
15 first question, is the relative magnitude of
16 potential bias at Mission consistent from year to
17 year, given all these different factors?

18 MR. LAPOINTE: The short answer is no, for two reasons.
19 One is that we tried to have a very consistent
20 sampling scheme and so from that aspect, if it's
21 consistent, you'd expect it to be a consistent
22 level of bias, but we also obviously had
23 improvements. So we talking about going from
24 single beam from 1977, up until 2003 or 2004, was
25 single beam technology, and 2004, the split beam
26 estimator became the estimator. So clearly, if
27 you're changing techniques, that could create an
28 inconsistency over that time series.

29 The more fundamental challenge, though, is
30 the fish behaviour challenge. So what the fish
31 do, and a perfect example would be the pink salmon
32 issue, is going to affect the relative degree of
33 bias. So if you have early upstream migration of
34 pinks, that can create a larger bias than if you
35 don't. So the fish behaviour going from here on
36 forward, now that we have the technique relatively
37 consistent, although we are still working on a
38 mid-channel program, is the thing that can create
39 the differences in the biases between years.

40 Q Okay. And I'd like to ask this question to both
41 of you. Is it fair to say that scientists
42 generally agree that the statistical methods used
43 at Mission are good and reliable, despite some of
44 the problems that we have talked about today and
45 yesterday?

46 MR. LAPOINTE: I'll go first and then I'll let Brian
47 chime in. I think that if you ask folks, a fair

1 assessment of what they might say would be, and I
2 don't know if statistics folks are the best folks,
3 or the acoustics folks, but the point's probably
4 the same either way. I think they'd probably say
5 that what we're doing is the best that can be done
6 at the site that we're working on with the caveat
7 that the one area that we can improve is in the
8 mid-channel sampling. That's still the weak link.

9 And I think they'd also be quite quick to
10 point out that Mission is a very challenging site
11 to do acoustics. You have tidal effects, you've
12 got eddies, you've got 400 metres of river you're
13 trying to cover, it's a very significant
14 challenge.

15 So the techniques that we are using are good,
16 but the challenge still remains and, right now,
17 the biggest challenge is the mid-channel sampling.

18 DR. RIDDELL: There we go. If I could just comment for
19 a second on the question before, too, I mean, I
20 think the very obvious difference from year to
21 year is Mike is talking about pink run timing, but
22 the very fact that you have pinks even in odd
23 years and not in even years is a huge change. And
24 then, I mean, you can't really underestimate the
25 concern you get with added uncertainty because of
26 the environmental conditions.

27 With the profile of the stream at Mission,
28 you could have years of low flow in a lower summer
29 period where you really could have fish out in the
30 middle in the main channel and so the issue of the
31 appropriateness of the site for hydroacoustics
32 really depends on the environmental conditions you
33 encounter in the year, but Mike really touched on
34 all those things.

35 I would agree almost completely with what
36 Mike said when thinking about the sort of
37 questioning you put to me before and coming from
38 the departmental background, I think Mike
39 encapsulated it pretty well exactly. It's very
40 good work for the environment they're working in,
41 but they're working in an extremely difficult
42 environment. And I would repeatedly hear that
43 from our staff, that we're the DFO experts on
44 hydroacoustics.

45 And I think the other thing we should
46 recognize there is we didn't start out actually
47 having a really, really good working relationship

1 because there really was a very long history of
2 thinking that Mission was correct. But as more
3 and more uncertainty got involved there and the
4 Department started putting more effort into trying
5 to assist and evaluate what's going on there, I
6 think the working relationship now is vastly
7 improved and very constructive now.

8 Q Sorry, working relationships between who?

9 DR. RIDDELL: Well, there was always the departmental
10 science staff looking at different types of
11 technology and different environment, but they
12 weren't the ones working directly in Mission so
13 they would have a particular mindset about how
14 hydroacoustics functions, how good could it work,
15 but that is from their personal experience, not
16 working in the Mission environment. So there was
17 quite a long dialogue there, probably through the
18 '90s, more than in the 2000s. And then with the
19 development of Qualark, again, in the 2000s,
20 there's been a much more open dialogue. So I
21 think Mike has encapsulated it correctly.

22 MS. BAKER: Thank you. I didn't mark the memo that we
23 referred to with Mr. Lapointe dated July 11, 2008.
24 I should mark that as an exhibit.

25 THE REGISTRAR: Exhibit number 354.

26
27 EXHIBIT 354: Email from Mel Kotyk dated
28 July 11, 2008, entitled, "Sumas FN fishing
29 and Mission Hydroacoustics site
30

31 THE COMMISSIONER: Ms. Baker, I wonder if I could just
32 ask just a couple of very brief questions.

33 MR. LAPOINTE: Sure.

34 THE COMMISSIONER: There's a lot of information here,
35 Mr. Lapointe, so it's probably in there somewhere,
36 but just --

37 MR. LAPOINTE: Okay.

38 THE COMMISSIONER: -- to remind me, just a couple of
39 things, why was the Mission site chosen? Were
40 other sites considered? Are you locked into the
41 Mission site? The other query I have is I
42 understand the escapement information comes from
43 the DFO to the Pacific Salmon Commission, and the
44 forecasting is done by DFO and that comes to the
45 Commission. Why is it the Commission that's
46 operating the Mission site, and not the DFO?

47 MR. LAPOINTE: Okay. On the first part of your

1 question, I suspect that you're going to be
2 leading me through some evidence that speaks to
3 why the Mission site is where it is so I don't
4 know if -- I think that might be the most
5 effective way.

6 THE COMMISSIONER: That's fine.

7 MR. LAPOINTE: I'm not sure, counsel, if you agree.

8 MS. BAKER: Yeah, that's fine. We are going to deal
9 with it.

10 MR. LAPOINTE: Okay. Okay. On the second part of your
11 question, I actually don't know the long-term
12 history of the role of the PSC admission pre-1985,
13 but if you actually look at the 1985 treaty,
14 there's a diplomatic note towards the end of that
15 document that clearly defines one of the bilateral
16 responsibilities of the PSC, which was established
17 in 1985 under that treaty, as being monitoring at
18 Mission. And I suspect that probably is because
19 as part of the IPSFC, which was the predecessor to
20 the PSC, this program was started in 1977 so
21 that's eight years before the new treaty. So I
22 think it was something that evolved as the IPSFC
23 recognized a need for monitoring lower over-
24 escapements as part of the IPSFC, and then when
25 the new treaty was signed, it's just sort of
26 naturally got woven into the responsibilities of
27 the PSC. I think I may have missed some of your
28 other questions so you may have to help me out
29 there.

30 THE COMMISSIONER: No, I think you've addressed it, I
31 just recall you saying in one of your appearances
32 here --

33 MR. LAPOINTE: Okay.

34 THE COMMISSIONER: -- when you were asked about whether
35 the PSC could take on some of the DFO
36 responsibilities around forecasting and whatever
37 else comes into the data picture, and you
38 suggested, for a variety reasons, that was
39 probably not in the cards.

40 MR. LAPOINTE: Yeah, so this, I think, was in reference
41 to a question under cross where -- and I want to
42 say it was from the Area E group, but I'm not sure
43 if that's correct, about the context, I guess, is
44 kind of like, well, in the old days, when the
45 IPSFC had all this responsibility, they did all
46 this work. And it's true, the IPSFC did the
47 escapements, they did the forecasting, and when

1 the new treaty was signed, some of those duties,
2 and I wasn't around in that negotiation period,
3 and maybe Brian will have some recollection and he
4 can help here, some of those duties were
5 transferred to DFO, most of them were. The only
6 things that were retained, the main element was
7 the in-season management data flow. And since
8 Mission is such an important part of the in-season
9 management data flow, it was retained, the
10 spawning escapements, the forecasts.

11 Now, as Ms. Grant said yesterday, you know,
12 it is definitely collaborative. Like, you were
13 asking questions about the forecast and, you know,
14 there was a time, even in the last decade, when
15 because we have a responsibility under the treaty
16 with respect to forecasting, that we might have
17 provided our comments on the forecast in February,
18 even though Canada's review might have occurred in
19 November. And one of the things I've been trying
20 to do is that wasn't effective because Canada
21 already had an internal review. To have us now
22 come and say something in February that's
23 significantly different really kind of, you know,
24 could throw a wrench in the spokes, so to speak.

25 So now, and Sue's testimony reflects this, we
26 participate in November and provide our input then
27 so that we're not creating those spokes in the
28 wrench.

29 So hydroacoustic is an example, forecasting
30 is an example, escapement enumeration, all
31 examples of how -- I'm not taking credit for this,
32 but how the philosophy is you try to be an
33 effective partner in this, in terms of your
34 timeliness of your participation, all those
35 things, and so that's why I can see it could be a
36 bit confused, our responsibility, you know?

37 If Catherine, my staff, can help to forecast,
38 I let her help forecast, you know, to the extent
39 she can do it within the duties I have with me.
40 So it's trying to foster that collaboration that's
41 important because we work so closely together and
42 the information is so integrated that we've got to
43 work together, and so we do.

44 DR. RIDDELL: My recollection would be identical, Mr.
45 Commissioner, because in 1985, the Fraser River
46 Panel was being defined in the Memorandum of
47 Understanding, and as Mike pointed out, the

1 Mission hydroacoustics at the time, that was the
2 final piece of the in-season management. And so
3 it was a natural breakpoint between
4 responsibilities of the panel for in-season
5 management of Fraser sockeye and pink and then DFO
6 responsibility for stock assessment more
7 generally. And stock assessment doesn't occur
8 actively in-season and so the Mission really is a
9 clear break between the end of the in-season
10 information and the beginning of DFO's
11 responsibilities.

12 MS. GRANT: Mr. Commissioner, I don't know if it's
13 useful, but Exhibit 65 has the Memorandum of
14 Understanding, 1985, and page 134, potentially, it
15 might have the -- I'm not sure about the page
16 number, but at the very end has the breakdown of
17 responsibilities. So it would be in higher, or
18 earlier.

19 THE COMMISSIONER: Thank you, both.

20 MS. GRANT: We can provide that.

21 MS. BAKER: That's it right there.

22 MS. GRANT: Oh, there it is. Okay. Page --

23 MS. TSURUMI: 126.

24 MS. BAKER:

25 Q All right. Thank you. Now, I wanted to move on
26 to spend a bit of time on Qualark. So Dr.
27 Riddell, you're going to be the lead answerer for
28 this next batch. First of all, the Department of
29 Fisheries and Oceans operated a second
30 hydroacoustic program from '93 to '98 at the
31 Qualark site; is that right?

32 DR. RIDDELL: Yes, it is.

33 Q Okay. And that site was implemented in response
34 to the Pierce and Larkin review in 1992?

35 DR. RIDDELL: Yes.

36 Q And I don't know if I need to take you to this
37 exhibit. Let me know if you need to see it, but
38 can I just ask you if you remember that Larkin
39 recommended that hydroacoustic monitoring be
40 located at every major tributary? Do you recall
41 that?

42 DR. RIDDELL: Yes, I do.

43 Q Okay. And the establishment of Qualark was in
44 response to that recommendation?

45 DR. RIDDELL: Yes.

46 Q Now, the recommendation said every major
47 tributary, that was recommendation number 3, but

1 only one at Qualark was actually implemented. Why
2 was that?

3 A Well, there were other sites evaluated for
4 potential application of hydroacoustics, but the
5 hydroacoustics programs are very intensive, labour
6 intensive and you require a particular expertise.
7 At that time, you were using the dual beam
8 hydroacoustics that required quite a bit of data
9 processing. And so for every site, you would have
10 needed a fairly highly-trained staff and fairly
11 extensive equipment, and you had to have physical
12 environments in each of those sites that were
13 conducive to getting good hydroacoustic
14 information.

15 When our staff and DFO, at the time, did the
16 assessments, it did evaluate a couple of other
17 sites, but the incremental value of the
18 information was not really viewed as being worth
19 the substantial increase in staff, basically,
20 because you had to have expert staff to operate
21 these. And we thought at the time that Qualark
22 was by far the preferred site because it did
23 address fish enumeration that could be done
24 hopefully while going into the canyon, and then we
25 could use the escapement surveys in the upper
26 river to acquire the other information.

27 Q Was there any need to have a new site close to
28 Mission? Was that one of the factors you looked
29 at?

30 DR. RIDDELL: Well, there was a consideration of being
31 as close to Mission as possible in the sense that
32 to do any direct comparisons, you didn't want long
33 time lags, and that even Qualark is,
34 approximately, three days of fish migration past
35 Mission. Did I say that correctly? Three days'
36 fish passage past Mission and so that's even
37 getting to be up there.

38 Everything else above that, of course, is
39 going to be substantially more because they have
40 to get through the canyon, as well. And there was
41 always the consideration that we wanted to be able
42 to evaluate the accuracy at Mission if we were
43 going to build something additional further
44 upriver.

45 Q You said other programs were looked at. Where
46 were the other sites, or what other programs were
47 considered?

1 DR. RIDDELL: Well, probably the one that was most
2 thoroughly evaluated was at Boston Bar, but Boston
3 Bar is only another 45 kilometres up the river.
4 If you were to do the major tributaries, you'd be
5 looking at the lower part of the Thompson was a
6 very, very difficult environment for
7 hydroacoustics, and part of that is because of
8 development along the Thompson. Anyone that's
9 gone through that route will realize that you are
10 confined by rail on one side and highway on the
11 other, and if they're not on the river, they're
12 very steep sides. And so it's a very, very
13 difficult environment to work in. You'd have to
14 go further up above that canyon reach. And the
15 other river, it just gets to be a large volume of
16 flow without the sort of added contour type of
17 advantages you have at Qualark.

18 The other sites that were evaluated more
19 intensively were actually in the tributaries,
20 where we would look at trying to provide high-
21 quality escapement enumeration without spending as
22 much in the mark recapture programs in some of the
23 very large stocks. And even there, we had
24 limitations. You could probably address about
25 half of the major stocks, I thought, if they
26 looked at potential for using hydroacoustics.

27 Q Did you have anything to add to that, Mr.
28 Lapointe?

29 MR. LAPOINTE: Thank you. Just on the Boston Bar site,
30 some of the context of this relates to the history
31 way back to Pierce Larkin and some of it's more
32 recent so in a more recent context, there was a
33 workshop that was held by the PSC, funded through
34 the Southern Boundary Restoration Enhancement
35 Fund, which looked at various possibilities for
36 assessment programs within the Fraser River. And
37 in terms of main stem applications, there were two
38 sites that were considered. Just a minute, I've
39 got something in my throat.

40 Q Okay. Well, while you're having a drink of water,
41 I'm just going to ask you if you can open Tab 15,
42 which is CAN064768 and you can let me know if
43 that's the reference to the workshop you were just
44 talking about.

45 MR. LAPOINTE: Sorry, Tab 15?

46 Q It should be 15. Sorry, maybe I've got -- sorry,
47 10.

1 MR. LAPOINTE: 10. Yeah, that's correct, that's the
2 workshop report.

3 Q Okay.

4 MR. LAPOINTE: So in discussing potential opportunities
5 for hydroacoustics, not just in the Fraser River,
6 this actually included submarine applications, as
7 well, but in the main stem context, it was clear
8 that you would choose particular sites based on
9 certain criteria. So from the standpoint of
10 getting in-season feedback on the Mission program,
11 as Brian said, being as close to Mission as
12 possible was desirable because of the time lags
13 and just having something that is as close to sort
14 of apples to apples comparison as you can get.

15 From the standpoint of successive passage,
16 which is part of the PSC mandate in terms of
17 monitoring success through places like Hell's
18 Gate, then Boston Bar made sense because it's
19 above the Hell's Gate, most of the canyon, most of
20 the difficult areas of passage. So that was a
21 site that was clearly a possibility for that
22 purpose. And as Brian said, if you talk about
23 tributaries, you can do escapement enumeration,
24 and we are, and DFO is doing escapement
25 enumeration with acoustic technology at places
26 like Chilko using DIDSON and so forth.

27 So site location was always in the context of
28 the objectives of what you were trying to
29 accomplish with those programs. Now, Boston Bar
30 was a site that was identified, it was one that
31 was, I think, promoted quite heavily, or favoured
32 quite heavily by PSC because it related most
33 closely to our mandate. So if Hell's Gate is a
34 way of getting an index of successive passage, an
35 acoustic site near Hell's Gate and Boston Bar is
36 probably about as close as you can get and do work
37 there just because of being able to get to the
38 site and so forth. That was a logical place to
39 go. So we actually did a feasibility study in
40 2008/2009. The documentation's at the end of Tech
41 Report 16, PSC Tech Report 16, I think it's like,
42 page 44. We went up there with a DIDSON and tried
43 to say, "Hey, can you do -- and it looks like it's
44 probably feasible to do it there, but that was it.
45 I mean, it was a feasibility study, nothing really
46 has come from that. So that's all I would really
47 add.

1 Q And that Boston Bar site and the work that you did
2 in terms of a feasibility study, is that going to
3 be continued with? Are you going to be attempting
4 to develop that site?

5 MR. LAPOINTE: Not at the present time. We have done a
6 feasibility study, but like many of these things,
7 it's just trying to fit it into the funding
8 priorities that you deal with. And that's not
9 intended to be a complaint, it's just the reality
10 of trying to say if we have what we have, we, you
11 know, focus on our Mission program. If we had
12 incremental amounts, we'd think about whether we'd
13 go to different locations.

14 Q And what would be the value added from that site
15 that would be of benefit to the management of the
16 sockeye?

17 MR. LAPOINTE: It would provide in-season, quantitative
18 feedback of any potential migration challenges
19 associated with getting through the Fraser River
20 canyon. So knowing whether fish are making it
21 through the canyon might impact, you know, how
22 many fish you'd want to have be available to make
23 it through the canyon if you're seeing high
24 mortality.

25 Q Okay. One question, and then I'll come back to
26 you, Dr. Riddell. We talked a few days ago about
27 the difference between estimates, and I don't want
28 to go back into that discussion, but --

29 MR. LAPOINTE: Sure.

30 Q -- is the information that would be obtained at a
31 site, like at Boston Bar, would that assist in
32 trying to narrow some of those biases?

33 MR. LAPOINTE: Yeah, potentially, it would be another
34 check about the quantity of fish that made it to
35 that point in the river. Yeah, it could be quite
36 valuable in that way.

37 Q Okay. Sorry, Dr. Riddell?

38 DR. RIDDELL: Well, we kind of jumped to the more
39 current period, here, but I was just going to add,
40 thinking about your question about what are the
41 programs considered, a significant program that
42 occurred in the late '90s was DFO's study at
43 Spences Bridge, which is another site evaluated,
44 but the intention of that was not to design
45 another site, but to use that as a verification of
46 how accurately hydroacoustics could monitor the
47 migration of sockeye moving upriver. At that

1 time, river hydroacoustic enumeration, it was
2 fairly well developed in Alaska, but it was really
3 being developed in Canada, to a large extent. And
4 so that was an important program in our scientific
5 staff's minds, to verify that the dual-beam
6 hydroacoustics could work as well as visual
7 counting through fences, but it depended on having
8 the physical environment of the hydroacoustic
9 site.

10 And then just to comment on Mike's point
11 about the Boston Bar, I think, you know, it's nice
12 to think that every site can add more information
13 to it, but there could be some significant
14 problems in directly mapping the fish back from
15 Boston Bar to Mission -- sorry, Boston Bar, to
16 Qualark, to Mission. The very reason you'd be at
17 Boston Bar is you have to go through Hell's Gate.
18 Hell's Gate, depending on flow, can have a very
19 different delay from year to year and so it's
20 maybe a little bit overly optimistic to think that
21 we could get a very useful match there.

22 There's no question, as the year proceeded,
23 you could get some sense of whether or not you
24 were really losing a lot of fish, but I don't know
25 how quickly you could really have drawn that
26 conclusion. If you had a week or 10-day lag, that
27 may be enough to make it not particularly useful
28 in-season.

29 Q It may not be useful in-season, but would it
30 provide useful information at the end of the
31 season when people are trying to understand where
32 losses happened and how they happened?

33 DR. RIDDELL: Well, your use of "where" is the critical
34 thing. Not in terms of total magnitude,
35 necessarily, but if we were able to partition
36 where mortality is occurring, and later on, I
37 guess we'll talk about the legacy program and the
38 use of radio tags, that was a critical question in
39 people's minds, where is the mortality occurring
40 and what could be done about it.

41 Q In response to the suggestion that there should be
42 more hydroacoustic programs developed, was any
43 work done -- and I could have this out of
44 sequence, but I understood some work was done,
45 looking at using a DIDSON to estimate spawners at
46 Chilko and sometimes at Quesnel. Was that in
47 response to those recommendations?

1 DR. RIDDELL: Yeah, you've jumped to the second time
2 period.

3 Q Okay.

4 DR. RIDDELL: So if you're talking about --

5 Q That's why I said I wasn't sure if I had the
6 timeframe correct, or not. So we'll wait, then,
7 and we'll come back to that one.

8 DR. RIDDELL: Okay, sure.

9 Q All right. So I had asked you first about the
10 initial Qualark site that was in place from '93 to
11 '98. I take it the Qualark site was suspended
12 after the 1998 season?

13 DR. RIDDELL: Okay.

14 Q And why was that?

15 DR. RIDDELL: That was really a decision that the
16 scientists involved felt that they had
17 demonstrated the utility of the site and the
18 technology. And as I said, these are specialized
19 people. One of them was actually a nuclear
20 physicist turned hydroacoustics expert and so we
21 really only had two lead scientists and a couple
22 of staff. And there were other sites that
23 required attention, hydroacoustically. They spent
24 a great deal of time working on the Yukon River,
25 for example. And so we had set up a site in the
26 Yukon that is still used to this day to get the
27 Chinook and Chum escapements in the lower part of
28 the Yukon coming into Canada, and that's been
29 critical in eventually acquiring the agreement
30 with the United States.

31 And we also had a hydroacoustic study going
32 on at River's Inlet because of the debate about
33 the lost sockeye, when it's returning and what was
34 causing it, and what was the fishing pressure on
35 it. So we just had a limited number of people and
36 a number of other questions and the decision was
37 simply made that if they felt that they had
38 contributed what they can at the time at Qualark,
39 that we could use them elsewhere. And as we've
40 shown later, I mean, you can always come back to
41 the site that you knew was a good site.

42 Q All right. So the Qualark program from '93 to '98
43 was carried out as an experimental science
44 program; is that fair?

45 DR. RIDDELL: It was carried out in response to the
46 reviews, but it was carried out as a science
47 program to indicate that this could be used as a

1 site and provide information on abundance at that
2 point.

3 Q All right.

4 DR. RIDDELL: But it was not immediately picked up by
5 management and it wasn't immediately integrated
6 into PSC work and so we moved the program at that
7 point.

8 Q All right. And that leads to my next question,
9 was the data during that five-year period used in
10 in-season management at all?

11 DR. RIDDELL: Well, go ahead, yeah.

12 MR. LAPOINTE: Not in any in-season sense. And just to
13 be clear, the program may have gone from '93 to
14 '98, but actually, there were three years, '96,
15 '97, and '98 where there was a time series of
16 daily estimates. So it took a while to get the
17 development going. So my recollection of this,
18 and I was around then, was that it was more of a
19 post-season evaluation. So I can recall doing
20 some of the stock discrimination to parse out the
21 Mission estimates to get the stocks that would
22 actually be headed to Qualark because not all the
23 fish that go past Mission head to Qualark and so
24 there were comparisons done post-season, but not
25 in-season.

26 Q All right. And Qualark did get restarted in a
27 somewhat different format in 2007; is that right?

28 MR. LAPOINTE: Yes, it is.

29 Q Okay. And there were changes made to the Qualark
30 hydroacoustic program in 2007 as compared with the
31 program that was in place from '95 to '98?

32 DR. RIDDELL: Well, the major change is the evolution
33 of the hydroacoustic equipment, itself. Whereas
34 Mike and I have been referring to dual-beam
35 hydroacoustics as sort of state of the art in the
36 '90s, there was the introduction of what's called
37 a DIDSON hydroacoustic system, I think first used
38 by PSC in 2004.

39 MR. LAPOINTE: Mm-hmm. That's right.

40 DR. RIDDELL: And this has actually revolutionized
41 hydroacoustics in river. I tell people it simply
42 went away from estimation to what you can
43 accomplish as direct counts. And so that reduces
44 the uncertainty by a huge amount. It still is
45 dependent on site quality and ensuring you have no
46 blind spots, et cetera, but the technology took a
47 huge step forward.

1 Q Can you, just for the non-science people, just
2 give a thumbnail of what the difference is between
3 a DIDSON and a dual beam? What's the difference
4 in terms of the output? Why is it so much better?

5 DR. RIDDELL: Well, DIDSON stands for, I think it's
6 direct identification software -- or sonar. Dual
7 beam direct identification sonar. And the
8 difference is where we talk about dual beam, you
9 have the options, with DIDSON, of using 42 beams
10 and a range of 66 metres out, or at the high
11 frequency -- well, that is -- yeah, that's the low
12 frequency, high frequency goes to 92 beams, but it
13 goes down to about 15 metres. Now, the difference
14 is it's like seeing marks or tracks on a paper or
15 a video screen for dual beam, where you can
16 actually see fish migrating. You don't see the
17 outline of a fish, but you see the length of a
18 fish, you can see the tail beats. You can
19 identify species of fish if you're looking at them
20 from top down sort of thing. Now, we have some
21 extremely nice examples where you happen to be
22 sonifying a pool where there's a sturgeon. Now,
23 you can recognize that as a sturgeon instantly.
24 It really is like looking at a video screen. And
25 so now you can align the beam past a particular
26 area that the fish have to go by and you can just
27 do direct counts. Mike referred to this yesterday
28 because in dual beam, you're concerned about
29 whether or not you may be saturating the signal,
30 that you're not getting a response in direct
31 proportion to the abundance of fish. We have not
32 seen any example where we've saturated the ability
33 to count using a DIDSON.

34 In 2009, the DFO staff actually counted 6.5
35 million pink salmon because it's a continuous
36 movement, but it's not so much that you can't
37 count it in any screen. And so it really has
38 changed the ability for enumeration like that.

39 Q And is the system, this DIDSON system, and I'm not
40 just talking about the equipment alone, but also
41 the setup of the site, is it the same at Qualark
42 as it is at Mission now because there is some
43 DIDSON being used at Mission, as I understand it?

44 MR. LAPOINTE: Maybe I should take that one.

45 Q Yes.

46 MR. LAPOINTE: So at Mission -- well, first, Qualark,
47 as Brian described, is DIDSON on each bank.

1 That's the estimation scheme, one DIDSON each
2 bank. Some in my sub-sampling over time, like
3 they don't count 24/7 every track. They sub-
4 sample every 20 minutes, or something like that.

5 At Mission, the primary estimator, as I said,
6 is a split beam. There's the boat that transects
7 back and forth, and there's a split beam on the
8 south bank, which would be the Abbotsford side of
9 the river. And then we have a DIDSON also on that
10 bank, which is used primarily as a diagnostic,
11 just to kind of see if there's anything going on
12 with the fish behaviour that we might not detect
13 with a split beam. And then on the north bank,
14 which is the bank that's on the Lougheed Highway
15 side, I guess, where the Tourist Information
16 Bureau is, on that side, we also have a DIDSON,
17 and that is used for estimation. But because of
18 the processing time involved with split beam data,
19 we haven't yet adopted or processed the north bank
20 data in real time, although we could. So the
21 DIDSON is used on the north bank, not currently
22 part of the in-season estimate, but could be, and
23 on the left bank, or the south bank, just as a
24 diagnostic. So there are DIDSONs there, but we're
25 not -- they're not the primary estimator as they
26 are at Qualark.

27 Q Okay. So what's the value in having Qualark in
28 addition to Mission, or Mission in addition to
29 Qualark as you've -- however you may want to
30 describe it.

31 MR. LAPOINTE: We probably both should answer this. I
32 don't know who wants to go first. Do you want me
33 to go, or do you want to go?

34 DR. RIDDELL: Well, maybe I'll start because, I mean,
35 you're really asking the question about now
36 because if you'd asked this a couple of years ago,
37 the value would have been that Qualark was re-
38 established following the continued discussion
39 about another review in 2004, and then the
40 standing committee review. So the issues were not
41 going away. And the Qualark reestablishment was
42 really part of a bigger program that we'll talk
43 about, I guess. So in the short term, in 2007,
44 '08, and '09, really, Qualark was really
45 considered a science program with collaboration
46 with PSC. Most of it at that time still post-
47 season and so it really was trying to address

1 developing how to resolve some of the problems
2 that we recognize at Mission and what could
3 Science Branch add by re-establishing Qualark. It
4 was also part of the larger science program. And
5 that -- in 2010, though, I think there was more
6 direct communication in-season and so it started
7 to be more accurately involved. And now why we
8 need both, I'm sure we'll both identify that there
9 are some sockeye populations that will leave the
10 main channel, leave the Fraser River between the
11 Mission and the Qualark site. I mean, in the
12 past, they were relatively small stocks, but
13 that's not true any more because of the Harrison
14 River population is now up to a few hundred
15 thousand. So there are potential errors between
16 Mission and Qualark that you have to take into
17 account. And then the majority of the pinks will
18 spawn really between Mission and Qualark, but
19 there's still a significant number of fish, pink
20 salmon, that will go past Qualark, but the
21 majority will be in the lower river.

22 MR. LAPOINTE: I don't know how much -- I'll try to
23 keep any remarks brief here. So in the last three
24 years, '08, '09, 2010, I think is only three, I
25 don't think we had anything in '07, but we've had
26 very frequent exchange of information between the
27 Qualark folks and ourselves both ways. And so it
28 wasn't used formally in the management, but there
29 was very consistent dialogue between our
30 respective staffs in the realm of saying, "Okay,
31 are you seeing things that are consistent with
32 what we're seeing?" You know, it was sort of a
33 blind sort of exchange. We wouldn't know what
34 they had until after. You know, we see the fish
35 in Mission, they don't see those estimates until
36 three days later so it was providing very good
37 consistency with the Mission estimates. And that
38 is the perspective that we think of it as sort of
39 in relation to this workshop report, what you have
40 here, is that for us to have corroboration in-
41 season, which is the only thing that Qualark can
42 provide that spawning escapements, for example,
43 can't provide because we don't see those until
44 sometime after the season, that in-season feedback
45 is critical. But also in the context of the
46 discussion we had yesterday, if you're trying to
47 draw an inference about how your program is doing,

1 and you don't know what the true answer is, having
2 a system that's systematic and similar in the way
3 it collects data, not identical, obviously some
4 differences are important, is a much better way to
5 get that information than waiting until the fish
6 show up on the spawning grounds so many months
7 later. So we think of Qualark as a very good
8 crosscheck, if you like, confirmation of what's
9 going on at Mission that we can't really get any
10 other way, really, in a real quantitative sense.
11 So the last thing I would just say is in reference
12 to 2010, in 2010 -- so the first two years, if I,
13 you know, showed you a time series, and we could
14 get to these spots if you'd like to see them, and
15 I flashed them back and forth between you, between
16 Mission and Qualark, I think you'd have a hard
17 time telling the difference between them. They
18 were just -- the correspondence was remarkable.

19 Now, to make it apples to apples, you do have
20 to do some things. For example, you have to
21 remove the catches that occur between Mission and
22 Qualark from the Mission data, and you have to
23 remove those stocks, like the Harrison and the
24 Weaver that wouldn't be expected to be seen at
25 Qualark. And when you do that apples to apples
26 comparison, like I said, it's just -- you know,
27 the probably of those being that close together,
28 given the two independent sampling schemes and
29 being 95 kilometres apart is just really
30 remarkable.

31 Now, at 2010, we start to see some deviations
32 during certain periods that happen to correspond
33 with periods of fisheries in the river, in the
34 Lower Fraser so there may be some mechanism there
35 which we don't understand yet.

36 And myself, being responsible for keeping
37 track of this stuff and saw that, and I reacted
38 and said, "Okay, could this be a repeat of 2006?"
39 And 2006 was a year when we had substantially more
40 fish seen upstream than we estimated at Mission
41 and we were seeing a signal at Qualark that
42 suggested not -- you know, it was maybe 20 percent
43 more on sort of a daily basis on some of the days.
44 And so I just made a decision with my staff, and
45 perhaps one that, you know, if I had to do it now
46 on all the data I have, might have made
47 differently in terms of the way I consulted my

1 staff, but that we actually used Qualark to
2 correct Mission for those periods when there were
3 differences. So we kept track of the ratio
4 between them and we actually modified the Mission
5 estimates based on that.

6 Q Sorry, you were seeing bigger numbers at Qualark
7 than Mission?

8 MR. LAPOINTE: Larger numbers of fish than you would
9 have expected based on Mission after you
10 subtracted the catch and subtracted those stocks
11 that don't swim to Qualark. So that's the one
12 area where this year, even though it was an
13 experimental program, and I think if you ask my
14 DFO colleagues, they never would have expected me
15 to do that, I did it and I accept responsibility
16 for it. But now, of course, we're saying it's
17 important to understand why they're different.
18 You know, to lean on one in the middle of the
19 summer without kind of a thought of thinking how
20 they could be different was probably a bit of a
21 hasty decision on my part. So we have plans post-
22 season to investigate for those periods where they
23 are different. It's not different over an entire
24 time series, it's just certain periods where the
25 peaks are different, to find out why they would be
26 different, and that's part of the ongoing post-
27 season research we'll be involved with through
28 that hydroacoustics working group.

29 Q So will you be looking, in that working group, at
30 whether Qualark should be used in-season to adjust
31 Mission, or whether it should be just used at the
32 end of the season, or in some other way?

33 MR. LAPOINTE: Well, I can tell you one thing that
34 they're going to want to talk about is
35 establishing some sort of protocol that would be
36 applied when they are different. I think the way
37 we think of these two sites, and the way PSC staff
38 thinks of them is not so much one or the other,
39 but how to use them together. And maybe some sort
40 of an averaging type sense might be a way that
41 we'll go in the future. And the reason I say that
42 is not because I have -- you know, we do
43 acknowledge, it's well understood that Qualark's
44 an easier place to do acoustics, okay? The fish
45 are pushed to the banks, you can count them with a
46 DIDSON, you don't have tidal effects like you have
47 at Mission. It's a much better site,

1 acoustically. There's no debate about that at
2 all. But in an in-season sense, because our
3 experience at Mission is that we always get
4 surprised, the fish always -- you know, not just
5 at Mission, you know, look at 2009 and 2010 and
6 the total return and ask yourself, you know, about
7 that surprise.

8 In-season, I think, it may be more
9 precautionary, or perhaps a better way to go,
10 scientifically is just to say either one of them
11 could encounter something unexpected so it might
12 be better to average them than say I'm going to
13 lean on one or the other. And again, this is
14 something that we're going to talk about more
15 scientifically this winter, but that's kind of the
16 way we're thinking about it. Yes, having them
17 corroborate each other is good for both, but it's
18 not really a question of choosing one or the
19 other, it's trying to find the perfect way to
20 blend the two tools, from our perspective.

21 Q All right. And you actually prepared, Mr.
22 Lapointe, you prepared a memo in 2009 talking
23 about the location of the Mission hydroacoustic
24 program and the importance of that location, and
25 that's at Tab 15, it's a memo dated November 17,
26 2009?

27 MR. LAPOINTE: That's correct. That's in the context
28 of the ongoing dialogue with Sumas First Nations.
29 So we were asked, "Why do you guys want to be
30 here? What's so important about this spot?" And
31 that's why I wrote this memo, was to document that
32 for the folks so that people would understand.
33 And so, again, getting back to the Commissioner's
34 question about the history and so forth, when the
35 Mission program -- when the PSC or IPFSC, I guess,
36 in this case was looking for a site to do
37 acoustics, they did actually explore a number of
38 different sites. They looked in the Lower Fraser
39 near Dease Island, they looked at a number of
40 different possible spots, and my take on it, I
41 wasn't involved at the time, but my take on why
42 they ended up at Mission was kind of a couple of
43 reasons. One is most of the sites below Mission
44 had issues associated with bigger tidal effect.
45 So even at Mission, the river is tidal.

46 MS. BAKER: I'm sorry, I don't mean to interrupt, but
47 Mr. Lunn, could you put up this memo, it's Tab 15

1 on the list of documents. Thank you. Sorry.

2 MR. LAPOINTE: So again, the lower river is even more
3 tidal than at Mission. There is a lot of islands,
4 as you know, Annacis Island, different islands
5 that make it potentially more costly to do the
6 work because you've got to cover off different
7 migration routes. And then the fundamental one
8 that I think was also an important driver is that
9 the Mission highway bridge, or the railway bridge,
10 I'm not sure exactly which one, was the upstream
11 boundary of the commercial fishery so there
12 couldn't be any commercial fishing above there.
13 So the concept was that if you had an escapement
14 tool above the commercial fishing boundary, you
15 would be monitoring what was left after all the
16 primary removals from the fisheries downstream of
17 it.

18 So tried these other sites, encountered
19 challenges acoustically, management-wise, it made
20 sense to be upstream at the bridge, ended up at
21 Mission.

22 Now, after having been there since 1977, of
23 course, there's a pretty tremendous inertia
24 associated with being at that site. There's the
25 whole long time series of management adjustment
26 data sets that we use in-season. There's the
27 familiarity with the site that really contributes
28 to the scientific integrity of the program. You
29 know what's going on, you've been there for so
30 many years, you've encountered all the different
31 things that occur. There's the fact that Brian
32 mentioned that you're downstream of most of the
33 major tributaries that would be peeling off the
34 Fraser into the various streams, like Birkenhead,
35 and Weaver, and so forth. There's only -- I think
36 it's the Pitt and the Widgeon that are still
37 downstream of Mission. So you've got most of the
38 fish that are heading to spawning areas at
39 Mission. So there's a number of reasons why now
40 that we are there and have been there since 1977,
41 that that's really an important site. And I don't
42 know if I've gone through them all. I can see
43 that I've kind of hit, I think, most of these
44 first, A, B, C, D. Oh, the timeliness one is the
45 one that I didn't touch on. Well, maybe it's two
46 I didn't touch on.

47 Not only is it upstream of the commercial

1 fishing boundary, but it's downstream of a lot of
2 the primary First Nations harvest areas. So from
3 a fisheries planning tool, and I can't really
4 speak for DFO on how they might use it in this
5 way, but knowing the quantity of fish that are
6 available for planning those fisheries that are
7 upstream at Mission may be important. You know,
8 it may be important for folks to know that.

9 And then the timeliness issue relates to this
10 travel time in terms of Qualark. So in a test
11 fisheries sense, we have marine test fisheries in
12 Juan de Fuca Strait and Johnstone Straits and it
13 takes the fish about six days, plus or minus, to
14 get from those test fisheries to Mission. Mission
15 is kind of used, as I described yesterday, as sort
16 of, you know, verification of those test fishing
17 projections, and it takes the fish six days.

18 If you move up river, you're going to wait
19 another number of days. Say, Qualark, three days.
20 You're delaying the time for that verification.
21 The reason that's important in the current context
22 is that the allocations in terms of fisheries,
23 specifically, commercial fisheries, but also First
24 Nations. If you look at the First Nations, you'd
25 have about, in a notional sense, 750,000 fish for
26 the river, and 260,000 for marine, so about 25
27 percent of the First Nations is in marine areas.
28 All the U.S. fisheries, of course, are in marine
29 areas. About 80 percent of the commercial
30 allocations, if you added up all the percentage
31 here, the (indiscernible) types are in marine
32 areas.

33 If we wait -- so when the peak of the run is
34 at Mission, it's eight days past the peak in those
35 marine areas, or six days past the peak in those
36 marine areas.

37 If you're now talking about waiting for a
38 verification at Mission three days more, you're
39 now 11 days past the peak in those marine areas --

40 Q This would be if you were to use Qualark instead
41 as an example, that's what you're talking about?

42 MR. LAPOINTE: Yeah, as an example. So I'm trying to
43 get at this timeliness issue. So what Fraser
44 Panel members are telling us, and we keep hearing,
45 "We want you to get something equivalent to
46 Mission in Johnstone Straits, or farther seaward,
47 more close to the timeliness of where the

1 allocations are." So it's that challenge that --
2 the pressure for the adjustments is actually to
3 move downstream in terms of timeliness issue.

4 So we call this issue, I think we call it the
5 catch allocation run size uncertainty mismatch,
6 and there's actually some information on our
7 website that kind of describes this in more
8 detail. It's really germane to the test fishing
9 discussion that you're going to have next week.
10 You know, those are the reasons, I think, and this
11 document is hopefully a pretty readable document
12 that kind of outlines that and doesn't do it in a
13 way that says that -- there are many purposes,
14 just as I describe, where, in fact, being in a
15 different spot would be more valuable for some
16 objectives, but from an acoustics perspective,
17 it's really not possible to get downstream of
18 Mission and really do a good job, with the tidal
19 effects and the braided channels and so forth.

20 Q Okay.

21 MS. BAKER: I'll have that marked, please, as the next
22 exhibit.

23 THE REGISTRAR: Exhibit number 355.

24 THE COMMISSIONER: Ms. Baker, did you mark the earlier
25 document, or did I just miss the number?

26 MS. BAKER: The proceedings from 2007, I didn't mark
27 that. I'll come back to it, though, later in my
28 questions and I'll mark it at that point.

29 THE COMMISSIONER: So this is Exhibit --

30 MS. BAKER: The one that's up on the screen right now
31 is 355.

32 THE COMMISSIONER: 355.

33 MS. BAKER: Yeah.

34
35 EXHIBIT 355: Memo from Mike Lapointe dated
36 November 17, 2009, entitled, "Importance of
37 the location of the Mission acoustics
38 program"
39

40 MS. BAKER:

41 Q And just to touch on one of those -- the
42 historical dataset, if we were to move to, or if
43 you were to move to a different location, what
44 impact would that have on the certainties or the
45 uncertainties in your use of the data, or the time
46 series of data that you have for Mission, as
47 compared with a new site?

1 MR. LAPOINTE: So a couple of them. One would be you'd
2 have to get familiar with that site, okay? Every
3 site has some nuances that you learn about as you
4 work there. It doesn't matter where it is.

5 From a data consistency perspective, so let's
6 talk about, say, management adjustments and, you
7 know, the differences between assessments at one
8 site and another site, with Mission being the
9 lower site and, say, spawning grounds being the
10 upper site as what's used in the management
11 adjustment, clearly, that difference is related to
12 the assessments at each of the sites. So if
13 there's an assessment error component, that
14 component may vary if you move the site -- the
15 lower river site, for example. How -- you know,
16 the characteristics are related to the site, but
17 also to the extent that that management adjustment
18 difference is related to enroute loss, there's
19 going to be a component of that that's related to
20 how far the two sides are apart from each other,
21 right? So if the fish are migrating a further
22 distance, then you might expect, all else being
23 equal, under a stress, they might see more loss
24 because they have further to go to get between the
25 two sites. So both of those would be affected by
26 a move. And in addition, if you were to do a
27 move, I would suggest it would be prudent to do a
28 calibration where, in fact, you'd have a period of
29 time when you'd probably have both sites
30 operational to calibrate one against the other.

31 Q All right. Thank you. Dr. Riddell, have you got
32 anything to add on this?

33 DR. RIDDELL: No, that's fine.

34 Q Mr. Lapointe, you also prepared a memo looking at
35 the value and the uses of the Qualark acoustics
36 program, and perhaps we can have a look at that
37 document now. That's Tab 18.

38 MR. LAPOINTE: Okay. I don't have 18, do I?

39 Q This is a memo dated November 19th, 2010. So it's
40 pretty current, and Dr. Riddell, I believe you've
41 had a look at this memo, as well; is that right?

42 MR. LAPOINTE: Yeah, Brian had a review of it. Did you
43 want a specific question, or did you want me to --
44 how do you want me to handle this? I don't want
45 to steal the point that you want me to make.

46 Q Okay. Hold on.

47 MR. LAPOINTE: So I'm going to hold my breath here and

1 listen to your questions.

2 Q Okay. This document was prepared by you and
3 addressed to the Fraser River Panel, looking at
4 Qualark and whether it should be continued as a
5 program and what its values are to the management
6 process as a whole; is that fair?

7 MR. LAPOINTE: That's correct.

8 Q Okay. And you outline, on page 2, some of the
9 uses and value of the Qualark program. You
10 identify that the primary benefit of the Qualark
11 site is that it provides in-season feedback on the
12 Mission estimates?

13 MR. LAPOINTE: That's correct.

14 Q And I think you've talked quite a bit about that
15 already today. You also say in your second point
16 that estimates from Qualark have been used to
17 support lower river estimates used in the
18 estimation of differences between estimates, DBEs.
19 And is that the discussion that we had with you a
20 few days ago, when you were talking about DBEs?

21 MR. LAPOINTE: Yes, so the concept there is that if you
22 have two lower river sites that seem to
23 corroborate each other, then it may cause you to
24 look elsewhere for the sources of that difference.

25 Q All right. The third one, biases resulting from
26 species composition issues should be lower at
27 Qualark than at Mission, and this is reflecting
28 the pinks being less abundant at Qualark?

29 MR. LAPOINTE: Yeah, and so, as the next sentence says,
30 that you still have to be aware that both sites
31 had test fisheries, and whenever you put a net in
32 the water, you're challenged by whether that net
33 is a random sample, but yeah, we should have fewer
34 pinks relative to sockeye at Qualark because most
35 pinks -- well, I don't know about most, a
36 substantial fraction of the pink salmon population
37 spawns in the main stem Fraser below Qualark.

38 Q And turning the page, you say the fourth point is
39 that the agreement between Qualark and Mission
40 should bolster confidence in the in-river catch
41 estimates that are made for areas between the two
42 sites. And you note that's from a DFO perspective
43 so what do you mean by that?

44 MR. LAPOINTE: Well, for example, as I said for 2007
45 and 2008, when we compare Mission and Qualark and
46 the Mission projection of the fish to Qualark is
47 made by subtracting the catch that occurs between

1 Mission and Qualark, as one of the things that
2 makes it apples to apples, if those two estimates
3 then agree with each other, then you have a very
4 strong corroboration that the calculation that
5 you've used, which includes the catch, must be in
6 the ballpark, there shouldn't be any significant
7 issue with it. So in the case of 2010, what we
8 see is more fish being observed at Qualark than at
9 Mission. So again, there's data there that can be
10 used to draw an inference about the catch
11 estimates that I think is helpful in terms of
12 being independent scientific estimates.

13 DR. RIDDELL: No, that's fine.

14 Q [Mike turned off]. And then the last point that
15 you make is that Qualark estimates, themselves,
16 may be used as an estimate of the amount of fish
17 entering the canyon and that that could be useful
18 for planning inriver fisheries. And this is the
19 point that you've just described; is that right?

20 MR. LAPOINTE: I don't know if it's the point that I
21 just described, but --

22 Q That you described about --

23 MR. LAPOINTE: Oh, previously, a few minutes ago, yes.

24 Q Yeah.

25 MR. LAPOINTE: Sorry.

26 Q All right. Are there any other uses for Qualark
27 that aren't identified in this memo? Perhaps, Dr.
28 Riddell, have you got anything else to add?

29 DR. RIDDELL: No, not in an in-season management. We
30 had other uses where when we're talking about the
31 Science Program, we use it as sort of a critical
32 site for getting a mark recapture estimate by
33 counting radio tags by, but that's not an ongoing
34 application.

35 Q Okay. And then the next part of your memo, Mr.
36 Lapointe, talks about options for future funding
37 and I take it what was on the table in November of
38 last year was is there going to be funding for
39 Qualark, is it going to become part of the regular
40 management of the Fraser River system; is that
41 correct?

42 MR. LAPOINTE: We were directed, staff was directed to
43 write this memo in the context of trying to
44 explore whether or not this would be funded by
45 U.S. or Canada. It was part of our secretary of
46 budget and so that was the context for why this
47 memo was drafted in the first place.

1 Q And did that discussion happen?

2 MR. LAPOINTE: Yes. In addition to this memo, it also
3 provided a presentation which compared the two
4 time series from the 1996/97/98 period, and also
5 the most recent period just to provide the -- show
6 the data because people hadn't seen some of these
7 data. So that was presented to the Fraser Panel
8 on January -- the first week of January. And the
9 outcome of that is that we've been instructed to
10 write a proposal, PSC staff write a proposal to
11 seek funding potentially through a bilateral
12 source, but we're just in the process of drafting
13 that now and we do expect a decision certainly by
14 the end of February.

15 Q If Qualark is not continued, would that have a
16 significant negative impact on the work that
17 you're doing in terms of estimating in-season and
18 post-season?

19 MR. LAPOINTE: I think there's a tremendous value
20 added. Obviously, if it doesn't happen, we still
21 have to do our work so we'll do our work. The
22 timeliness of this right now is somewhat important
23 with respect to the fact that we have ongoing
24 research at Mission to include the mid-channel
25 sampling, which having Qualark for that period of
26 the development would be particularly
27 advantageous. So from that perspective, I guess
28 that opportunity would potentially be lost if
29 Qualark wasn't funded, but clearly, if we -- you
30 know, we've been using Mission up until now, other
31 than 2010, and trying to manage the fishery and
32 we'd continue to do that, obviously, if we don't
33 have Qualark, but it would be very valuable to us
34 to have Qualark, particularly during this
35 developmental phase.

36 Q And Dr. Riddell, what is your view on the value of
37 this site to the overall program?

38 DR. RIDDELL: Well, I agree with Mike's use of term,
39 "invaluable." I mean, I think it's proven that
40 this is an essential site if we really want to
41 improve our understanding of migration and improve
42 our estimates of the differences between
43 estimates, particularly in the odd years. And if
44 we're looking at building pink salmon in the last
45 few cycles, then the conflict between pink and
46 sockeye will continue.

47 We probably haven't really even pointed out

1 that we started off yesterday talking about
2 verifying estimates. Until you actually had a
3 separate upstream site, whether in the mid-'90s or
4 now, more formally, with Qualark, in 2000, there
5 wasn't really any way to directly evaluate
6 Mission. Mission was always accepted as being a
7 very credible estimate because until the --
8 probably, the mid-'90s, we really hadn't seen
9 major discrepancies between estimates. Once you
10 do all the escapement estimates, basically,
11 reconstruct the run down to Mission, there had
12 been pretty good correspondence for a long, long
13 time. And the difficulty now is the environmental
14 conditions in-river and so you have multiple
15 sources of potential error where, you know, you
16 may have statistical counting errors at Mission,
17 but how do you separate that from in-river
18 migration errors that you may not see the fish
19 after they're counted at Mission, until they get
20 to the spawning ground. So independent sites and
21 verification is really becoming increasingly
22 important, I think, in terms of everyone's
23 credibility and the fisheries management process,
24 and in understanding and providing explanation to
25 users.

26 MS. BAKER: Thank you. Could I have this marked,
27 please, as the next exhibit, this memo of November
28 19th, 2010?

29 THE REGISTRAR: Exhibit number 356.

30
31 EXHIBIT 356: Memo re Qualark prepared by
32 Mike Lapointe dated November 19th, 2010
33

34 MS. BAKER: Mr. Commissioner, I see the time and I'm
35 moving to a new area so --

36 THE COMMISSIONER: All right. I just had a couple of
37 thoughts as both witnesses were addressing these
38 memos and I'll just raise them and we can take the
39 break and because I don't know what Commission
40 counsel's questions are now to follow so I just
41 wanted to raise these in case they may fall within
42 other questions that she's going to ask, but if
43 not, perhaps she'll consider asking them.

44 You have both discussed the history of
45 Mission and Qualark, and now you've addressed an
46 examination of the two sites in terms of their
47 continued usefulness for the programs that you've

1 been conducting. I just want to return to the
2 Wild Salmon Policy and maybe after the break, I
3 can learn from both of you as to how the
4 hydroacoustic programs have been considered within
5 the Wild Salmon Policy, and when it comes to
6 evaluating the go-forward position on these sites
7 and the future usefulness of these sites, how that
8 resonates within the Wild Salmon Policy in terms
9 of structure. In other words, has there been a
10 blue-sky consideration of where we will go in the
11 future with the implementation of the Wild Salmon
12 Policy and the future usefulness and upgrading of
13 hydroacoustic technology, incorporating it with
14 the other programs that the Wild Salmon Policy
15 addresses in its report, as well as, of course,
16 counting.

17 The other point you raised, and it may be
18 coming in a different session, or it may be coming
19 in this session, you talked about the escapement
20 surveys and I just apologize, but I may have
21 missed it, but just how they work together with
22 the other programs that are in place for counting.

23 MS. BAKER: Are you asking about spawning escapement?

24 THE COMMISSIONER: Well, I think it came through an
25 answer that Mr. Lapointe gave when he talked about
26 escapement surveys and I just missed the context
27 of the point you were making.

28 MR. LAPOINTE: I think I can probably help you out
29 after the break on that.

30 THE COMMISSIONER: All right.

31 MR. LAPOINTE: We'll come back to it.

32 THE COMMISSIONER: Thank you very much.

33 THE REGISTRAR: The hearing will now recess for 15
34 minutes.

35
36 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)

37 (PROCEEDINGS RECONVENED)

38
39 THE REGISTRAR: The hearing is now resumed.

40 MS. BAKER: Thank you, Mr. Commissioner. So I'll let
41 Dr. Riddell answer the questions that you posed
42 before the break.

43 THE COURT: Thank you.

44 DR. RIDDELL: Mr. Commissioner, concerning the Wild
45 Salmon Policy, I guess one aspect that we haven't
46 talked about very much is that there are samples
47 routinely taken at the test sites for stock

1 composition. And that information is analyzed in-
2 season. And so if we were to think forward in
3 terms of how you would incorporate this type of
4 information under Wild Salmon Policy, it would be
5 that you would track some of the conservation
6 units that you may be having to get them out of
7 the so-called red zone up into the amber zone
8 where they're considered to be safe from immediate
9 risk of extinction sort of thing. And so you may
10 well interject new management objectives to
11 recognize specific conservation units in real
12 time. That is not really done at this time but it
13 could be taken into account. Mike, do you want to
14 add something?

15 MR. LAPOINTE: Yeah, just to add, in fact, there is an
16 example of how it is done in real time right now
17 as it relates to the Early Stuart, which, I guess,
18 actually might be more than one CU, I think, as
19 there's a couple lakes.

20 DR. RIDDELL: Yeah.

21 MR. LAPOINTE: So quite often a tactic -- because the
22 Early Stuart has been at a very low run size in
23 recent years, there's a strategy or harvest tactic
24 called "Early Stuart closure". So the idea is to
25 delay the start of fisheries until the Early
26 Stuart sockeye have passed and the stock ID
27 combined with the acoustics can tell you when
28 maybe 90 percent of the abundance has passed,
29 which would then mean that you could start
30 fisheries that would not impact the Early Stuart,
31 as adversely might be. And Early Stuart is a bit
32 of a unique case because it has such a distinct
33 timing but --

34 DR. RIDDELL: Yeah.

35 MR. LAPOINTE: -- the opportunities are there for other
36 applications of that nature.

37 DR. RIDDELL: Your second question, sir, on the
38 escapement surveys, I don't know that we were
39 clear on exactly what you were looking for. We
40 are using -- I shouldn't say "we" anymore -- the
41 department is using hydroacoustics in some
42 freshwater spawning escapement estimations. So
43 the large programs where you have to conduct mark-
44 recapture over a six or eight-week period, they
45 tend to become very, very expensive. They're
46 accurate and they're very precise but they're very
47 expensive. So we have now developed an

1 application used once in Quesnel in the Horsefly
2 River and annually now in the Chilko River. So
3 the department has been watching for opportunities
4 to reduce costs and use funds elsewhere by putting
5 these high-quality hydroacoustic systems in to
6 better enumerate escapement. You still have
7 problems with species composition and so they have
8 an added little burden there because even in
9 Chilko you have sockeye and Chinook in the same
10 timing and areas and you'd have different -- well,
11 maybe not as much in Horsefly but Horsefly very
12 likely could have sockeye and maybe some Coho
13 issues in that area. But they wouldn't be
14 abundant enough to cause an error with the
15 abundance of sockeye.

16 Is there another question that we can answer
17 for you on that?

18 THE COMMISSIONER: I apologize. It may have come up in
19 this context, the DBEs.

20 DR. RIDDELL: Mm-hmm.

21 THE COMMISSIONER: And I think Mr. Lapointe was talking
22 about --

23 DR. RIDDELL: Yeah.

24 THE COMMISSIONER: -- Qualark and Mission having some
25 bearing upon tightening up on information with
26 respect to that. But I had understood, perhaps
27 wrongly, that in addition the escapement surveys
28 would be part of the picture of trying to tighten
29 up on the information --

30 MR. LAPOINTE: Sure.

31 THE COMMISSIONER: -- about these issues. And I may
32 have connected a whole bunch of different dots I
33 shouldn't have.

34 MR. LAPOINTE: No, that's okay. So in the context of
35 Brian's comments then, to the extent that a DIDSON
36 would provide a more robust estimator, say, in a
37 system like Quesnel where there's multiple streams
38 that aren't always surveyed with the intense
39 methods then, yeah, having a system-wide estimate
40 with a DIDSON at Quesnel would really shore up the
41 spawning ground part of that DBE thing. So you
42 actually haven't really misconnected things, I
43 don't think.

44 The only other thing I'd say about the
45 spawning escapements is that in the scheme of
46 things, you talk about the mid-channel sampling
47 acoustically being an in-season tool. When you're

1 talking about spawning escapements, you're talking
2 about an outcome of the management at the end of
3 the season, which is obviously critical. It's the
4 primary objective and also the thing that drives
5 what comes back in the future. So it's in-season,
6 main stem stuff versus upstream stuff, which are
7 the outcomes which we obviously, within the
8 context of Wild Salmon Policy, have to understand
9 something about the distribution of those. So in
10 other words, a main stem program couldn't replace
11 the distribution information.

12 Two other quick points on terminology just
13 because some of my hydroacoustic staff are going
14 to probably say we're misspeaking here. Dual
15 frequency is actually a technology that came after
16 single-beam and it's not the same as split-beam.
17 So I think when Brian was using the word "dual
18 frequency" what he really means is split-beam in
19 most of the context, which he used. And this
20 DIDSON is, I think, dual frequency identification
21 sonar is what that word actually stands for. So
22 just for the record, just to make sure that people
23 aren't confused when they read the transcripts.

24 MS. BAKER: Thanks. Do those answers --

25 THE COMMISSIONER: Yes, thank you.

26 MS. BAKER: -- cover what you need? Okay, thank you.

27
28 EXAMINATION IN CHIEF BY MS. BAKER, continuing:

29
30 Q One document I meant to take Dr. Riddell to before
31 the break is a document found at Tab 12 and it's
32 CAN171500 and it's titled "A brief history of
33 Fraser River hydroacoustics". It's written by
34 John Holmes, George Cronkite and Hermann
35 Enzenhofer.

36 Q Dr. Riddell, you've read this document?

37 DR. RIDDELL: Yes, I have.

38 Q And is it a reasonably accurate summary of the
39 history of the hydroacoustic program in the
40 Fraser?

41 DR. RIDDELL: Yes, I think it's an excellent summary.
42 It really captures the two time periods with a few
43 graphs for comparison and really highlights the
44 sort of sequence of development in hydroacoustics.

45 MS. BAKER: All right. So as a useful outline of the
46 history, I would like this marked as the next
47 exhibit, please.

1 THE REGISTRAR: 357.

2
3 EXHIBIT 357: A brief history of Fraser River
4 hydroacoustics by John Holmes, George
5 Cronkite and Hermann Enzenhofer (CAN171500)
6

7 MS. BAKER: All right. I'd like to move on now to a
8 different area, the Integrated Assessment Program.
9 And these questions are primarily directed at Dr.
10 Riddell.

11 Q In 2006, Dr. Riddell, while you were still at the
12 Department of Fisheries and Oceans, you proposed
13 an Integrated Fraser River Assessment Concept to
14 senior management in the Pacific Region; is that
15 right?

16 DR. RIDDELL: Yes, it is.

17 Q And I have a copy of an outline of that program,
18 which you should be able to find at Tab 17.

19 DR. RIDDELL: Yes.

20 Q Do you have that?

21 DR. RIDDELL: Yeah.

22 Q Okay. Who was this proposal -- I guess why was it
23 developed and who was it presented to, this
24 proposal?

25 DR. RIDDELL: Well, it was developed because I was
26 division head of salmon assessment and freshwater
27 ecosystems at the time and so I was considering
28 the repeated sort of concerns about the accuracy
29 and issues in the Fraser sockeye assessments. And
30 I was increasingly concerned about the credibility
31 and profile of the department, as this repeatedly
32 came up publicly. And at the time, really looking
33 at using current technologies that were available
34 to improve how we actually do the core assessment,
35 it was developed by myself and Al Cass and
36 presented to the senior regional management
37 committee, at that time managed by Paul Sprout.

38 MS. BAKER: All right. Thank you. And I'd like this
39 marked, please, as the next exhibit.

40 THE REGISTRAR: 358.

41
42 EXHIBIT 358: Integrated Fraser Assessment
43 Concept, August 3, 2006, by Brian Riddell
44

45 MS. BAKER:

46 Q Okay. And what happened with this proposal?

47 DR. RIDDELL: We proceeded to implement this proposal.

1 It was implemented as a science program. And the
2 scale of the program is such that there were a
3 number of parties involved, not just the
4 department.

5 Q And I don't know if we've made this clear yet in
6 the hearings but a science program, a project
7 that's funded through science is typically not an
8 ongoing program; is that correct? It would be
9 almost like an experimental program that would
10 maybe, if it was successful, be then moved over
11 funding-wise to management and carried on through
12 management fundings, as an ongoing program; is
13 that correct?

14 DR. RIDDELL: That is the theory.

15 Q That's the theory, okay.

16 DR. RIDDELL: In this case, if we continued it as a
17 science program because one component is taking a
18 long-term look at the risk Fraser sockeye are to
19 climate change and how are we going to actually
20 evaluate the upstream mortality issue and the
21 animals' behaviour.

22 Q All right.

23 DR. RIDDELL: So there was both a science and a
24 management component. But the thinking at the
25 time was definitely that if this worked, it would
26 become a significant in-season management program.

27 Q All right. But it did start its funding life as a
28 science project?

29 DR. RIDDELL: Yes.

30 Q Okay. And when did that program start to get
31 underway, was it 2007?

32 DR. RIDDELL: Yes, in 2007, and this is building off
33 some work that started before 2007 because of the
34 late-run Fraser sockeye mortality studies that
35 were being funded by the Pacific Salmon Commission
36 through the southern endowment. And so there was
37 some radio-tagging going on in the river. This
38 program, as all its components, was starting to be
39 implemented in 2007. It really wasn't fully
40 implemented until 2008.

41 Q Okay. And this program is still ongoing; is that
42 correct?

43 DR. RIDDELL: It was ongoing through 2010. Because of
44 the funding through a number of endowment funds
45 and the Pacific Salmon Foundation and a
46 significant sum from the Southern Endowment Fund,
47 it is currently not planned to be fully

1 implemented in 2011.

2 Q Okay.

3 DR. RIDDELL: All right. With the exception that we've
4 already talked about, Qualark and the Pacific
5 Salmon Foundation has maintained some money put
6 aside to do some more radio-tagging, if the
7 opportunity exists.

8 Q All right. Well, let's go through what is in that
9 program and then we can talk about what components
10 you think should be continued. So as it was
11 conceived and implemented in 2007, what were the
12 components of this program?

13 DR. RIDDELL: Well, basically, this is really what we
14 would call a mark-recapture program. Mark-
15 recapture statistics are used around the world in
16 all sorts of different species and so the
17 statistics are pretty well worked out. The
18 innovations here were things as simple as using
19 the fish wheel and trying to apply that in the
20 Fraser River to see if you could get a random
21 sample of fish without damage from gillnets, et
22 cetera, and that would be in good health so you
23 could give them a tag with a radio tag and then
24 follow their survival. The radio-tagging was a
25 continuation of some work that had been conducted
26 in the past. Some expertise through LGL
27 Consulting and Karl English. And then Dr. Scott
28 Hinch's group at UBC, they're doing an extensive
29 amount of work in looking at the upstream survival
30 of sockeye and the physiological stress on the
31 animal.

32 To do mark-recapture, you must account for
33 all of the marks and where they're being lost from
34 the system. So you have to implement catch
35 monitoring and sampling of all fisheries. So if
36 there are Native and sport fisheries between where
37 you applied the tag and where you're going to
38 estimate their marked/unmarked ratio, you must
39 sample for the loss of tags at that point. And so
40 in this case, it was the fishing that could occur
41 between Mission and Qualark.

42 At Qualark, we've talked extensively about
43 the DIDSON program. The innovation here that we
44 initially had was one of a directional antenna for
45 the radio tag in the water and aligned through the
46 DIDSON beam. And the intention of this is that
47 you would know exactly when a radio tag went by

1 and then because of the clarity of the DIDSON, you
2 could get an exact estimate of the unmarked fish
3 going by with that marked fish. And the final
4 component then is that, to study things like
5 upstream migration, look at the difference between
6 estimate concerns, study the effects of climate
7 change and then we had receivers strategically
8 placed throughout the watershed so that we could
9 track each individual fish with a radio tag.

10 Q Okay.

11 DR. RIDDELL: There were five integral programs.

12 Q And if I can ask you to turn to Tab 9 of the
13 binder in front of you, which is -- I'm not sure
14 if we have a CAN number for this -- oh, yes,
15 064973. This is the Fraser Salmon Legacy Project.
16 It's a presentation. Is this legacy project the
17 project that you've just been describing?

18 DR. RIDDELL: Yes, and it's called the legacy program
19 because this is actually presented in 2009 and it
20 served two purposes. At the time we were dealing
21 with the downturn and economic cycle and we had
22 lost a lot of money coming from the Pacific Salmon
23 Commission's Southern Endowment Fund and so we
24 were going to the Pacific Salmon Endowment Fund to
25 get money from another source to pay for it. And
26 at the same time this level of detail was gone
27 through because these Pacific Salmon Endowment
28 Fund was changing its board of directors going
29 from Rick Hansen as the chair, setting up a new
30 structure managed through the Pacific Salmon
31 Foundation.

32 MS. BAKER: All right. And I'll have this marked,
33 please, as the next exhibit.

34 THE REGISTRAR: Exhibit 359.

35
36 EXHIBIT 359: Fraser Salmon Legacy Project
37 (CAN064973)
38

39 MS. BAKER:

40 Q If we turn to page 4 of this exhibit, that sets
41 out the five components that you just ran through
42 with us? It should be on the screen in front of
43 you hopefully.

44 DR. RIDDELL: Yes.

45 Q Okay. And you talked about mark-recapture but I'm
46 not sure that we've yet had an explanation about
47 what that actually means. If you can give us just

1 a thumbnail of how those programs are designed to
2 work?

3 DR. RIDDELL: Yeah, sure. Well, we initially designed
4 this, and as you've heard from the discussion with
5 Mike and I, we probably don't need to really go to
6 this extent anymore because of the match between
7 Qualark and Mission is so good. The initial
8 intention here was one of you put tags on at a
9 particular site and, this case we were using it as
10 a fish wheel. The fish wheel was actually located
11 either at Crescent Island just below the Mission
12 Highway Bridge, it was actually about two or three
13 kilometres below it, and then the fish would be
14 released from the fish wheels and our sampling
15 then, to make any population estimate you have to
16 have a secondary site of sampling where you can
17 determine the ration of the marked fish to the
18 unmarked, in this case, the radio-tagged to the
19 not-tagged.

20 And once you know that, plus the number of
21 tags that you've released them, and can account
22 for the numbers of tags that were removed in
23 between those two sampling sites with a couple of
24 assumptions that can be attached, you can actually
25 make an estimate of the population that passed
26 your point of tagging. And so this would have
27 included the Mission hydroacoustic site, which
28 would have been right above that.

29 Q Okay.

30 DR. RIDDELL: Now, there are some basic assumptions and
31 this is where much of the discussion has gone for
32 a couple of years. The one that we struggled with
33 a lot is we thought the fish wheels would give us
34 an opportunity to get a very good random sample.
35 And it turns out both because of the sampling
36 nature of fish wheels in a river, the fish are
37 very, very sensitive to vibration and noise. And
38 so we had some concerns developed there. And the
39 one that's really been, I think, most revealing to
40 us is the sensitivity of the animals to
41 temperature.

42 So in 2010, for example, the sensitivity of
43 that was so great that we actually put the tags on
44 in the marine environment now. So there's a real
45 almost knife-edged survival. If you tag around up
46 to 18 degrees Celsius then we had reasonable
47 survivals. If you tagged above 18.5, then we

1 immediately had significant higher mortalities.
2 And so you can't really have the thermally-based
3 mortality due to handling and try to study the
4 natural environment at the same time. So we had
5 to remove that handling stress from the fish.

6 Q Okay. What was the cost of running this program?

7 DR. RIDDELL: Well, the costs differed a bit in the
8 development, of course, because that large fish
9 wheel in your package, which is pictured in slide
10 6. That had to be completely designed and rebuilt
11 because the small fish wheels proved to not
12 collect enough animals. So the total cost, in my
13 recall, is roughly three million dollars over
14 about three-and-a-half years. But some of that
15 now, of course, is all in these capital
16 investments for equipment. The radio tags are not
17 cheap in themselves so there is a significant
18 annual cost.

19 Q All right. In this program, you've described some
20 of the funding sources for it. But whose program
21 is this? Is this a DFO program? Is it a Salmon
22 Commission program? Is it a Salmon Foundation
23 program? Like whose program is this?

24 DR. RIDDELL: Well, it's really all of the above. It's
25 not really the Pacific Salmon Foundation's program
26 because the foundation is not around to do
27 science. I managed it because of initiating it
28 within DFO. But the information is shared openly
29 amongst all parties. There is some limitation on
30 how quickly this is because if people are doing
31 scientific investigation within it, then we do
32 recognize their involvement to publish that
33 information. LGL, the consulting firm that
34 actually manages most of the program in-season,
35 they are the principal group that managed the
36 radio-tag data, they maintain the database, create
37 a lot of these graphics you see on distribution
38 but that information is always open to other
39 members of the study to participate. And it's
40 open to anyone in the Fraser basin that we talk
41 with.

42 Q I think you indicated that there's some concern
43 about funding and I take it there's a concern
44 about whether Qualark, which is a component of
45 this, will continue to be funded but there's also
46 concern about where the funding will come for the
47 other components; is that right?

1 DR. RIDDELL: Well, yes. We had to be creative in
2 finding funds. We even have private donors who
3 liked the idea so much that in one year they
4 contributed almost \$100,000 to this because they
5 believed that it was going to improve the
6 situation in the Fraser. And that doesn't happen
7 every year. The concern here now is whether we
8 need to continue to doing it at this scale because
9 it was done as, what is the utility, what can we
10 learn from it. For example, going outside to put
11 the tags on in the marine environment, that may
12 reduce some costs but it has others where you have
13 to have access to vessels to get tags on sockeye,
14 et cetera.

15 So the big costs are labour and an annual
16 basis for running the fish wheels. If we don't
17 use the fish wheels, then we give up some of the
18 stock composition information that we talked about
19 yesterday. Not stock; I should call it really
20 "species composition". But I mean the program
21 could still be put together. The Qualark
22 discussion with DFO is the major change in the
23 sense that that had always been their significant
24 contribution to this legacy program. And if
25 they're not doing it now, then Qualark could
26 continue on its own.

27 Q Sorry. Qualark could continue on its own?

28 DR. RIDDELL: It could continue on its own because it
29 has its own merit.

30 Q Oh, I see, sorry.

31 DR. RIDDELL: All right.

32 Q Well, I think we should probably go through the
33 program. You've done an assessment, I take it, of
34 these different components to see if they are
35 useful or whether you want to continue with them
36 so maybe we can do that now. Running through the
37 components that you've identified, what are the
38 values of those different components having now
39 implemented this program for a few years? And do
40 you see a need to continue them?

41 DR. RIDDELL: Well, I mean, if you go through each of
42 them starting with the fish wheel, I think we just
43 commented that there are issues with the fish
44 wheel because of the temperatures in the rivers
45 now. There are still some nagging concerns about
46 how random a sample of sockeye the fish wheels
47 along the shore were providing. It may be better

1 to simply apply the tags in the ocean. Now, there
2 is a direct cost of tagging in the ocean if you
3 have fisheries. So this year with the
4 unexpectedly large run, we lost over 50 percent of
5 the tags applied in Johnstone Strait and Juan de
6 Fuca to fisheries. Now, you can recover some of
7 those but you don't get those fish going into the
8 river where you can get then the upstream
9 migration information. So you save some money
10 some places and you spend more elsewhere.

11 The fish wheel may not actually be continued
12 this year. We don't have any plans to do that. I
13 have kept some money within the Pacific Salmon
14 Foundation because we are still working to see,
15 with the Yale First Nation, if the fish wheels
16 could be used at Qualark to get a better estimate
17 of species composition. The canyon at Qualark
18 actually is quite a good site for a fish wheel to
19 use because the animals are very shore-oriented.

20 Now, the radio-tagging has proved to be
21 extremely --

22 Q Sorry. I'm just thinking it might be useful if we
23 went piece-by-piece and maybe Mr. Lapointe could
24 provide --

25 DR. RIDDELL: Sure.

26 Q -- his comments as well. On the fish wheels, do
27 you have anything to add?

28 MR. LAPOINTE: I think Brian --

29 Q Oh, your mike's off.

30 DR. RIDDELL: Thank you.

31 Q Thank you.

32 DR. RIDDELL: I think Brian captured the main issues.
33 I mean conceptually I think the design of this was
34 excellent. But what happens is you put these
35 things in the water and you learn. And so I think
36 we really were learning and so what Brian's going
37 to be telling you, and this is a good example of
38 the fish wheel, we learn and started with a small
39 fish wheel, thought we could catch more fish with
40 a big fish wheel, could catch more fish but then
41 you talk about trying to look at climate change
42 and the warming Fraser River and you say, well, if
43 we're putting tags in the river that we're trying
44 to track the changes in, it's going to create a
45 challenge for us. So I have nothing more to add
46 on the fish wheel.

47 Q Thank you. So moving to the next, radio-tagging.

1 That might tie in with what you've already talked
2 about but you can...

3 DR. RIDDELL: Well, the radio-tagging is proven to be
4 one of the most informative assuming we can get
5 around this bias, if you're handling fish and
6 adding mortality to it. Going back to 2006,
7 actually, there was a very large marine-tagging
8 program and they did lose tags to fisheries
9 outside. But the reason I bring it up is that
10 once you detected a fish moving past the receivers
11 at Mission then we had a very good accounting for
12 those fish all the way up the rivers. So if there
13 was something to be continued under climate
14 change, then the radio-tagging really does provide
15 a really useful tool to monitor what's going on in
16 the river.

17 We are definitely seeing patterns where
18 you're losing fish in the river that you could not
19 possibly really detect without using the shore-
20 based receivers and applying radio tags. And
21 there are two or three significant places where we
22 tend to have problems in losing tags. We've only
23 really come to that by doing this over a few
24 years. So the radio tags are certainly things
25 that, if we can find a way to continue that
26 resources or the money for that, it's very
27 informative. We are using the radio-tag
28 information in building the first in-river
29 management model for Fraser sockeye as well. And
30 Mike's staff and all the discussion we've talked
31 about managing fish to Mission basically so that
32 we have an accounting of fish at that time.
33 Beyond there, until the fish are on the spawning
34 grounds in the past, there's really not an active
35 management program. So there is an estimate of
36 what passes Mission but then there are fisheries
37 that are conducted, catches that are sampled,
38 biological samples taken. There's not an active
39 management of what's going actually on in the
40 river.

41 So using all the information that we've
42 acquired in this program and working with Simon
43 Fraser University and some models there, we are
44 building a risk model for saying, what if our
45 First Nation in the upper basin signs an agreement
46 to have two or 3,000 food, social and ceremonial
47 fish every year? What would that mean in terms of

1 really trying to manage to directly provide those
2 fish to that community? And so you can actually
3 build a model using the information in the lower
4 river and what you know about loss in-river, what
5 would it take to deliver fish to that community?
6 Q Right. I don't want to take you off topic, but
7 just for reference, Exhibit 337, if you can just
8 quickly go to that and we can just identify that
9 this is the program you're talking about? This
10 was the concept for that program that you're
11 referring to?
12 DR. RIDDELL: Sean Cox, yeah.
13 MR. LAPOINTE: I recognize it as being that -- Brian, I
14 don't know if you --
15 DR. RIDDELL: Is that the one?
16 MR. LAPOINTE: -- are as familiar with it as Sean Cox's
17 in-river model proposal.
18 DR. RIDDELL: Yeah, this is a couple of years old but
19 yes, that's the program.
20 Q Okay. Thank you. I just wanted to identify that
21 for the record. Sorry. And we can go back to the
22 screen that you had up prior.
23 MR. LAPOINTE: Did you have anything more on the mark-
24 recapture, Brian? I don't really have anything
25 more --
26 DR. RIDDELL: Not in the mark-recapture. We were
27 talking --
28 MR. LAPOINTE: -- to add on it. I think the main
29 challenge, as Brian said, is the effect of the
30 tag. And by moving the marine area issue, reduce
31 the effect of the tag but then you have this
32 incremental cost, which is annoying, I guess, in
33 terms of making it work. So I wouldn't --
34 Q Does it provide any different information as to
35 counts at Qualark than what you would have just
36 with the regular DIDSON at Qualark?
37 MR. LAPOINTE: Not counts at Qualark *per se*. You have
38 the counts at Qualark and the counts at Mission.
39 One of the challenges with doing the in-river
40 tagging, and it seemed like the most acute effect
41 of the tag, was in the area between Mission and
42 Sawmill, relative to the marine area fish. So it
43 made the mark-recapture part of that challenging
44 from the standpoint of the fact that there's this
45 tag effect that occurs. Now, that you're in the
46 marine areas, I guess we're going to look at this
47 data this winter, I guess, and see. I suspect the

1 marine area tagging may have something informative
2 because you don't have to worry about that tag
3 effect between Mission and Sawmill. So we haven't
4 done that work yet so we have to do that analysis.

5 DR. RIDDELL: An example of where it would provide an
6 incremental bit of information, we have talked
7 about Qualark and the difference in terms of the
8 numbers with Mission because there are some
9 populations that diverge from the river in
10 between. If they were large populations and where
11 your tagging would capture some of them, you could
12 look at the distribution of the radio tags to be
13 somewhat informative, what portion of the
14 population is going into those other tributaries.
15 Now, if you were talking about the Chilliwack
16 Summer Sockeye, that's a pretty small population.
17 And the likelihood of getting a tag on that is
18 fairly low. But if it was the Harrison River
19 sockeye that are now up in the hundreds of
20 thousands abundance, then there's probably a good
21 chance that you'll tag a few of those. So
22 whenever you're talking about ratios like that,
23 you really need to look at the numbers of animals
24 that you have a likelihood of tagging because it
25 could be very, very sensitive to small sample
26 error. So I think that's all we need on the
27 radio-tagging.

28 Qualark, we've spent quite a bit of time
29 talking about and we'd assume that it's
30 proceeding.

31 Q Yeah, I don't think we need to go into that.

32 DR. RIDDELL: The catch monitoring. This program has
33 worked very closely with DFO and it will continue.
34 The emphasis on the tag recovery and the reward
35 program will simply be reduced. Catch-sampling
36 and catch-monitoring is a routine task conducted
37 in-river by DFO. We have done work with them,
38 more closely in the last couple of years, to try
39 and identify exactly why tagged fish aren't making
40 it through a couple of fishing locations. Is it
41 repeated encounters of nets? Is it just something
42 to do with how the tag is handled? Is it because
43 we didn't get the tag back from particular
44 fishers? And so on. And so they were doing a lot
45 more work on that in the last couple of years.
46 But in the absence of the tags, if that doesn't
47 continue then we would still continue catch-

1 monitoring.

2 And then the radio-tracking through the river
3 system, again, really dependent on whether you do
4 that work or not. There is a long-term cost to
5 the department, well, to Canada or whoever pays
6 for it at this point, because we have been very,
7 very fortunate to get almost all of our receiver
8 equipment from the Columbia Basin. A number of
9 the power utility groups down there do very
10 extensive radio-tagging to study the effects of
11 the dams on the migration behaviour of fish
12 returning. And when they stopped doing those
13 programs because of the contact that LGL had with
14 them down there, they provided all of that
15 equipment to us basically for free. And so where
16 we've had anywhere from 27, I think, to about 35,
17 receivers, we now, I think, have lost 23 of them
18 that are going back for studies in the United
19 States. So to continue that work, we would have
20 to buy receivers.

21 Q So 23 were loaned on a short-term basis only and
22 they have to go back?

23 DR. RIDDELL: Well, we did it on an annual basis
24 basically because they weren't certain exactly
25 when they'd have to do something. But each year,
26 they were very generous in providing them to us.

27 Q And when will those have to go back? Is that for
28 2011?

29 DR. RIDDELL: They're gone.

30 Q Oh, they're gone, okay.

31 DR. RIDDELL: They're gone.

32 Q And were they in place for 2010?

33 DR. RIDDELL: Yes.

34 Q Okay.

35 DR. RIDDELL: Yeah.

36 Q So what's being contemplated for 2011?

37 DR. RIDDELL: Well, if we have money and we proceed
38 with the radio-tagging, then we would look to see
39 a group like Pacific Salmon Foundation, again,
40 might be able to buy some of the receivers and
41 start to acquire these over time. Community
42 groups that are interested in a particular area.
43 These are not really expensive. The current
44 models are about \$8,000 apiece. And even if you
45 have 11 or 14, whatever that difference really is
46 at this point, you could put those in a very
47 strategic location and capture most of the

1 distribution of the tags.
2 Q And do you think that the data received from that
3 upriver monitoring is useful for the --
4 DR. RIDDELL: Oh, absolutely.
5 Q Yeah.
6 DR. RIDDELL: I mean, it's the only way to really test
7 the model and it provides us the data to put it in
8 because it's information on mortality but as well
9 as migration rates. Where do they hold in the
10 river? So there's a lot of information that is
11 being acquired by the radio-tagging.
12 Q Is some of this information received through the
13 in-river monitoring the kind of information that
14 would be useful in trying to flush out some of the
15 DBEs that we talked about earlier?
16 MR. LAPOINTE: Has been used extensively in the late
17 run, in particular, but also in summer runs in
18 2005, it wasn't part of this program but the
19 initial rate of tracking program was conducted in
20 that year. In 2006, the rates of loss were
21 actually used to back calculate how many fish
22 should have been at Mission because it appeared
23 that we had a low bias at Mission. So it's been
24 used very extensively. The pattern of mortality
25 of late-run sockeye with respect to river entry
26 timing that we talked about, I think, when we I
27 was here last week, is very well-documented from
28 the mortality rates of these tags related to the
29 river entry date. So in other words, the fact
30 that almost none of the fish that ran to the river
31 prior to the 14th of August actually made it to
32 the spawning grounds where you see a very dramatic
33 increase in that survival rate, as you look at
34 later-arriving fish. So as Brian said, it's been
35 very freely shared and used quite broadly by a lot
36 of different folks in relation to these issues.
37 Q Thank you. The next area I'd like to cover, which
38 I think is my last area, is the recommendations --
39 THE COMMISSIONER: Could I just ask --
40 Q -- from --
41 THE COMMISSIONER: Ms. Baker --
42 MS. BAKER: Oh, yeah?
43 THE COMMISSIONER: -- could I just ask a couple of
44 quick questions?
45 MS. BAKER: Yeah.
46 DR. RIDDELL: Sure.
47 THE COMMISSIONER: One is, I'm assuming that none of

1 these programs you've addressed are used or have
2 been used for out-migration?

3 MR. LAPOINTE: That's correct. There have been some
4 programs done related to out-migration, some very
5 recently, in fact, on the Chilko but this one does
6 not address that specific issue.

7 THE COMMISSIONER: Okay. And when you're talking about
8 the radio tags, when you say "mortality", are you
9 talking about recovering tags from fish that have
10 been caught or the ability to recover tags from
11 fish who simply die in the river system?

12 MR. LAPOINTE: It's both really.

13 THE COMMISSIONER: Okay.

14 DR. RIDDELL: Yeah.

15 MR. LAPOINTE: So what you get from the radio-tag data
16 by itself is the number of tags that made it to
17 the spawning grounds, the number of tags that pass
18 various points. So that ratio would be, depending
19 on how you calculate it, a mortality rate or a
20 survival rate, depending upon what you use. The
21 tricky part is to try to assign why the fish that
22 didn't make it, what was the reason that they
23 didn't make it? Was it catch? Was it natch (sic)
24 mortality? What was the cause? Obviously, if you
25 get that fish from a fisherman who's caught it,
26 you know that it's clearly a fishing mortality.

27 And there's also work done in relation to, if
28 you don't have a recovery but you know that that
29 fish went missing in a reach when there was an
30 intensive fishery ongoing and you look at the
31 harvest rates that were associated with that
32 fishery, you may be able to draw an inference that
33 that was a fishing mortality. One of the areas
34 where I think we could improve, if we continue in
35 the future, is to have a more intensive catch
36 sampling so that we can really sort that out.
37 Right now, it's a little bit -- I don't know if
38 "circular" is the right word, but so the Mission
39 escapement number is used for the abundance, the
40 observed catches are used for the catches and the
41 ratio of those provides a harvest rate. That's
42 fine in a science sense. Like I think that we
43 would accept that that's good. But in the
44 climate, political climate that we're in in-river
45 then you have to ask, well, if those are the two
46 pieces of primary data, and those are the pieces
47 that people are concerned about, there's a bit of

1 a lack of independence there.

2 So I'm not saying it's not valid
3 scientifically; I'm just saying that a better way
4 might be to just have a test area like in a reach
5 of the river where you have a receiver on one
6 side, a receiver on the other side, very intense
7 sampling to get that mark rate, the reporting rate
8 of the number of fish that are caught. So it's
9 separate from the pieces of information that have
10 sometimes been part of the controversy, I guess,
11 for lack of a better way of saying it. And I
12 think we could do a more extensive job but
13 obviously when you're talking about the Fraser
14 Watershed, it's not a trivial task.

15 DR. RIDDELL: But that is being done. That's exactly
16 what's being done.

17 MR. LAPOINTE: Sure.

18 DR. RIDDELL: I mean the other verification you have,
19 using multiple tools, by having the marked-to-
20 unmarked ratio at Qualark, we can sample the up-
21 river fisheries and if someone tells us, well, we
22 caught 20,000 sockeye, then we can say, well, you
23 should have seven tags for us. I'm making these
24 numbers up. And in most cases, we are within
25 plus-or-minus a tag. Sometimes we actually have
26 more, sometimes we have one less but if you
27 actually look at catch estimate and total number
28 of tags, it's been very, very close each year. So
29 we are doing exactly what Mike says.

30 And this year, we put particular emphasis on
31 an area around Bridge Rapids. And the intensity
32 there was to look at what is the interaction? Are
33 the fish being caught encountering the net
34 multiple times but not being caught so that
35 they're not going by but they're dying? Or are
36 they actually all being taken out of the river as
37 catch? And you really have to actually be there
38 to get that intensive sampling. But just to give
39 you an idea of the extent you can take this to, we
40 have two sites where we're looking at fishing
41 pressures and trying to separate effects. But the
42 other interesting one is in the Thompson River,
43 the fish are actually dying mostly at the outlet
44 of Kamloops Lake. So they've made it through the
45 canyon, which is a significant pressure. It can
46 be extremely warm if you're going through there in
47 the summer.

1 MR. LAPOINTE: Talking about Thompson Canyon now,
2 Brian, just to -- Thompson and Fraser, right?
3 DR. RIDDELL: Well, you're above the Fraser Canyon --
4 MR. LAPOINTE: Yeah, yeah.
5 DR. RIDDELL: -- and you're through the Thompson Canyon
6 and up to the outlet of Kamloops Lake. And we're
7 seeing a significant loss of tags at that point.
8 That actually is a resting point. People in the
9 area know that the animals come through there and
10 before they enter Thompson Lake, they hold there
11 for a while. And it's quite possible that some of
12 the animals are succumbing.
13 Now, the other thing we're doing with the
14 radio tags and David, I don't know if he's still
15 here, but he'll talk about it today probably, we
16 have a little what's called a "button tag". And
17 it simply glued on the back of the radio tag. And
18 it tells us in a very, very short time interval
19 the entire thermal history of the fish once you
20 recover that tag. And so we can see fascinating
21 things about how they actually use the lakes. And
22 they come in and they go down and they're hold for
23 a while at cool temperature and then they'll come
24 back up and they'll move and they'll go down
25 again. I mean there's probably years of study and
26 really capturing all this data. But it's all been
27 extremely useful and informative.
28 THE COMMISSIONER: I have just two brief questions
29 following from what you just said, Dr. Riddell.
30 One is when you use the term "we", I'm not sure
31 which hat you're wearing.
32 DR. RIDDELL: Yeah, well, that's a very good point. I
33 do get frequently confused. I call myself "we" in
34 this case because we still are involved through
35 the Pacific Salmon Foundation. But the program
36 really is the Department of Fisheries and Oceans.
37 And David is Department of Fisheries and Oceans.
38 THE COMMISSIONER: Okay.
39 DR. RIDDELL: So the button tag is his information.
40 That's the department's data.
41 THE COMMISSIONER: Okay. But the Pacific Salmon
42 Foundation is a partner or has an involvement
43 but...
44 DR. RIDDELL: We are a partner. We've paid a large
45 portion of the funds in the past three years.
46 THE COMMISSIONER: I see.
47 DR. RIDDELL: And that's through the Pacific Salmon

1 Endowment Fund. There's some donors. But the
2 major fund is the Fraser Salmon and Watersheds
3 Program, which is a major program within the
4 Pacific Salmon Foundation funded by federal
5 government and the B.C. Living Rivers Fund from
6 the province.

7 THE COMMISSIONER: And finally, just a quick question.
8 How engaged are the First Nations on the Fraser
9 and the programs that you've described?

10 DR. RIDDELL: Within this program, there are a couple
11 of groups that are very involved and others that
12 are interested and returning tags so not as
13 directly involved. Matsqui First Nation are the
14 people that man the fish wheels. And in the last
15 couple of years, we've tried to work with the
16 department to allow them to use the fish wheels as
17 a fishing platform. And then the Yale First
18 Nation is very involved with Qualark. And then in
19 the sampling of the catch throughout the river
20 system, of course, there are First Nation monitors
21 for the catch reporting and recovery of tags. The
22 receiver monitoring, not very much. That's really
23 been managed by LGL and the Department of
24 Fisheries and Oceans. And anything else they've
25 been...? I think that's the major involvement of
26 them.

27 THE COMMISSIONER: Thank you very much.

28 MS. BAKER:

29 Q Thank you. So I would like to just go through
30 some recommendations that have been made in past
31 Commissions to see how those have been dealt with.
32 You should have in front of you Exhibit 14, which
33 is a Table of Recommendations and Responses
34 prepared by Canada. Do you have that? If you'd
35 turn to page 244.

36 DR. RIDDELL: Yes?

37 Q These are recommendations from the Wappel Review.
38 And then 252 is the recommendations from Williams.
39 Both dealing with some of these issues. So
40 starting with 244.

41 THE COMMISSIONER: That's Exhibit 14.

42 MS. BAKER: It's Exhibit 14, page 244, recommendation
43 number 6.

44 MR. LUNN: I don't think --

45 MS. BAKER: Is that not --

46 MR. LUNN: We have David Paterson's c.v. at Tab 14?

47 MS. BAKER: It's Exhibit 14.

1 MR. LUNN: Exhibit 14, thank you. That was my
2 confusion.

3 MS. BAKER: Do you have a copy of Exhibit 14 or not?

4 THE COMMISSIONER: It will come up on the screen. I
5 don't think it's in his file.

6 MS. BAKER: No, it's a separate exhibit that's been
7 marked earlier.

8 DR. RIDDELL: Right.

9 MR. LUNN: Sorry, what page number, please, Ms. Baker?

10 MS. BAKER: 244.

11 Q All right. Recommendation number 6.

12 DR. RIDDELL: Yes?

13 Q This is from Wappel. Again, that:

14

15 That the Government of Canada ensure, as a
16 matter of priority, that the Mission hydro
17 acoustic station be equipped with the latest
18 technology and --

19

20 And then the next part:

21

22 -- establish additional acoustic estimation
23 stations at various strategic locations in
24 the Fraser and Thompson rivers to accomplish
25 quantitative estimates of fish and their
26 stock identity.

27

28 We did talk about some of the sites that were
29 evaluated after 1992. Were there any additional
30 sites looked at following this recommendation?

31 MR. LAPOINTE: What is the year?

32 DR. RIDDELL: What is the year?

33 Q This is 2005.

34 DR. RIDDELL: Yeah. So the Boston Bar feasibility
35 study would have been done after that.

36 Q All right. So the one you've already described
37 today?

38 DR. RIDDELL: That's right, yes.

39 Q Okay. And page 252 sets out the Williams
40 recommendations at number 1. Again, reference to
41 Boston Bar or Qualark so this again is the
42 evidence that you've already given today about
43 your evaluation for the Boston Bar site?

44 DR. RIDDELL: Yeah. With respect to Boston Bar, that's
45 the only work that I know that's been done there
46 and Qualark we've already talked about.

47 Q Yeah, Qualark was re-established following the

1 Williams Commission?

2 DR. RIDDELL: Yes.

3 Q Okay. Don't put away Exhibit 14, but just put it
4 to one side. We talked earlier about a workshop
5 that was held in 2007 by the Salmon Commission.

6 MS. BAKER: If that could be put up again. That's
7 document at Tab 10. That's it.

8 Q Was this workshop done following the Williams and
9 the Wappel reviews and in response to them to look
10 at some different sites?

11 DR. RIDDELL: In part. It was also in part to inform
12 another ongoing project that was probably a result
13 of those reviews and that was development of an
14 Integrated Fraser River Sockeye Stock Assessment.
15 So there was money provided to DFO to design or
16 develop a framework for choosing between all the
17 potential projects that might be proposed for
18 particularly in-river but also in general. And so
19 this workshop was, in part, to inform that
20 framework so that there'd be a discussion of at
21 last the hydroacoustic side of those potential
22 projects.

23 MS. BAKER: All right. Could I have this marked,
24 please, as an exhibit?

25 THE REGISTRAR: Exhibit 360.

26

27 EXHIBIT 360: Workshop on Hydroacoustics for
28 Salmon Management, March 22-23 2006
29 Vancouver, BC - Pacific Salmon Commission
30 Technical Report No 21 (CAN064768)

31

32 MS. BAKER:

33 Q There was a couple of sites mentioned in this
34 document, which I'm not sure we have covered. If
35 you turn to page -- I think it's CAN23-24 but in
36 the document itself it would be page 17, I think.
37 There's Upper Fraser River hydroacoustic site.
38 What do you know about that assessment?

39 MR. LAPOINTE: Just what I heard from Dave Levy at this
40 workshop. I do know that they were exploring, I
41 believe it was -- I don't believe it was DIDSON, I
42 think it was split-beam technology for application
43 at the area near Prince George. And one of the
44 things that you encounter when you start moving
45 these things up the river in terms of cost
46 benefit, these programs are not inexpensive to run
47 on an annual basis. Even if it's DIDSON, DIDSONs

1 are about \$80,000 each. There's a capital cost.

2 There's an operating cost and so the
3 challenge becomes, okay, what's the management
4 application or the application that's being used
5 and is the cost consistent with the DNA sampling
6 associated with this program. And DNA for us
7 costs us about \$19 a fish. So you start adding
8 this stuff up. And so I think -- and you could
9 ask David to talk to this -- but I think his
10 conclusion was perhaps this program, while it was
11 feasible to conduct at this location, might not
12 have been justifiable relative to the cost of the
13 program but he'd be best to speak to that.

14 Q But the Salmon Commission or the Department of
15 Fisheries and Oceans haven't pursued a site here?

16 MR. LAPOINTE: Not that I'm aware of it beyond this
17 study, no. This was a feasibility study and
18 there's nothing ongoing.

19 Q All right. I'm just going to leave those
20 proceedings for a moment and ask Dr. Riddell about
21 a POST array system. Is that also a hydroacoustic
22 kind of project? And what is it? And has it been
23 explored?

24 DR. RIDDELL: POST is not hydroacoustics. POST stands
25 for Pacific Ocean Shelf Tracking. And what it is,
26 is passive receivers that are set on the ocean
27 bottom or at least they're moored on the bottom.
28 And you have active sonic tags that are put in
29 fish. And as the fish passes over the array or
30 the string of receivers, that signal from the fish
31 is detected and retained in the receiver's
32 databank. Then you have to actually have people
33 that are trained to go out, locate the array and
34 put basically, call it a coupling system that goes
35 down and triggers the data upload from the
36 receiver to the receiving information system on
37 the boat. And POST has become the sort of name of
38 the group that looks after that technology. It
39 was largely developed by a fellow named David
40 Welch working with Vemco, a Canadian company. And
41 David has since gone out on his own and is a
42 private consultant and so there is a group that is
43 actually housed at the Vancouver Aquarium that
44 manages the POST program.

45 Q And is that POST program being used now in terms
46 of Fraser River sockeye assessment?

47 DR. RIDDELL: Well, sort of a yes/no. And again, not

1 in management. I think that's true.

2 MR. LAPOINTE: Yeah, that'd be fair to say, not in in-
3 season management, sure.

4 DR. RIDDELL: It is in science. Some of the university
5 programs, for example, they do have a raise set in
6 the lower part of the Fraser and I believe two
7 towards Mission. And they are used for studies of
8 adult salmon coming in and looking at their
9 migration rates up-river. And there has been some
10 research conducted on juveniles, particularly like
11 Coho and steelhead. And last year for the first
12 time, the Pacific Salmon Foundation, DFO and UBC
13 applied a POST technology on juvenile Chilko
14 sockeye smolts. So not in management; definitely
15 in some science programs.

16 MR. LAPOINTE: I can maybe just add one specific Fraser
17 reference is that acoustic tides have been used in
18 the late-run sockeye issue. There's a bit of a
19 ying-yang between acoustic tags and radio tags.
20 Acoustic tags have to actually be, or currently at
21 least, surgically implanted in the fish. There's
22 actually surgery conducted on the fish to insert
23 the tag. Radio tags are actually pushed through
24 the mouth into the stomach basically. So there's
25 that trade-off. You can't detect radio tags in
26 saltwater whereas acoustic tags you can detect in
27 saltwater clearly. So in the late-run application
28 with the Fraser, it was being able to detect the
29 fish off the mouth of the Fraser that the acoustic
30 tags were valuable because you couldn't do that
31 with a radio tag. So it's mainly in the late-run
32 application other than juvenile stuff that Brian
33 mentioned that the acoustic tags have provided
34 some value.

35 Q Are there any limitations of using the POST
36 technology in-river?

37 MR. LAPOINTE: There are, in fact, associated with that
38 project, these hydrophones, as they're called,
39 because they're listening for the tag in the main
40 stem Fraser. There was an array at Mission.
41 There was an array at the Harrison. There were a
42 number of arrays that can be used in freshwater
43 systems. There's no limitation in freshwater to
44 use them. You have to have the receiver and you
45 have to be able to retrieve the information but it
46 can work in freshwater fine.

47 Q And are there any limitations or any impacts from

1 the tag size used in this kind of (indiscernible -
2 overlapping speakers)?

3 MR. LAPOINTE: That mainly relates to juvenile
4 application. Right now, the Chilko study is the
5 most recent one, I think. The smallest fish that
6 they were comfortable putting those tags in was
7 around 120 millimetres or 110 millimetres. The
8 average one-year-old Chilko smolt would be about
9 80. So the tag is not quite small enough to be
10 confident that it wouldn't affect a fish that's
11 more of the average size in Chilko. So it's
12 mostly a juvenile issue primarily.

13 DR. RIDDELL: Well, I mean the tag size and duration is
14 the trade-off. And there are some limitations
15 that we encountered last year. For example, if
16 you're dealing with adults and you want to extend
17 battery life, you only need to have the signal
18 maybe generate every 30 seconds or even one
19 minute. So you can actually have a prolonged
20 battery life doing it that way. But if you're
21 coming down the Fraser River and if you are moving
22 with the current, then what we did is had the tags
23 all reprogrammed so that they were actually
24 putting out a signal every 11 or 12 seconds. And
25 so that really reduced the battery life.

26 But the limitation in-river is one of
27 background noise and so there are some areas if
28 you have a lot of cobble moving through on the
29 ground, that actually generates a lot of
30 background noise that you have trouble detecting
31 the signal against and you have to have the signal
32 be transmitted as it goes past a transponder and
33 it would have to be within about a hundred metres.
34 And so it is a bit of a trick in terms of how many
35 transponders you need in a river to look at
36 downstream migration. The adults you can just put
37 in more tags, it's less stressful. But there
38 clearly are some limitations.

39 MR. LAPOINTE: There's one other value actually
40 mentioned on the Fraser, that it's limited by
41 dollars more than anything else but tags were put
42 on Cultus sockeye. These sockeye were reared to a
43 certain size to make them big enough to handle a
44 tag. And they have a technology with a tag where
45 they can actually make the tag be dormant to save
46 battery life basically. So the tag was emitting
47 its sounds while the fish were out migrating,

1 going out past the detection receivers up in
2 southern Georgia Strait and northern Georgia
3 Strait and up shelf and then went dormant and then
4 turn back on about the time they would come back
5 as adults.

6 And about two years ago I think was the first
7 time we saw an actual demonstration of this
8 technology where a hundred Cultus sockeye were
9 tagged and sure enough two years later, because it
10 takes them two years in their ocean migration, two
11 of them came back and were detected by the array
12 off Juan de Fuca Strait. And the reason I bring
13 this example up is that if you had enough tags on,
14 you could conceivably get a pretty good idea about
15 the migration timing of the adults coming back of
16 a stock like Cultus sockeye. It would cost you a
17 considerable amount of money but you cannot do
18 that with genetics because of the needle-in-the-
19 haystack problem of a few Cultus mixed around a
20 bunch of other stock.

21 So here's an example of a stock that's in
22 trouble, a conservation unit where knowledge of
23 when it's present in the marine area where
24 fisheries are planned, would be very valuable.
25 But of course, you have to put more than a hundred
26 tags on, obviously, because you only had two back
27 but you could conceivably do it. It's feasible
28 but it would be costly.

29 DR. RIDDELL: There are groups working on making the
30 tags smaller. And really what's going on is not
31 to do with the electronics anymore than it is to
32 do with batteries. And there's a new tag that
33 will allow us to tag down to about 9.5
34 centimetres, which people think is stretching it.
35 But you could do the same thing. You could ask
36 the tag to only function for about a month, let it
37 go to sleep for two years and then turn it back on
38 when the animal is coming back. It's the exact
39 same thing as Mike's talking about but the way
40 this tag would be manufactured, it's much more
41 open market and people are thinking that if we buy
42 large volumes, you can start getting the price
43 down so we could tag more fish.

44 The real value of the study last year with
45 Chilko was to actually, for the first time, tag
46 fish that are strictly wild. They were never put
47 in a hatchery. These are just a sub-sample of the

1 smolts because they're by far the largest of the
2 smolts but they're strictly wild fish. So if we
3 could tag the nine-to-ten-centimetres with this
4 tag then you could get into an area. Even that
5 won't allow you to tag all the populations. I
6 mean the fish coming out of Quesnel Lake, for
7 example, you'd never be able to put a tag on like
8 that. So it's not going to be a panacea of new
9 studies but you could apply in some areas.

10 Q Right. And one last question again --
11 THE COMMISSIONER: Can I just ask --
12 MS. BAKER: Yeah.
13 THE COMMISSIONER: -- just before we adjourn for lunch.
14 The program you're talking about, is that the
15 program that we saw at the beginning of the
16 Commission's hearings when it was Mr. Welch was
17 (indiscernible - overlapping speakers)?
18 MR. LAPOINTE: David Welch, exactly. Some of the data
19 from that --
20 THE COMMISSIONER: So that's the same program?
21 MR. LAPOINTE: -- program.
22 THE COMMISSIONER: All right.
23 MR. LAPOINTE: Exactly it, yeah.
24 MS. BAKER:
25 Q The one last question I would like to ask again
26 relates to the recommendations so it's Exhibit 14,
27 page 71, and this is a recommendation from John
28 Fraser's report in 2005. We see number 5, that
29 they recommend that DFO explore application of new
30 technology to collect information and stock levels
31 in ocean areas. And if you would move to the DFO
32 response column under the heading, "Subsequent
33 Actions", second paragraph, it's one line, it
34 says, "Starting in the mid 1990s, hydroacoustic
35 technology was tested in Johnstone Strait." And
36 I'm wondering if you could tell us a little bit
37 about that. Did that happen? What was tried?
38 And did it work? Is it worth pursuing?
39 MR. LAPOINTE: Yeah. So I'll try. I'm more familiar
40 with the most recent work. But there were a
41 number of folks, almost all this work was based
42 out of -- a number of scientists based out of IOS,
43 the Institute of Ocean Sciences in Sidney. David
44 Farmer is a name that comes to mind. David Farmer
45 is a name that comes to mind. There was a
46 gentleman named Mark Trevorrow, I think, that was
47 doing some of this work. And they have explored a

1 number of different hydroacoustic techniques and
2 I'm going to have a hard time remembering the
3 details on this because I wasn't directly involved
4 with these programs. But even things like Doppler
5 radar, long-range sonar, all these kinds of
6 potential applications were tried back then.

7 And then more recently, through the Southern
8 Boundary Restoration Enhancement Fund, so this
9 would have been 2007 or 2008, a gentleman named
10 Svein Vagle, who was I think a consultant based
11 through IOS, led a program in Discovery Passage to
12 look at the applications of long-range acoustics
13 to measure salmon passage in that area. Far as I
14 know, there's nothing ongoing right now.
15 Challenges would probably be fairly obvious due to
16 Johnstone Straits is very highly tidal so fish can
17 be fluxing back and forth so that's a challenge
18 you have to deal with. Always with acoustics
19 pretty well you have to deal with a species
20 composition sampling because you get an acoustic
21 signal but it doesn't tell you which species. So
22 Svein's report is actually available on our
23 website. All the Southern Endowment Fund reports
24 are available on our website so I'd direct you to
25 that for more details.

26 But there have been explorations, high
27 potential value. It's one of these things I'd
28 probably put in the R and D category. It's like
29 it's always good to keep apprised of these
30 developments because sooner or later what you
31 thought was impossible turns out to be very
32 possible. But not there yet in terms of our
33 capability to make it sort of feasible in an
34 implementation phase would be my view of where it
35 is right now. And I don't know, Brian, if you
36 wanted to add to that.

37 DR. RIDDELL: No, your recall is pretty good. When we
38 look at Johnstone Strait hydroacoustically, it is
39 a very, very challenging environment. There is a
40 great deal of background noise. There's so much
41 background noise that when we were designing the
42 juvenile program last year, it was the assessment
43 of David Welch and Kintama that runs a lot of
44 these arrays that they could not put even a POST
45 receiver in Johnstone Strait and actually trust
46 the information back.

47 And the other thing that they've discovered

1 is that there's actually quite a bit of bubbles
2 entrained in the water in Johnstone Strait because
3 of the extent of turbulence and mixing. So a
4 number of these things were tried and the staff at
5 IOS are expert in this because of their work in
6 marine hydroacoustics for a number of
7 applications. And really not too much has really
8 proven to be fruitful yet.

9 Q If work was done and some of the challenges in
10 Johnstone Strait or in a marine area were
11 overcome, what would be the advantage of that kind
12 of hydroacoustic sample?

13 MR. LAPOINTE: Same kind of thing relative to the value
14 of a test fishery versus a Mission in-river
15 program. It's the volume of fish that are
16 sampled. It's the actual number of targets that
17 are part of the sample that's the critical part.
18 So I said yesterday, I think, talking about test
19 fisheries we probably catch on average about one-
20 half of 1 percent of the fish going by from one
21 test boat in Johnstone Straits. Potentially, if
22 you could develop this technology, you could get
23 up into the 10, 15, 20 percent range pretty easily
24 given where we've been in the river. So that kind
25 of a difference, in the order of magnitude
26 difference in the sample size has a very big
27 impact on accuracy and precision. But we have all
28 these challenges, of course.

29 Q Right. And then just to close off, I just wanted
30 to flag in the exhibit marked now as Exhibit 360,
31 at pages 15 and 16 on Ringtail, which is page 9 in
32 the actual document. There's a reference to Svein
33 Vagle's hydroacoustic estimation for salmon in
34 marine waters. That's what you were referring to?

35 MR. LAPOINTE: That's exactly it. Yeah, that's right.
36 And this report is actually available -- the more
37 detailed report is available.

38 MS. BAKER: Thank you. Those are my questions.

39 THE REGISTRAR: The hearing is now adjourned until 2:00
40 p.m.

41
42 (PROCEEDINGS ADJOURNED FOR NOON RECESS)

43 (PROCEEDINGS RECONVENED)

44
45 THE REGISTRAR: The hearing is now resumed.

46 MS. BAKER: Thank you. It will be Canada examining the
47 witnesses next.

1 MR. SPIEGELMAN: Good afternoon, Mr. Commissioner.
2 Jonah Spiegelman, counsel for Canada.
3

4 CROSS-EXAMINATION BY MR. SPIEGELMAN:
5

6 Q I am just going to take the opportunity to ensure
7 that I understand what was said this morning, and
8 then ask just a very few questions.

9 So from what I understood from your evidence
10 this morning, there is both positive and negative
11 aspects to Mission as a location to conduct
12 hydroacoustics for fish, and primarily the
13 positive aspects of the location of Mission and
14 the system you have set up there are that the
15 geographic location is convenient in terms of
16 being upstream of commercial fisheries and
17 downstream of in-river portions of the migration;
18 is that correct?

19 MR. LAPOINTE: That's correct.

20 Q But it also has some challenges, mostly associated
21 with the hydroacoustic suitability of the site?

22 MR. LAPOINTE: Yeah, in relation to fish behaviour.
23 Sure.

24 Q And as well I believe I heard you testify that
25 there was the older technologies are in place
26 there and they aren't quite as accurate and state-
27 of-the-art as some of the newer DIDSON
28 technologies?

29 MR. LAPOINTE: There's a level of interpretation to the
30 split beam that's not needed for the DIDSON
31 technologies, that's for sure.

32 Q And, sorry, I'll go back to the positive aspect.
33 One of the other things that you mentioned was
34 important was the long time series and experience
35 you have at the site, and it allows you to
36 interpret data more accurately; is that correct?

37 MR. LAPOINTE: That's correct.

38 Q And as I understood the evidence this morning, the
39 Qualark has something of the reverse scenario
40 happening, in that the hydroacoustic suitability
41 of that location is very good.

42 MR. LAPOINTE: That's correct.

43 Q And you have the state-of-the-art equipment
44 installed there and it has been tested and the
45 folks are satisfied that it's working well?

46 MR. LAPOINTE: That's correct.

47 Q Conversely, though, the geographic location of

1 Qualark isn't ideal, in that it's harder to, in
2 terms of timing, to get in-season run size
3 estimations in time for marine fisheries?
4 MR. LAPOINTE: There's a timeline, a longer timeline,
5 yes.
6 Q A longer timeline. So just taking those
7 considerations into account, Mr. Lapointe, you
8 testified that Qualark does have value for in-
9 season management of the fishery.
10 MR. LAPOINTE: Yes. Yes, I would agree.
11 Q Yes. And that value is primarily, in terms of in-
12 season management, is related to the sort of
13 cross-checking, I believe you said, to the Mission
14 estimates?
15 MR. LAPOINTE: Yes, the confirmation, the consistency
16 aspect.
17 Q Right. And you set this view out fairly clearly
18 in the memo of November 19th, 2010, which has been
19 marked as Exhibit 356.
20 MR. LAPOINTE: That's correct.
21 Q And it's fair to say that the use of Qualark data
22 and collection of Qualark data increases the
23 confidence that you would have in your Mission
24 estimates; is that correct?
25 MR. LAPOINTE: Yeah, having that confirmation is
26 certainly something that my scientists in the
27 program would really value.
28 Q And the error in estimation at the Mission site is
29 one component of the difference between estimates
30 that you calculate?
31 MR. LAPOINTE: That's correct.
32 Q And so taking it one step further, having
33 increased confidence in those Lower river
34 estimates will have an impact on the calculation
35 of management adjustments?
36 MR. LAPOINTE: Yes, in differences between estimates it
37 provides some strong rationale to try to dissect
38 the causes a little bit more carefully.
39 Q And would you agree that that's useful to have?
40 MR. LAPOINTE: I certainly would.
41 MR. SPIEGELMAN: Thank you. Mr. Lunn, could you pull
42 up the Canada's document number 3.
43 Q This is an e-mail dated September 29th, 2010.
44 And, Mr. Lapointe, you were one of the recipients
45 of this e-mail; is that correct?
46 MR. LAPOINTE: Yeah, I recognize it.
47 Q You recognize it. And on the last page of this

1 document, could you describe what that is?
2 MR. LAPOINTE: So are we looking at the very bottom of
3 the page that's in front of me? I'm just trying
4 to...

5 Q Oh, no, sorry, the last page of the document, page
6 4.

7 MR. LAPOINTE: This is the detail budget form that
8 looks like it's in the one that maybe have gone to
9 the Southern Endowment Fund at one point, but I
10 think that's what that is. Yes, that's detailed
11 project breakdown costs for Qualark associated
12 with a past year's Southern Fund proposal, I
13 believe. But it may not be from that source, but
14 it is budget, detailed budget breakdown.

15 Q Perhaps, Dr. Riddell, do you recognize this
16 document?

17 DR. RIDDELL: Well, only from reviewing it in
18 preparation. I didn't see this in advance. I can
19 say from my experience in managing Qualark in the
20 past that this is definitely the sort of right
21 breakout.

22 MR. LAPOINTE: Yeah. I'm not questioning the numbers.
23 I'm just trying to question the recollection of
24 where the form was originating from, that's all.

25 MR. SPIEGELMAN: Thank you. Can I get that marked as
26 the next exhibit, please.

27 THE REGISTRAR: Exhibit number 361.

28
29 EXHIBIT 361: E-mail and chart regarding
30 Qualark operating costs breakdown Qualark
31 Acoustic Site dated September 29, 2010
32

33 MR. SPIEGELMAN:

34 Q Finally, I just want to talk a little bit about
35 the progression of what's been happening in terms
36 of hydroacoustic estimation for Fraser River
37 sockeye. And we've heard a lot of evidence up to
38 this point about various uncertainties and
39 developing the technologies along the way, and I
40 think that those are pretty clear in the evidence.
41 And we've also heard a lot about techniques and
42 methodologies that have been developed after
43 having identified certain biases or potential
44 biases in the data, and a lot of work has been
45 done to try and address those biases. Are those
46 fair statements?

47 MR. LAPOINTE: Yes.

1 Q And have these scientific or technological
2 advancements been subject to peer review in the
3 larger scientific community?

4 MR. LAPOINTE: Some have. And some are more in
5 internal tech report documents. So I could
6 probably -- my scientists would be the lead author
7 on most of these papers. Many of the
8 methodological sort of formulaic things have been
9 peer reviewed. Precision estimates at Mission,
10 even in the old program were peer reviewed, but
11 there are some that do remain kind of in the grey
12 literature, in the sort of technical document
13 domain. So there's a kind of mix and match: some
14 have, some haven't.

15 Q Okay. And those that have or haven't, they've
16 been generally -- you've done a lot of
17 collaboration with outside agencies and
18 researchers; is that correct?

19 MR. LAPOINTE: Yeah, so I would say that even the ones
20 that haven't, because they would have been
21 reviewed by, for example, our DFO colleagues in
22 the Hydroacoustic Working Group would probably
23 have been subject to almost the same or more level
24 of intensity review than they would be from going
25 outside. The fact is that the expertise on river
26 acoustics happens to primarily reside in the
27 Pacific Northwest, and so we are working with the
28 experts. We are the experts. So I think that the
29 review is fairly good that way, and there's even
30 some collaboration with folks in Alaska on these
31 things. So I think it's a good review, but not
32 all of it is peer review in the refereed journal
33 sense.

34 Q Thank you. Do you have anything to add, Dr.
35 Riddell?

36 DR. RIDDELL: Well, actually, in the History of the
37 Fraser Hydroacoustics that we discussed this
38 morning and was marked, it actually has a
39 literature list on the back. And you'd note there
40 that there are a number of scientific
41 publications, and that there have been efforts to
42 undergo peer review. And I think the other group
43 we would note that there is interaction with, is
44 University of Washington and the Biosonics
45 industry in Seattle. So there's no question that,
46 as Mike says, the in-river expertise for
47 hydroacoustics is definitely in the Pacific

1 Northwest, and Mike's staff and the Departmental
2 staff are definitely amongst the leads of that.
3 MR. SPIEGELMAN: Okay, thanks, that's helpful. Those
4 are my questions.
5 MS. BAKER: Thank you. I think the next person is
6 going to be Ms. Gaertner.
7 MS. GAERTNER: Thank you, Mr. Commissioner. Brenda
8 Gaertner for the First Nations Coalition.
9

10 CROSS-EXAMINATION BY MS. GAERTNER:
11

12 Q I just have a few questions, actually. I'm
13 pleased to say that most of the questions I had
14 prepared have been covered in the material today,
15 so I'm just going to pick up on a few things and
16 be able to move on. I just wanted to confirm
17 historical information, if I may, just to start
18 with.

19 MR. LAPOINTE: Sure.

20 Q Just to make sure I've got it right. When Mission
21 was first chosen in the late '70s, and really up
22 during the '80s or so, the primary goal of Mission
23 at that point in time was to help to assist in --
24 well, maybe you could just tell me.

25 MR. LAPOINTE: Sure.

26 Q What were they doing then and how would you
27 compare that to what they're doing now?

28 MR. LAPOINTE: Sure. So probably up until even as late
29 as the mid to early '90s, I would characterize the
30 primary purpose of Mission would be to monitor
31 progress towards escapement targets, so to see
32 what has come out of the fisheries remaining left.
33 Because it was upstream of the primary harvest,
34 particularly commercial harvest, and the First
35 Nations harvest upstream of Mission was smaller at
36 that time. So it was used to monitor something
37 that we call gross escapement, which I think we
38 talked about probably more than we care to
39 remember last week. But the idea of making sure
40 there's a sufficient number of fish for the
41 spawning grounds, management adjustments, any
42 allocations of catches upstream of Mission. So it
43 was used as kind of a tool to see, given the
44 management actions that were taken downstream,
45 what are the outcomes to date in terms of
46 potential spawning escapement to the spawning
47 grounds and fish for First Nations and others

1 upstream of Mission.

2 Q And at that time when they first started, one of
3 the tendencies in the fisheries was actually to
4 fish fairly strongly at the early part of the
5 season, and only wait till the end of the season,
6 really, to begin to ensure spawning escapement.

7 Is that a fair way of putting it?

8 MR. LAPOINTE: Well, no, I would say if you go back in
9 history into the turn of the century, like the
10 late 1800s, 1900s, before there was the
11 development of stock discrimination techniques,
12 people did fish the front half of the run and
13 expect the escapement that was left -- and those
14 fish happened to also be of somewhat poor quality,
15 particularly in the river, because they were fish
16 that delayed, they were essentially --

17 Q And when you're saying "people", you're talking
18 about the commercial fishery there, am I correct?

19 MR. LAPOINTE: I'm talking about, yeah, I mean, it was
20 largely commercial fishery back then and we're
21 talking about fisheries downstream of the Lower
22 river, so that would primarily, I don't know what
23 the marine First Nations or other fisheries were
24 at that time. So definitely if you go back to
25 that period of time there was a lack of
26 understanding that in fact the fish that were
27 coming later were actually from different stocks.
28 So it was really a convenience and an ignorance
29 about the stock dynamics that existed at that time
30 that led to that kind of fishing pattern.

31 Now, if you go back, start getting into the
32 modern era, and I'm talking about -- this may not
33 seem modern, but you go from like the 1952 area to
34 the 1990s, which is sort of the start of the
35 dataset for these 19 forecasted stocks that we've
36 talked about, there is clear development already
37 at that point of the stock discrimination
38 techniques. That's why we can parse out the
39 recruitment in those years and the catches to
40 individual stocks. So in those years I wouldn't
41 say it would be fair to say that the fisheries
42 were frontend loaded in time. I would say that
43 there was a very consistent pattern of effort, so
44 essentially very regular weekly openings of
45 fisheries throughout the run, beginning in
46 probably the third week of July, right through to
47 September, and these are outlined in the schedules

1 of the PSC Annual Reports.

2 So your comment about intense harvest, that's
3 absolutely correct in terms of exploitation rates
4 in the sort of 70 percent and higher range, but it
5 was definitely spread out breadth-wise through the
6 run across all the stocks.

7 Q Okay. But the goal of Mission at the time was
8 still quite different than what you're using it
9 for now.

10 MR. LAPOINTE: Yeah, if you think about it, if you're
11 going to have a fishery out front of Mission that
12 harvests 70 percent, you'd better ensure that your
13 monitoring of the 30 percent that you need for
14 your spawning escapement is reasonably accurate.
15 Because if it's not, then clearly you could have
16 some mistakes that would not be beneficial to the
17 resource in the long run. So that was clearly the
18 role of Mission at that time.

19 Q And so if I have remembered your evidence
20 correctly from last week, what we're doing now is
21 quite different. And, Mr. Commissioner, you'll
22 recall that last week we heard about the
23 importance of measuring the peak and just after
24 the peak, and how challenging that's becoming in
25 many, many ways. But that that's the key
26 component of when we begin to do --

27 MR. LAPOINTE: Yes.

28 Q -- some in-season. That's quite a different task
29 for the Mission acoustics; is that correct?

30 MR. LAPOINTE: Yes. So now it's actually designed,
31 it's used for both. So it's still used for the
32 escapement monitoring, but the critical part of
33 that is perhaps somewhat diminished, given the
34 fraction of the fish that have been harvested in
35 recent years. In other words, if you're
36 harvesting a lower fraction, 30 percent range in
37 the last few years, the importance of that
38 monitoring from a conservation perspective becomes
39 a little less than if it's 70 percent. But the
40 primary tool in the run size is Mission. So in
41 the past we would have used some of these
42 commercial seine models that have been discussed
43 last week, and so forth. Now, without those
44 tools, because of the way the fishery is being
45 managed, we need to do something else and the
46 thing we're using is this Mission program coupled
47 with the test fisheries. So it definitely was not

1 a run size, primary run size tool prior to the
2 '90s, late/mid-'90s.
3 Q And therefore some of the decisions that are made
4 as a result of Mission are getting more and more
5 sensitive also in terms of its impact. Would you
6 agree with me, also?
7 MR. LAPOINTE: Yes. Yes, because of its impact on the
8 run size estimation, absolutely.
9 Q And so that verification role that others play, in
10 fact Qualark and otherwise, is becoming actually
11 not only useful but extremely important. Would
12 you agree with me on that?
13 MR. LAPOINTE: Yes. And even from the standpoint of
14 the accounting of the run. So now in many of
15 these years, maybe 70 percent of the run will
16 actually pass Mission, as opposed to previous
17 years maybe 70 percent of that run would be in
18 catch. So as a component of the total run
19 calculation, it's a much more significant
20 component now than it used to be.
21 Q Thank you. To the best of your knowledge, in a
22 year like this year, or 2010, I guess we're in
23 2011 now.
24 MR. LAPOINTE: Yes, thanks.
25 Q Sorry. In 2010 with the level of abundance that
26 we were dealing with, what's your present
27 knowledge on the overall range of percentage
28 reduction that we're going to be looking at in a
29 post-season environment to the in-season run
30 estimates?
31 MR. LAPOINTE: Are you talking about post-season run
32 size now, I'm just trying to...
33 Q Post, yeah, you're nearing completion of the post-
34 season run size, and I'm just interested in the
35 level of change that we're anticipating.
36 MR. LAPOINTE: Yeah, we don't have the post-season data
37 right now because spawning ground estimates are
38 not complete.
39 Q That's why I'm not going to nail you down, so I'm
40 just asking you --
41 MR. LAPOINTE: No, no, but I think it came up already,
42 maybe yesterday, and I can't, it's all melding
43 together for me, sorry, Mr. Commissioner, I'll try
44 to remember when it was. But so the final in-
45 season adopted runs were around 34.5 million for
46 2010. The Late run component of that, which is
47 the Late Shuswap primarily, is about I think 24

1 million, or something like that. If we look at
2 the accounting at Mission as another check, that
3 accounting at Mission would be about 29.5, and all
4 that difference between the 34.6 and the 29.5 is
5 in that Late run group. So instead of 24 million,
6 it's going to be about 20. So you're looking at,
7 what is that, four or five million out of 30, that
8 would be kind of the percentage reduction, based
9 on where we are right now. Now, we're going to
10 get spawning ground estimates and we're going to
11 go through those all again. And I'm not going to
12 prejudge, I haven't seen any of those numbers. I
13 don't know what they're going to say, but they'll
14 determine the post-season run size.

15 Q Okay. So I was actually getting at more just as a
16 comparison. I didn't want to pin you.

17 MR. LAPOINTE: Sorry.

18 Q I know those numbers -- no, it's good. So that's
19 about in some cases a 20 percent reduction, is
20 that about right?

21 MR. LAPOINTE: Yeah, 15, 20, something like that.

22 DR. RIDDELL: Yes.

23 Q And would you agree with me, and Dr. Riddell, if
24 you'd like to add to any of this, please do. But
25 would you agree with me that for some stocks or
26 some conservation units that level of error could
27 be extremely difficult for the stock to be able to
28 handle?

29 MR. LAPOINTE: It would depend upon the level of
30 exploitation rate out in front. So that would be
31 the only caveat I would say. So if that level of
32 reduction converts to a level of reduction in
33 escapement, then that clearly is something that
34 would have an impact, but it would depend upon,
35 like I say, what the abundance of that stock was
36 to start with and how that reduction translated
37 into escapement.

38 Q Is there anything else you'd like to add, Dr.
39 Riddell?

40 DR. RIDDELL: No, I mean, I think that is correct what
41 Mike has just said. It's also a trade-off with
42 the survival of the stocks of concern. You do
43 have a particularly good example this year with
44 Cultus Lake, because that is a component of the
45 Late run Mike's talking about. So it will have
46 been overestimated by 15 to 20 percent. But
47 you're going to have to keep in mind that I

1 believe the escapement there is over 12,000, and
2 we have been struggling along at a couple of
3 thousand for a number of years. So the 20 percent
4 error is not going to have as big an effect. If
5 that stock had not done well, if it had not shown
6 the recovery of some of the others, then your
7 point is certainly correct, that you would have
8 increased the harvest rate inappropriately. In
9 this case you potentially have an error in the
10 harvest rate, but it's really going to have a
11 relatively minor effect. So you would probably
12 add, what, in the range of 1,500 to 2,000 more
13 spawners on top of what was accomplished.

14 Q I guess what I'm going to with that is just if we
15 look for conservation for precautionary purposes
16 and we want to make sure that our numbers are as
17 best as we can, that verification between Mission
18 and Qualark is only going to potentially, if
19 productivity declines, become more important into
20 the future. Would each of you agree with me on
21 that?

22 DR. RIDDELL: Yeah, and this is a topic that has been
23 debated for a while now, because when the Cultus
24 recovery plan was developed, the Department did go
25 through a number of discussions in terms of what's
26 an appropriate in-season harvest rate to set,
27 whether it was 20 percent or 30 percent. The
28 difficulty with that is if you set the target at
29 30 percent and your control error is plus or minus
30 50 percent, then a couple of years that we set 30,
31 we ended up with 40 and 45. So I'm sure that some
32 people feel that that's not an appropriate error.
33 And so what we'd really want to make sure we do is
34 say with a certain level of confidence, just like
35 forecasts, we would like to be 75 percent
36 confident that you don't exceed 30 percent harvest
37 rate on a stock of concern, in which case you need
38 to go into your season with a target of maybe 24
39 percent harvest rate. So these numbers are
40 becoming increasingly important to us so that we
41 can track these values, because people are setting
42 standards now that we haven't had to meet in the
43 past.

44 MR. LAPOINTE: And since you asked, I would agree with
45 the statement that you made and just indicate that
46 if Qualark and Mission are combined, the variation
47 should be less in a combined estimate than it

1 would by either by themselves.

2 Q Thank you. That's very helpful. I just wanted to
3 pick up on one of the realities of Qualark, not so
4 much a problem, is that we've lost our account of
5 a certain amount of stocks that have already left
6 the main stem of the Fraser, that's just the
7 Harrison and the Weaver and the Cultus. Dr.
8 Riddell, do you have other recommendations or are
9 you aware of other locations in which we're
10 marking in-season abundance for the stocks that
11 have segued out and that could complement with
12 Qualark? So how are we doing in-season
13 assessments on Harrison and Weaver and Birkenhead.
14 Are you aware of that, and do you know?

15 DR. RIDDELL: Well, my last recall on that is a lot of
16 the relative size of those stock is being drawn
17 from the DNA analyses. So you can get an estimate
18 in-season of what the relative composition was and
19 then you can look at the numbers of fish that
20 would be returning to those streams.

21 The hydroacoustic staff did look at
22 implementing hydroacoustics in the Harrison River,
23 but the problem really is one of siting there.
24 It's very shallow along the levee. It's difficult
25 to really get a good estimate of passage without
26 doing some sort of shoreline modification. But I
27 think right now, really the only estimate or
28 tracking in-season is done via DNA.

29 MR. LAPOINTE: I would agree with Brian's comments.

30 Q Thank you. Two questions, I'll begin with Dr.
31 Riddell and, Mr. Lapointe, if you have anything to
32 add, please do. But, Dr. Riddell, my next two
33 questions are blue-sky questions a little bit. If
34 for conservation or precautionary purposes we
35 wanted to increase fisheries targeted on abundant
36 stocks and leave either conservation units or
37 others that are weaker to return to the spawning
38 ground, where would you best locate the
39 hydroacoustic assessments in the river?

40 DR. RIDDELL: Well, unfortunately that depends on the
41 stock. If it's an upriver stock of concern, then
42 clearly Qualark is the place to get the best
43 estimate of what's proceeding upriver, assuming
44 that you're also putting in place a DNA sampling
45 program to track it. If you're interested in
46 Cultus Lake as an example, though that is in the
47 Lower river, all right, and so you'd need a

1 different assessment site for that. So the
2 placing of these assessment programs is very
3 dependent on the location of the stock, where you
4 can actually get data of good quality so you can
5 make a good judgment. So I'm not sure it's quite
6 as easy as that. But Qualark clearly for most of
7 the CUs are upstream of the canyon and therefore
8 Qualark will give you the best estimate of what's
9 leaving the downstream fishing area.

10 Q So Qualark plus DNA.

11 DR. RIDDELL: Qualark plus DNA for the upriver.

12 Q All right. Mr. Lapointe, is there anything you'd
13 like to add to that?

14 MR. LAPOINTE: Well, I think Brian's basically right.
15 I think that I would characterize it a little bit
16 as we're talking about in-season. So you always
17 have this trade-off in-season between the
18 timeliness of the information and wanting to have
19 the information be the most relevant for the
20 conservation of whatever CU it is that you're
21 trying to protect. So from a most relevant to the
22 CU perspective, you could almost say if you could
23 get in-season feedback upstream of the last most
24 significant fisheries, that would provide you the
25 best evidence of what may be going to make it to
26 the spawning grounds, which might allow you to
27 react in-season.

28 The trade-off is if you talk about some
29 upriver stocks, like Bowron, for example, which is
30 way up by Prince George. If you had a site, say,
31 I don't know, Prince George or something, that's
32 about 15 days travel from the mouth of the river.
33 So by the time you got that information about
34 Quesnel, if that's how far you had to go up to
35 take into account all the significant potential
36 impacts on Bowron, most of your ability to take
37 any action that would protect Bowron would be
38 lost, because Bowron would have already been
39 subject to all those fisheries. So it's that
40 trade-off between the timeliness to take an action
41 that makes a difference to these stocks, and the
42 information value that you're always struggling in
43 with siting these things, in addition to the
44 geography that Brian mentioned.

45 Q Is that why, Dr. Riddell, you started with Qualark
46 so quickly is that it gives you a good assessment
47 of everything that gets past the canyon,

1 essentially, before the canyon?

2 DR. RIDDELL: Yeah. And like this morning, I mean a
3 number of the reports talked about having some
4 sort of monitoring or particularly hydroacoustics
5 at each of the major tributaries, that's very
6 difficult to do. I mean, as Mike is saying, if
7 you have a principal fishing area, so if you're
8 going up the main Fraser, you have fishing going
9 on through the canyon and then probably the
10 principal First Nation fishery then is still one
11 at Bridge River or Bridge Rapids. So if you have
12 monitoring there, so you know what the catch is.
13 Once you know the assessment at Qualark and you
14 have a stock of concern, then you can make an
15 estimate of what you think the allowable removal
16 in-river should be, and then the First Nations and
17 the Department can monitor what's going on. You
18 can work with these things, particularly if it's
19 high quality. But all the additional information
20 of course gives you more confidence.

21 Q I just have a quick question that an elder's, I
22 think, knocking at my ear right now. I heard a
23 number of times and a number of questions over the
24 years as to why aren't we doing something right
25 when the Thompson and the Fraser split out? That
26 seems to be something that from many perspectives
27 is an obvious place. I wonder if you could speak
28 to that, Dr. Riddell.

29 DR. RIDDELL: Yeah, we've been there, done that.

30 Q Okay.

31 DR. RIDDELL: We've looked at the bridge going across
32 the Upper Fraser and looked at the bridge in the
33 Thompson. They're difficult environments to work
34 in. They're still big with large flows. And I
35 think if you had the resources really, because
36 really the bottom line in much of this is that you
37 could probably develop more sites. You simply
38 don't have the resources and people at this time
39 to be everywhere all the time. But they're very
40 difficult sites.

41 Q Okay.

42 DR. RIDDELL: And we wanted to put receivers in there
43 for juveniles, and we couldn't make that work. So
44 they're very noisy for the sonic tags, and they're
45 just a challenge hydroacoustically, but with
46 enough effort, I'm sure you could do more.

47 Q Thank you. One more blue-sky question. I'll

1 start with you, Dr. Riddell. If we were trying to
2 use hydroacoustics and these other integrated
3 processes that you were mentioning today that have
4 been part of your effort and DFO's efforts, to
5 better understand juvenile outmigration, including
6 specifically what's going on in Johnstone Strait,
7 and health and abundance of juvenile outmigration,
8 what would you recommend would be some of the
9 things we might want to do?

10 DR. RIDDELL: Well, actually, I and Dave Welch and
11 Scott Hinch thought about that quite a bit this
12 summer. The first thing I think we would
13 recommend is a site in probably about a third of
14 the way up Johnstone Strait, where you could find
15 a way to monitor the rate of passage of the Fraser
16 sockeye moving through Johnstone Strait. And the
17 reason for that is there is sampling going on
18 within the Strait that the Department is
19 undertaking, and the criticism of that has always
20 been that you're sampling the end of the run, that
21 you don't know the portion of the run that you're
22 sampling. And so you could mount a single site
23 program, so a fixed location monitoring fish
24 passing that location.

25 Where we went was opposite Sayward in
26 Johnstone Strait, and the intention was that in
27 the very narrowest portion of Johnstone Strait you
28 could use a purse seine during slack tide to
29 sample the fish moving through the Strait, or you
30 could even potentially use a DIDSON to look at
31 smolts. Because what you need is an index of the
32 abundance moving by on a day. That was the first
33 place that we went to try and do something like
34 that.

35 And then David Welch is certainly promoting
36 the idea that we need an improved sensor array at
37 the north end of the Straits of Georgia, and
38 that's doable because there is actually a fairly
39 narrow section that's very deep. And so you
40 probably could get a good measure of the fish
41 moving through there.

42 Right now there is a big gap of the POST
43 arrays that we talked about. The last detection
44 would really be at the top of Hornby, Denman over
45 to Texada Islands, and they call that the northern
46 Strait of Georgia line. I don't call that the
47 Northern Strait. That's sort of central Strait to

1 me. And you go from there right to the top of
2 Queen Charlotte Sound. I believe that was about
3 16 days passage in our smolts this past summer.
4 And so to really try to narrow down where we're
5 losing Fraser sockeye smolts, we need to partition
6 that big area.

7 It's very difficult to work in Johnstone
8 Strait, as I said. David does not think that you
9 can actually work in the actual narrow channels
10 because of the background noise. So we could get
11 closer to the mouth of Johnstone Strait, but then
12 we'd probably have to wait till the top of
13 Johnstone Strait. But you could do more within
14 the Strait of Georgia, and Juan de Fuca, we
15 shouldn't leave that off. There is an array
16 that's about two-thirds of the way out to sea
17 through Juan de Fuca.

18 Q And these are all doable at this point in time?

19 DR. RIDDELL: Well --

20 Q Subject to resourcing.

21 DR. RIDDELL: The so-called northern Strait of Georgia
22 line, the Queen Charlotte line, the Juan de Fuca
23 line, they all exist. The people that work in
24 that technology want to what they're saying is re-
25 instrument that, and that's actually costly
26 because the new ones are actually substantially
27 more expensive. The only one we wanted to add is
28 one across the north part of the Georgia Strait,
29 essentially across the Strait at Campbell River.

30 Q Thank you. Mr. Lapointe, is there anything you'd
31 like to add, or is...

32 MR. LAPOINTE: Really briefly, I agree with everything
33 Brian said. And just so a POST-type program with
34 a small enough tag to put it on more germane to
35 the average size of Fraser sockeye juveniles,
36 which will require some modification to the
37 receivers, because there's less of a travel that
38 the sound goes. But just to reiterate the
39 monitoring aspect that Brian mentioned in Georgia
40 Strait, we've been collaborating with a group,
41 Mike Price and his group, to provide DNA support
42 to a program designed to sample more in relation
43 to the sea lice issue than Fraser sockeye, per se.
44 But in Mike's samples of Fraser sockeye for the
45 last three years, the genetics of those samples
46 suggest they make sense. The stock proportions,
47 we're talking about samples of 300 fish sampled

1 near Discovery Passage with a seine boat, makes
2 sense relative to the abundance of spawners that
3 would have been in the brood year. So for example
4 his samples for the out-migrating fish that came
5 back this year showed a high fraction of Adams
6 River sockeye, which is exactly what you'd expect.
7 So I'd say just from the little bit of sampling
8 that wasn't even directed at monitoring that we do
9 have, it shows a really high probability of being
10 able to build a program there that would actually
11 be successful.

12 Q Thank you. Dr. Riddell, do you have anything to
13 add?

14 DR. RIDDELL: Well, I would just point out that there
15 is a lot of sampling for DNA. I mean, the trawl
16 surveys are all sampled for DNA, and so that's
17 sampled in July and September, and now they've
18 added an early June. The only thing I would say,
19 though, about the southern Strait of Georgia
20 around the aquaculture sites, I'm really cautious
21 about putting too much faith in the random
22 sampling. Yes, you know the stock composition. We
23 get the exact same reasonable outcome by sampling
24 by trawls. We get the exact expected mixture
25 based on the adult spawners in the middle of July
26 in the Strait of Georgia. So I think that that's
27 just a very robust type of measure. We get what
28 we expect to see.

29 My concern is random sampling around the
30 farms, is that we're not directly testing the
31 effect of the farms. And the debate will simply
32 continue if we don't have direct measures of
33 effect. And so a number of groups are working at
34 thinking about experimental designs that would
35 directly test whether or not and to what extent
36 there is an effect on survivorship of Fraser
37 sockeye. It's not going to be easy, because one
38 thing we all agree on is that handling juvenile
39 sockeye when they're in the early phase in the
40 marine environment is not easy. They have a high
41 mortality. Their scales come off easily. They do
42 not like to be held, and so they are a challenge.

43 But we will continue this debate about
44 aquaculture, you're probably going to talk about
45 later, if we don't come up with some direct
46 studies to really demonstrate whether or not
47 there's a serious problem. To what degree is the

1 problem real. I don't think there's any question
2 that there can be an effect, depending on the
3 quality of the environment in a particular year,
4 but you know we need to put it in some sort of
5 perspective.

6 Q Thank you, that's helpful in terms of what's
7 available to do the testing on the juveniles at
8 that stage.

9 I'm just going to briefly touch two more
10 items before I'm finished, and one of them is
11 you've helped us to understand well the importance
12 of the verification between Qualark and Mission,
13 and I also, I guess, just want to suggest that
14 that verification has also helped to increase the
15 confidence in numbers, and confidence in numbers
16 is an extremely important component of creating
17 collaboration going forward. Would you agree with
18 me on that?

19 MR. LAPOINTE: Yeah, I certainly hope it has outside of
20 the people that I work with. I know inside with
21 the people I work with, it definitely has and I
22 hope it has outside, as well.

23 Q Dr. Riddell, would you like to comment on that?

24 DR. RIDDELL: Yeah, I don't think you can overstate the
25 importance of that. That was one of the primary
26 reasons for implementing the Legacy Program,
27 restoring Qualark. I have people telling me that
28 we haven't demonstrated anything for all the
29 money, and I think that's just grossly uniformed.

30 Q And so one of the reasons perhaps is an
31 observation that this issue has come up in almost
32 all the more recent inquiries or Commissions, as
33 Ms. Baker had tendered to you, is there was a
34 great concern during the '90s about the accuracy
35 of Mission and there was a lot of distrust on
36 those numbers, which was creating a fair bit of
37 disagreements and a fair bit of challenges amongst
38 the harvesters and the managers. Would you agree
39 with me on that?

40 MR. LAPOINTE: I would, but I would just clarify by
41 saying that it's in the context of the political
42 environment. There are fingers pointing in a lot
43 of directions, and certainly Mission was one of
44 the places.

45 Q Yes, and that the importance of trusting the
46 numbers.

47 MR. LAPOINTE: Absolutely.

1 Q Exactly. All right. And so if we understand that
2 the Qualark is helping on that, is there anything
3 that you'd like to suggest to make sure we keep
4 the verification as independent as possible
5 between Qualark and Mission? I know it's
6 important to collaborate, but I also think it's
7 probably important to make sure there's some
8 independence and some ways of ensuring that
9 they're complementary. Any suggestions, any
10 cautions that, Dr. Riddell, you'd like to bring,
11 and then I'll turn to Mr. Lapointe.

12 DR. RIDDELL: Well, I'm probably visually smiling,
13 because this was a debate when we implemented the
14 program. I mean, to really verify something
15 independently, there should not be a continuous
16 dialogue. But when you have debates like you're
17 talking about, and you have distrust about
18 numbers, there is a significant pressure, of
19 course, to share information and to sort out what
20 the problem is. So, I mean, I think there was
21 some integrity of the sort of independent test
22 compromised the way Qualark evolved over the 2008
23 to '10. But I think it's understandable because
24 of the pressure that they were under in terms of
25 sharing the information.

26 It is preferable, I think, to have some
27 independence for verification because they should
28 be independent. You cannot have a sort of
29 circular argument going on and saying that they're
30 independent samples. How much you can do of that
31 without really drawing a very, very firm line, I
32 think is really tough to implement.

33 We did enter Qualark saying it would be
34 Science program for a couple of years and we
35 didn't even get through the first six months --
36 well, we didn't get through the first three
37 months, right?

38 Q Without needing the assistance of others to...
39 DR. RIDDELL: Well, just to get the feedback. People
40 hear about it. They go and talk to other people,
41 make comments about the numbers. Sometimes the
42 information that they're sharing is wrong and so
43 you have to actually open the whole thing up and
44 correct it.

45 Q So is it accurate, Dr. Riddell, that the
46 collaboration appears to be more useful than the
47 independence?

1 DR. RIDDELL: Now I would say so, yes. I think in the
2 early going if you'd asked me that when I started
3 the Count on Salmon as the Legacy Program, we
4 actually did put a fairly serious effort in
5 independence for a couple of years to really test
6 the verification. But it simply didn't hold up,
7 and this is probably a better outcome, given it's
8 a very public environment that we work in in the
9 Fraser River.

10 MR. LAPOINTE: Maybe I'd just add one small comment,
11 and that is that the reality is that the Mission
12 estimates come out and they're published on a
13 website, and then three days later the Qualark
14 estimates for the same fish come out. So I don't
15 know if that's a good direction or a bad
16 direction, but we can't change the estimates that
17 we publish for three days before by what happens
18 at Qualark three days later. The chronology is
19 such that our estimates are released. So
20 conceivably Qualark could change their numbers,
21 but I think that maybe that sequence is perhaps
22 helpful in some regard, relative to the problem.

23 Q Right, thank you. That is a good observation for
24 me, helpful to me. Thank you.

25 Two very brief questions. One is a
26 historical question, Mr. Lapointe. We've heard a
27 little bit about the dialogue you're having with
28 the Sumas First Nation. I just needed to confirm
29 to your knowledge when the Mission site was first
30 established in the '70s or '80s, was there any
31 dialogue with the Sumas First Nation about the
32 location?

33 MR. LAPOINTE: I'm not aware of that. I was in high
34 school in Massachusetts, but I'm not aware that
35 that dialogue occurred.

36 Q But to your knowledge, that dialogue did not
37 occur?

38 MR. LAPOINTE: My knowledge is that I have no knowledge
39 that any dialogue occurred.

40 Q Thank you. And, Dr. Riddell, do you have anything
41 to add to that?

42 DR. RIDDELL: No, I don't.

43 Q And then, Dr. Riddell, I have one final question
44 around the integrated Fraser assessment concept.
45 One of the goals in that concept was to help
46 address particular issues that First Nations have
47 to meet their FSC allocations. Ms. Baker talked

1 about the second one, which was their involvement
2 in the stock assessment programs, where you
3 actually responded to a question of the
4 Commissioner on that. Could you go to the first
5 goal, which was to what extent has the integrated
6 Fraser River assessment concept helped to provide
7 better understandings and better information in
8 order to assist in meeting the allocations of FSC
9 needs upriver, or actually anywhere.

10 DR. RIDDELL: Not being as directly involved, I don't
11 know that I can. I can comment on the past couple
12 of years, and in the beginning it would really
13 have been in evolution. I get very positive
14 feedback within the work of the Salmon Foundation
15 through the Fraser Salmon Watershed. We have I
16 think about 40 percent of the projects have direct
17 involvement of First Nations, so we are in good
18 communication with a number of the groups.

19 There were concerns expressed to us that we
20 didn't have open enough communication. And
21 actually we had, the Pacific Salmon Foundation had
22 a workshop on the Count on Salmon Program last
23 April, and all of the technical advisors for the
24 First Nations participated. Actually it was held
25 at the Salmon Commission. And so I think that
26 some people would certainly feel that we should
27 have made greater efforts to involve a broader
28 group of First Nations and be more open in
29 communication. I think the reality is it was just
30 a matter that once these programs get off and
31 rolling and you've got the tag, the radio-tagged
32 fish out there, and that the keeping up with
33 everybody in-season is very difficult. But I
34 think that the workshop was very productive in the
35 end and people all supported the program.

36 Q Great. And just to conclude on that, it's your
37 understanding and I know we have to separate these
38 topics out in order to cover them, but the
39 abundance that hydroacoustics helps us with has to
40 be very balanced with the stock assessment that is
41 being done in other ways, would you agree with me
42 on that, to get a best picture of where our
43 populations are at? It's not just abundance, it's
44 stock assessment, that so they're very tied
45 together, they're a very integrated program.

46 DR. RIDDELL: I'm not sure I fully understand. I mean,
47 if you're asking about the stock assessment being

1 the spawning ground assessments...

2 Q And the health of the salmon going up, and the
3 assessments of what stocks are still there.

4 DR. RIDDELL: Right.

5 Q All of that work is a necessary complement --

6 DR. RIDDELL: Yes, it is.

7 Q -- to the work on abundance.

8 DR. RIDDELL: Well, and the fish health is a good
9 point, because of the recent paper in Science, for
10 example. So we do the DNA for the stock
11 identification. As well, David may talk about
12 some of the work looking at genomics and fish
13 health, and physiological stress on salmon
14 migrating upriver. So there is a lot more work
15 being done on the health of the sockeye salmon as
16 they're migrating upriver.

17 MS. GAERTNER: Thank you. Those are my questions, Mr.
18 Commissioner.

19 MS. BAKER: Any re-exam from Canada? No.

20

21 RE-EXAMINATION BY MS. BAKER:

22

23 Q You mentioned the Count on Salmon Program and the
24 Legacy Program. Are those the same thing?

25 DR. RIDDELL: Yes, they are.

26 Q Okay. So it's just a name change after a couple
27 of years.

28 DR. RIDDELL: Yes. Mr. Hansen, as anyone who knows
29 him, likes to talk about legacies and foundational
30 changes, but most people don't understand what the
31 intent of that was. And so the Count on Salmon,
32 according to my staff, was much more transparent.

33 MS. BAKER: All right. I have no more questions for
34 these witnesses.

35 THE COMMISSIONER: Ms. Baker, I just have three brief
36 queries.

37

38 QUESTIONS BY THE COMMISSIONER:

39

40 Q The first is, and perhaps I should have asked Ms.
41 Grant this question, but with regard to hatcheries
42 or Weaver Creek, or other similar kinds of
43 operations, Alouette River, for example, the data
44 that's collected in terms of run size or return
45 salmon and so on, is that data fed into the other
46 data that is looked at with respect to forecasting
47 and run size assessment?

1 MR. LAPOINTE: Sure. So example would be Weaver Creek,
2 there's a spawning channel, that the count of fish
3 into that spawning channel is a significant part
4 of the overall spawning population for Weaver
5 Creek, which would be used to predict the returns
6 of Weaver Creek in future years as a population
7 that spawns in the creek, as well. But, yes,
8 fully integrated --

9 Q Okay.

10 MR. LAPOINTE: -- into the forecasting.

11 Q My next question is this. You mentioned, you used
12 as an example, the modern era being from the early
13 '50s through, and I think that's fair. But when
14 the witnesses were here talking about the Wild
15 Salmon Policy at the last session we had, I
16 believe a term was used, was transformational
17 around the Wild Salmon Policy. So if we have been
18 through a couple of eras in terms of the evolution
19 of our understanding of the species, the stocks,
20 and the technology that we use in our work to
21 assess the run size, and so on, can you tell me
22 where you think we are in terms of the evolution
23 of our understanding and the technology that could
24 come on the scene fairly soon to take us to the
25 level that's being talked about in the Wild Salmon
26 Policy.

27 MR. LAPOINTE: I'm not sure if I'm the best one to
28 answer this, or Brian's the best one to answer.
29 So maybe we'll let him have a crack, and if I have
30 anything to add, I'll see if I can.

31 DR. RIDDELL: I think he wants to avoid saying "Wild
32 Salmon Policy", basically.

33 MR. LAPOINTE: No, I just want to avoid trying to speak
34 of ignorance about all the elements of the Wild
35 Salmon Policy, which Brian is way more familiar
36 than I.

37 DR. RIDDELL: I think in 2005, basically, you started
38 entering the next era, if you want, because now we
39 are talking about managing production for all
40 users, including the commercial fisheries, First
41 Nation fisheries, and recreational and public.
42 And now we are also talking about sustaining
43 diversity because of the concerns we have about
44 climate change, and the value of biological
45 diversity that people are seeing in species around
46 the world.

47 How technology might help, well, I used to

1 call myself a geneticist, but it's evolved so much
2 that I don't even use that term any more, because
3 now you have the DNA analyses, they can tell
4 brothers and sisters in populations, and the
5 genomics studies that are looking at these virus-
6 like signatures. We have tools that I think we're
7 just scratching the surface of really using.

8 The fundamental question I think we're adding
9 in some of the sockeye populations is we know that
10 these populations really are irreplaceable
11 lineages. That if you lose those populations,
12 even if they're small and not being what some
13 people call economically important, when you have
14 lost something you can't replace. You may be able
15 to put other fish back there and get some
16 production. The difficulty is in sockeye salmon
17 and the history is that you cannot do that. We
18 have lots of examples where you've lost
19 populations and you try to put sockeye back and
20 they simply do not come back and produce fish, and
21 produce sockeye.

22 So it makes the diversity element we're
23 talking about the criteria for assessment of a
24 conservation unit, is the number of fish back and
25 the distribution of the fish amongst all the
26 spawning populations. So that now must be built
27 into the assessment criteria. Because as I said
28 in my first introduction to the Wild Salmon
29 Policy, diversity starts from parents. Those are
30 very, very localized events, and you start with
31 the small spawning populations that really
32 function in networks of these small demes, and
33 those are what we then call the populations. So
34 you need to actually sustain that habitat. And
35 the reason that we went that direction, of course,
36 the fullest use of habitat and maintaining habitat
37 quality is the way to maximize production of
38 salmon for everybody in the future.

39 Q And my final question, is really just a general
40 one that's come up today, and I think counsel have
41 asked, and you've given a fair assessment of this,
42 and I think Mr. Lapointe in particular addressed
43 the prior Commission, that is, prior to the
44 current Commission, and why perhaps we cannot go
45 back in some way to adopt some of the practices of
46 that. But just for my information, is there
47 anything from the old system that you think,

1 looking back and now looking forward, is something
2 that ought to be embraced by those who are in the
3 game, if I can use that, of managing the salmon.

4 MR. LAPOINTE: So when you say "prior Commission", just
5 so we're clear here, I think you're referring to
6 the --

7 Q 1985.

8 MR. LAPOINTE: -- IPSFC, International Pacific Salmon
9 Fisheries Commission.

10 Q Right.

11 MR. LAPOINTE: Okay, that's just so we get that part.

12 Q I'm sorry, I should have said that.

13 MR. LAPOINTE: So a lot of the changes that have
14 occurred since the IPSFC, some of them relate to
15 who's doing what job. Okay? So some duties that
16 were Salmon Commission/IPSFC, are now DFO. I
17 think that it doesn't really matter. We're
18 working well together. We can do the job. It
19 doesn't matter where it's being done.

20 Other changes relate to the way the fishery
21 has changed. So if you go back to up to 1985,
22 that, or you can maybe extend it to even part of
23 the PSC era, the 1993 era, we had a fishery that
24 was primarily based on a very large commercial
25 harvest, and a U.S./Canada split, and the old
26 IPSFC had both authority and the responsibility
27 for most of the things involved with the
28 management of what that was.

29 But then you start looking at the changes.
30 So you have changes resulting in Aboriginal
31 Fisheries Strategy in 1992. You have changes not
32 only in the aboriginal component of the fishery,
33 but also in the non-aboriginal component. What
34 I'm talking about is the amount of the fishery
35 that's in the Panel waters control, all those
36 Johnstone Strait fisheries that started to expand
37 long before 1985. Now all of a sudden this agency
38 that has very good responsibility for a particular
39 area has got less and less jurisdiction over the
40 areas that affect the ultimate outcome.

41 So I think some of the questions I had when I
42 was here about the PSC were kind of along these
43 lines. And what if they had all the power and the
44 authority, and I guess the way I look at it now is
45 a little bit differently. I look at it as sort of
46 the hierarchy objectives in the Treaty, spawning
47 escapement, international allocation, and

1 misallocation, some of that hierarchy is kind of
2 vested in any fishery that's been charged with,
3 you know it might not even be a treaty, that would
4 have, well, spawning escapement should be the
5 first priority in any fishery conducted on Fraser
6 sockeye. So it's a shared responsibility that's
7 evolved with the change in the way the fishery has
8 evolved.

9 So and we have had discussions about whether
10 having a single agency be empowered, that is one
11 model and it worked for the IPSFC, one that had
12 jurisdiction over most of the fisheries. Is that
13 the appropriate model going forward? Well, there
14 would be significant challenges to that model
15 because of the changes. So in thinking about,
16 getting back to I think the essence of your
17 question, about could you bring forward I think
18 the most important aspects to try to maintain,
19 which is definitely more of a challenge when you
20 have more people, diverse agencies involved, is to
21 keep that communication and understanding still
22 going on. In other words, there was a period of
23 time over the evolution of this where there were
24 kind of almost battles between the PSC and DFO,
25 keeping that integration is more of a challenge in
26 the current environment, and that's the thing that
27 I think I would emphasize we really have to work
28 on, so that we're all working together, not kind
29 of fitting ourselves into the timelines. We do a
30 lot of work now making sure that the PSC process
31 is well coordinated with other Canadian processes,
32 so that there's a natural flow as opposed to
33 having it be disjointed.

34 So the task I think is pretty well the same.
35 The environment that it's being done in is
36 different, and it's just important to have the
37 folks involved that are all entrusted with kind of
38 a dual responsibility here to be working towards
39 the common objective. And I am not convinced that
40 putting it all under one roof is the only model
41 that can work in that context.

42 DR. RIDDELL: If I could add to that. I agree with
43 Mike's comment about the structure, and I think we
44 really need to look at the time sequence of other
45 events, not just the change in the structure.
46 Right after the Treaty in '85, there was an
47 immediate review of Fraser sockeye to see whether

1 or not we could increase the escapements to
2 provide more fish for harvest. And industry was
3 involved, PSC was involved, DFO was obviously a
4 lead in this whole thing, and we came up with the
5 Fraser sockeye rebuilding initiative. I believe
6 the sort of main paper of that would be Collie and
7 Walters, and that I think has been submitted.
8 That set a whole track. We would change to fixed
9 escapement and we had plans to build escapement to
10 a higher level to monitor whether we could provide
11 more fish. So that was an additional objective
12 that was built in right away. That was a
13 fundamental change. You weren't fishing
14 necessarily at the 70-80 percent they had for a
15 while. You were looking at rebuilding that.

16 Right after that, then you start coming in
17 where we had change in the marine survival, and
18 now you've got the issue of multiple stocks, not
19 all at the same status any more. That then
20 amongst other species led to objectives the
21 Department had to look at, such as **SARA** potential
22 for listings.

23 And then following that a lot of that led
24 from the mid-'90s where we definitely saw a change
25 in the fish behaviour, huge challenge in terms of
26 in-season management. Much of the debate about
27 the over-spawning was how well can you predict
28 what's going to happen to those fish when they're
29 moving, and we -- not we, I shouldn't say us at
30 all, it was the in-season management process of
31 Fraser Panel. Now they're being faced with you
32 could have a 50-60-70 percent mortality of fish
33 moving upriver, and in some years that worked out,
34 and other years the environment changed and you
35 had lots and lots of fish on the spawning grounds.

36 So the whole environment has really become
37 substantially more complicated. I don't think it
38 really is structural at all.

39 I think that Mike's correct that there were
40 times on particular issues that there were
41 differences of opinion. But overall the groups of
42 people, both highly dedicated, number one, and
43 very competent and work quite well together. But
44 the issue is substantially more difficult than it
45 was, what are we talking, 25 to 30 years ago.

46 MR. LAPOINTE: And maybe just one last thing, I know
47 we're short of time, is if you look at where the

1 Treaty was in the IPSFC years, we had a 50/50
2 split of the harvest. Okay? So clearly in that
3 situation there's a strong bilateral interest to
4 be involved with all aspects of decisions. You
5 look at where we are now. You have 83-and-a-half
6 percent of the share of sockeye being in Canada's
7 hands. You have the Wild Salmon Policy
8 initiatives. You have the importance of priority
9 for First Nations allocations. It clearly makes
10 sense for Canada to have more authority, more
11 responsibility in the context of Fraser sockeye in
12 that context than it did when prior context we had
13 50/50 in each country. You didn't have all these
14 environmental problems. You didn't have the
15 Treaty obligations and First Nations priority
16 rights. I mean, you had them, but they weren't as
17 a forefront that they are now. So clearly it
18 makes sense for Canada to have more authority in
19 that context, because they have a lot more at
20 stake and lot more involvement than it was back
21 when it was 50/50 between the United States and
22 Canada. So that logically makes sense for me for
23 the country that has a lot more going on in terms
24 of this to be kind of have a little bit more
25 responsibility and accountability than they might
26 have had under the old regime.

27 MS. BAKER: Well, thank you, Mr. Commissioner. It's
28 three o'clock. Should we have a short break --

29 THE COMMISSIONER: Yes.

30 MS. BAKER: -- before we start Mr. Patterson.

31 THE REGISTRAR: The hearing will now recess for ten
32 minutes.

33 THE COMMISSIONER: Oh, I'm sorry. This panel is
34 finished? Maybe we can just go back on the record
35 just for minute. I thought Mr. Patterson was
36 joining this panel.

37 I just wanted to thank both Mr. Lapointe and
38 Dr. Riddell. You have been here often and you
39 have shown a willingness to cooperate with
40 counsel, and I am very grateful for that, as I am
41 sure other counsel are. So thank you very, very
42 much.

43 DR. RIDDELL: You're welcome.

44 MR. LAPOINTE: You're welcome.

45 THE REGISTRAR: The hearing will now recess for ten
46 minutes.

47

91
David Patterson (Affirmed)
In chief by Ms. Baker

1 (PROCEEDINGS ADJOURNED FOR AFTERNOON RECESS)
2 (PROCEEDINGS RECONVENED)
3

4 THE REGISTRAR: The hearing is now resumed.
5 MS. BAKER: Thank you, Mr. Commissioner. Our next
6 witness is Mr. David Patterson.
7

8 DAVID ANTHONY PATTERSON,
9 Affirmed.
10

11 THE REGISTRAR: Could you state your full name, please?

12 A David Anthony Patterson.

13 THE REGISTRAR: Thank you. Counsel?

14 MS. BAKER: Thank you. And you will need to either
15 bring the mike closer to your mouth or something
16 because it doesn't pick it up if it's too far
17 away. Thank you.

18 A Okay.
19

20 EXAMINATION IN CHIEF BY MS. BAKER:
21

22 Q Thank you, Mr. Patterson. I'm just going to
23 review your c.v., and that's available at Tab 14
24 in the binder before you. You have a Master's of
25 Science from SFU?

26 A Yes.

27 Q In Biological Sciences?

28 A Yes.

29 Q Thank you. And you are an employee of the
30 Department of Fisheries and Oceans right now?

31 A Yes.

32 Q All right. You're the program head for the
33 Environmental Watch Program?

34 A Yes.

35 Q And you are also an adjunct professor at the
36 School of Resource and Environmental Management at
37 SFU?

38 A Yes.

39 Q Can you just describe a little bit about what your
40 position entails in the Environmental Watch
41 Program?

42 A I'm the Program Manager. I basically oversee
43 biologists, technicians, supervise students, all
44 toward the program goal which is looking at the
45 impact of environmental conditions on migratory
46 success and reproductive success in Pacific
47 salmon.

January 27, 2011

1 So we have a physiology lab out at West Van.
2 We have incubation facilities at SFU, so just
3 general program management.

4 MS. BAKER: Thank you. Could I have this c.v. marked,
5 please, as the next exhibit?

6 THE REGISTRAR: Exhibit 362.

7

8 EXHIBIT 362: *Curriculum vitae* of David
9 Patterson

10

11 MS. BAKER:

12 Q Now, you've just briefly described the objectives
13 of the Environmental Watch Program. Can you give
14 us a bit of information about what the program
15 actually does? What are the components of that
16 program?

17 A Yes. Basically, as I mentioned earlier, the whole
18 program is really geared towards looking at
19 migration biology and the environmental factors,
20 predominantly in fresh water, that influence
21 migration success. That involves sort of three
22 main areas of the program.

23 We look at, we monitor and do research on
24 environmental conditions, mostly water temperature
25 is our main focus there.

26 We also do a lot of biological research in
27 migration biology. This is mostly in
28 collaboration with the universities and other
29 groups within the Department.

30 The third part of the program is leading from
31 the environmental forecasting and monitoring in
32 conjunction with the biological research. We also
33 provide science advice on the impacts of different
34 freshwater factors on migration success.

35 Q And do you do modelling?

36 A Yes. The advice comes in the form of, in some
37 cases, quantitative modelling, which is mostly
38 what we're talking about today, as well as we have
39 more general advice, write papers. The advice can
40 come in many different forms.

41 Q Okay. And who does the advice get provided to?
42 Who are the subjects?

43 A Right now, the main provider is we provide advice
44 to fisheries management. We also provide advice
45 to habitat management as well, and other habitat-
46 related issues. We provide advice to the general
47 science community and also the public.

1 Q As you noted, we're going to be talking about the
2 modelling side of your work today. Does the
3 quantitative modelling that's done with respect to
4 management adjustments, which is the focus of your
5 evidence today, is that modelling work used by the
6 Fraser River Panel in the management of Fraser
7 River sockeye?

8 A Yes.

9 Q Okay. We've talked a bit about management
10 adjustments already, but it probably would be
11 helpful to hear from you what is a management
12 adjustment? Just define what that is and what are
13 some of the key data inputs to management
14 adjustments?

15 A A management adjustment is simply -- the easiest
16 way to describe it is the foregone catch that is
17 added to ensure that we actually meet the spawning
18 escapement requirements. In other words,
19 additional catch is foregone to past Mission to
20 achieve the spawning escapement targets.

21 Now, the data required to doing that, the MA
22 model -- just have to back up a bit here, but the
23 MA model itself, what it does is it uses both
24 environmental data, temperature and flow, as well
25 as biological data such as run timing, to predict
26 the difference between estimates. From that
27 prediction from that model, we can then transform
28 the difference between estimates to calculate
29 actual numeric value of the foregone catch that's
30 needed to achieve your spawning escapement target.

31 Q Okay. We did hear about difference between
32 estimates from Mr. Lapointe in terms of the
33 assessment they do once the run has completed.
34 Are management adjustments -- how do management
35 adjustments relate to what has been described as
36 DBEs or differences between estimates?

37 A The difference between estimates is when you
38 subtract the spawning ground escapement estimates
39 from the Mission escapement estimates, the
40 difference between those two after you've
41 accounted for in-river catch.

42 The management adjustment is related to the
43 DBEs because it's the outcome for management
44 adjustments for the in-season anyway. We generate
45 the model to predict the difference between the
46 upper river and lower river. That's the
47 calculation from that that's the actual management

1 adjustment to compensation for it.

2 So in those years when we know high
3 temperature example, you're going to lose a
4 certain percentage of the fish in the river, you
5 had to add an extra value of fish to that, and
6 that extra value of fish, you have to want to
7 escape past Mission as the management adjustment.

8 Q So would it be fair, just as a shorthand, to think
9 of the difference between estimates being a
10 calculation that's done after all the data is in
11 at the end of the year and you're trying to figure
12 out what the run size actually was, so it's kind
13 of a backward-looking number, and the management
14 adjustment is sort of a prospective number trying
15 to imagine what you're going to need to achieve
16 your target, but it's a forward-looking number.

17 A For the case of the in-season management, yes.
18 That would be an easy way to describe it.

19 Q Okay.

20 THE COMMISSIONER: Ms. Baker, I wonder if the witness
21 could use some real numbers for me. I'm trying to
22 understand the relationship between the MAs and
23 the DBEs.

24 MS. BAKER: Yes.

25 THE COMMISSIONER: So if he could just give me an
26 example of what he does by using some real
27 numbers?

28 MS. BAKER: Yes, we're definitely on the same page.

29 THE COMMISSIONER: Okay.

30 MS. BAKER: That's where we're going.

31 Q It is confusing for us. We're all a bunch of
32 lawyers, not scientists, so if you can break it
33 down and exactly give us an example of how you
34 would do that calculation just using some round
35 numbers.

36 A Sure. If, for example you had -- first of all,
37 we'll start off with the primary objective, which
38 would be the spawning escapement target. So if
39 you were looking to get 100,000 spawners onto the
40 spawning ground. You had an in-season estimate of
41 approximately 300,000 fish this past -- in marine
42 approach areas as your estimate, and then you
43 wanted -- and if all things were perfect, then you
44 could harvest 200,00 and leave 100,000 to pass
45 Mission to achieve your 100,000 fish at the
46 spawning ground.

47 However, if you know, based on prior

- 1 experience, the relationship between Mission and
2 spawning grounds in, say, a high temperature year,
3 you're going to lose 50 percent of those fish that
4 you went by, then you'd have to allow an extra
5 100,000 fish to compensate for the expected
6 forecasted in-river mortality. So in this case,
7 your management adjustment would be 100,000. I
8 think I've got my math right there. I hadn't
9 thought about doing an analogy, sorry.
- 10 Q So the idea is to get 100,000 on the spawning
11 grounds, you've got to let 200,000 go through
12 because --
- 13 A Yes. That would be an extreme example, but that's
14 exactly what we're talking about. That way, you'd
15 end up with a harvest of 100,000, a management
16 adjustment of 100,000, a spawning escapement of
17 100,000 and, at the end of the day, the
18 calculations would be equal.
- 19 Q And when we're talking about management
20 adjustments, you're talking about that forward-
21 looking calculation. Here's the number we have at
22 Mission. How much have we got to make sure is not
23 caught --
- 24 A That's right.
- 25 Q -- to make sure we have the right number that goes
26 on the spawning ground. That's right?
- 27 A That's correct.
- 28 Q Okay. And then I don't want to confuse it, but
29 the difference between estimates is where you
30 actually say, "This is the number that landed on
31 the spawning grounds. This was the number that we
32 had at Mission." What happened to those fish in
33 the interval?
- 34 A Yeah, that's right. Which is probably why I
35 should have chosen a different set of numbers
36 here. But post-season, now, the actual difference
37 between the estimates themselves will still be the
38 spawning ground escapement estimate and the
39 Mission escapement estimate. So that's the actual
40 difference between the two of them.
- 41 Q So with your example, if you do the spawning
42 ground assessment and you have 80,000 fish at the
43 end of the day, then your management adjustment
44 wasn't big enough? Or if you had 150 fish on the
45 spawning ground, your management adjustment was a
46 bit too big from what you were predicting you
47 would need?

1 A Absolutely.

2 Q Okay. And this idea of creating a management
3 adjustment, an adjustment to your numbers to make
4 sure you meet your spawning targets, when did that
5 first start being done by the Department of
6 Fisheries and Oceans?

7 A I'm not sure of the exact dates. The early '90s
8 is the first time I've heard about them
9 recognizing there was a difference between the
10 pattern, I guess, in the difference between the
11 Mission numbers -- Mission estimates and the
12 spawning ground estimates and, from that -- so
13 strictly based on historic discrepancy, not using
14 environmental information at all, I believe they
15 actually then did some adjustments to the
16 escapements. And that process, that additional
17 fish, the extra fish they added to the escapement
18 was called a management adjustment, which is where
19 the name comes from.

20 It wasn't to do with temperature or discharge
21 at the time. It was strictly based on historic
22 pattern.

23 Q And was it in -- you said it was in the '90s. Was
24 it in response to, for example, the Fraser Inquiry
25 in '94?

26 A No, not that I'm aware of, no. I think this
27 pattern was recognized before then.

28 Q Okay.

29 A The subsequent -- the transformation of the
30 management adjustment model to one that's
31 environmentally based was in response to the '94
32 inquiry, but...

33 Q Okay. The prior one that you described, was that
34 a model or was it a judgment call? How was that
35 number arrived at, that management adjustment
36 number in the early days?

37 A I honestly don't know. The only discussions I've
38 had with people in this in the past, my
39 understanding it was just simply a regression
40 between the two numbers and adjustment.

41 Q Okay. But right now you do work with a model to
42 determine those numbers; is that right?

43 A Yeah. And basically, after the '94 fishery
44 season, and then the subsequent inquiry, there's
45 pretty good evidence that high temperatures were
46 causing some of the problems and the
47 discrepancies, so there was increased effort on

1 the panel. The recommendation was to set up the
2 temperature monitoring programs and develop a
3 model to forecast the actual loss in the river
4 because of high temperatures, for example.

5 In 1997, yes, you had these different
6 situations but it was, in this case, high flows.
7 That was the first year that they actually came up
8 with a model to predict the -- the in-river loss,
9 and therefore came out with a model to compensate
10 for that expected in-river loss. That was my
11 predecessors, Ian Williams, Steve MacDonald. They
12 developed that model.

13 Q And then has this model now gone through the
14 science review process that the Department has,
15 the PSARC process?

16 A No, it's not gone through a PSARC process. It has
17 been peer-reviewed in the science literature, but
18 it's not gone through a formal DFO science review
19 process.

20 Q Okay. But it has been peer-reviewed, the model
21 that you use now?

22 A The rationale for using an MA model, 'cause
23 there's more than one type of that model has been
24 gone through peer-review, yes. The actual
25 specific that gets used on an in-season basis can
26 actually vary, the actual form of it.

27 The rationale and the reason behind it and
28 the actual input variables that were used, that's
29 all been peer-reviewed.

30 Q Okay. And what are the environmental factors that
31 influence spawning migration mortality? What are
32 the key drivers?

33 A Most conspicuous one is water temperature. Then
34 we have discharging flow, so high flow as being a
35 problem. We also -- in suspended sediment,
36 there's general water quality issues, and then we
37 have biological factors, you know, predation,
38 disease. However, the other environmental factors
39 would be fishing itself and incidental harm from
40 that. But these are all -- these can all interact
41 as well and be cumulative, so it's not just -- you
42 can't think of these things in isolation. All
43 these factors work together and contribute to an
44 overall increase in mortality.

45 Q Is there a year where you could have ideal
46 conditions and you wouldn't need a management
47 adjustment? Is that a feasibility that we should

1 know about?

2 A Yeah, just because you have ideal conditions, that
3 does not necessarily mean your management
4 adjustment would be zero, because I think as
5 you've heard before in the -- the difference
6 between estimates is also a function of some of
7 the other factors that contribute to it.

8 For Summer run -- this would be specific run
9 timing groups, for example, Early Summer. There
10 has been a consistent bias towards -- negative
11 bias in terms of the en route discrepancy
12 estimates, so in that case it's unlikely, even
13 under ideal conditions, that any MA model you have
14 would actually be zero. There'd be some
15 adjustment to the escapement because of that,
16 because the historic is biased, so...

17 Q Okay. Well, we've been talking, I think,
18 primarily about in-season management adjustments.
19 There's also a pre-season management adjustment
20 that's calculated; is that right?

21 A Yes.

22 Q And what is the pre-season management adjustment
23 based on? What data is used in that model?

24 A For the pre-season management adjustment, they're
25 very similar in terms of the input variables.
26 However, the structure can't -- it's a little bit
27 -- there are subtle differences, but primarily
28 it's based on temperature and flow, and then run
29 timing for the Late run group. So those inputs
30 are put into the model and then pre-season, ahead
31 of time, we try and -- when I say "we", the actual
32 information is given to the Salmon Commission and
33 they run the models themselves now, 'cause were
34 just involved in the development aspect and
35 provided advice on them.

36 Q Okay. So what's the difference on the pre-season
37 model? Like for example, temperature, is that
38 available in the pre-season to do predictions?

39 A It is available pre-season. However, the
40 confidence you have in that value, as you can well
41 imagine, is not as good. We do do it, and it's
42 based on relationships between snow pack and water
43 volume, and also forecasted air temperatures.

44 Q Okay.

45 A And the actual -- the big structural difference is
46 that the temperature forecast we provide pre-
47 season are for a 31-day mean, for a monthly mean

- 1 for the season. Whereas in-season, we do a much
2 shorter 19-day temperature forecast because of the
3 constraints associated with the fishing itself.
- 4 Q Do you use any previous year's results for, say,
5 DBEs or management adjustments in prior years as
6 part of your pre-season model?
- 7 A Each year - let me be clear again - we're involved
8 in the actual development and the initial
9 implementation of the MA models, and we are
10 involved in providing advice on model selection.
11 The actual models that get used on -- for every
12 given fishing season, pre-season, that's
13 determined by the Salmon Commission itself.
14 However, they do update, on a yearly basis,
15 the new information from the previous year, so if
16 that's your question.
- 17 Q Right, okay. So that prior information does get
18 put into the models that are then run by the
19 Salmon Commission as far as you know?
- 20 A Yeah, yeah.
- 21 Q Okay. And the -- you mentioned the temperature
22 input. That's updated from your E-Watch Program
23 to the Salmon Commission in-season; is that right?
- 24 A Yes.
- 25 Q Is there any other data that comes from your
26 program and is given to the Salmon Commission for
27 input into the models during this in-season time
28 frame?
- 29 A Yes. The temperature data is the temperature we
30 actually collect as well as the temperature we
31 forecast using the forecast models. Similarly, we
32 simulate water discharge data that is measured by
33 Environment Canada, but then we run it through our
34 models to forecast discharge as well. Then we
35 provide that to the Pacific Salmon Commission and
36 we post it online for the public as well.
- 37 Q Okay. And when we had Mr. Lapointe here, and
38 actually I think it was perhaps with Mr.
39 Rosenberger or Mr. Lapointe - I can't remember -
40 we looked at some of that data that is in front of
41 the Fraser River Panel for their decision-making
42 and it included a chart which showed water
43 temperature and water flow. That's the kind of
44 information that's provided by your program?
- 45 A Yes, that's the primary information. We will
46 provide advice and feedback as well if contacted
47 to do so.

1 Q All right. And the management adjustments, they
2 are calculated for each stock or for each run
3 timing group?

4 A They are calculated by run timing group.

5 Q As you mentioned, there's a number of different
6 models, and you said the Salmon Commission selects
7 the model for each run timing group. But can you
8 just describe what the models are, like what's the
9 difference between them?

10 A Basically, they all have this very similar form.
11 You either have temperature, temperature plus
12 discharge, temperature discharge or run timing.
13 Those are the three variables that can come --
14 when whether the -- it will vary by each, the run
15 timing groups. For example, Early Stuart can be a
16 combination of temperature and discharge. The
17 Late run group is predominantly going to be run-
18 timing based.

19 However, you can have different structural
20 equations. You can have quadratic equations,
21 thresholds models. There are different variations
22 of temperature discharge and timing that go into
23 these things. That sort of model -- that's where
24 the different models come in. The selection of
25 those models is actually done by the Fraser River
26 Panel. The Salmon Commission will come up with
27 different model selections and recommend them but,
28 in some cases, it's the panel that actually adopt
29 the model, the actual MA itself?

30 The MAs are recommended. The MAs are
31 calculated from the different models and then the
32 Fraser Panel will then decide to adopt the MA,
33 presumably based on one of those models.

34 Q We've heard a lot about uncertainty in this
35 hearing so far, and particularly in the management
36 hearings. Is uncertainty modelled when you
37 calculate the -- when you run these models?

38 A In the pre-season, we do generate uncertainty
39 estimates for the temperature and flow parameters
40 that we provide. We provide basically 10,000
41 pairs of temperature and discharge information for
42 each of them. So, from there, you can generate a
43 distribution of expected outcomes which is a way
44 of quantifying the uncertainty.

45 We have looked at model uncertainty, that
46 structural model uncertainty and the actual in-
47 season. As far as I know, the actual uncertainty

1 is not modelled explicitly. And we don't even for
2 our temperature forecast, it's really hard to
3 actually get a handle on the uncertainty in the
4 forecasts.

5 We do a pro-season retrospective analysis to
6 actually see how well we did and how well we
7 performed, but I think, to be honest, I mean, the
8 people know from weather forecasts. It's the same
9 thing if you -- our temperature and flow forecasts
10 are driven primarily from the weather, so people
11 intuitively understand there's uncertainty
12 associated with weather forecasts. Therefore,
13 similarly, you'd expect the same thing from a
14 temperature and flow forecast that was based on
15 it.

16 Q And is your uncertainty analysis presented to the
17 Fraser River Panel along with the other data
18 that's provided?

19 A Our uncertainty analysis that we do for the pre-
20 season is documented in one of the technical
21 reports that we have. I have seen variations of
22 where the model uncertainty has been presented. I
23 don't know about in-season, but that would be --
24 you would have to ask the Salmon Commission in
25 terms of what they actually do, the in-season
26 model uncertainty aspects.

27 Q But you provide this pre-season to the Fraser
28 River Panel?

29 A We do, and we also will provide -- well, it's
30 available for them, yes. We provide the
31 uncertainty estimates in the pre-season, yes.

32 Q Okay. And, as a member of the Environmental Watch
33 Program, do you attend Fraser River Panel
34 Technical Committee meetings to present the
35 various data generated by your program?

36 A One person from our organization typically attends
37 the May-June pre-season meeting to present on
38 environmental conditions, as well as whatever
39 other topics we've been researching that's
40 associated with our program.

41 The actual Salmon Commission themselves will
42 present the MA models that were based from our
43 pre-season forecasts.

44 Q Okay. The different models that you describe, the
45 temperature model, the temperature flow model and
46 the run-timing model, could those models be run on
47 all the different management groups, or do you

- 1 always run certain ones on certain groups?
2 A Theoretically, they could be. I would not
3 recommend it. When we're involved in our model
4 selection and rationale part of this process, we
5 went through and did a rigorous evaluation of the
6 different combinations of those particular
7 variables to make sure that they're defensible,
8 both biologically and statistically.
9 From that, you can see Fraser run timing
10 groups, there are certain combination of variables
11 that are only applicable to -- makes more sense
12 both from a biological point of view and from a
13 statistical and rigor point of view, to apply to
14 certain run timing groups.
15 I mean, the same phenomena exists, but
16 there's no necessarily statistical support for
17 temperature and discharge combination, for
18 example, for one run timing group because the data
19 just doesn't exist to verify it. So you'd expect
20 there to be differences.
21 Q And is there a formal process that you're involved
22 in to select the MA model for the pre-season? Do
23 you attend that June meeting with the Fraser
24 Panel? I take it that it's their decision to
25 make, but are you involved in a formal process as
26 to evaluating different criteria for model
27 selection?
28 A No, there's no formal process for doing that.
29 It's informal. We're involved in discussions and
30 email exchange pre-season, but there's no formal
31 process for doing it.
32 Q And do you provide advice to the Fraser River
33 Panel as to best choice for model selection for
34 the different run-timing groups?
35 A Directly to the panel? It's been a long time if
36 I've done that. It's mostly toward -- would be
37 directly to the Technical Committee or the DFO
38 representatives on the Technical Committee is the
39 most common way, or directly with the PSC staff.
40 Q So you --
41 A We provide input but --
42 Q You provide the data, but your group also provides
43 some advice as to which would be the best model to
44 use at the Technical Committee level?
45 A Well, yeah, we will provide advice on model
46 selection, yes.
47 Q Okay. When do the in-season environmental

- 1 forecasts start to be generated for planning?
2 A We start the models up at the end of June
3 typically, in time for the first -- in time for
4 the Early Stuarts passing the marine fisheries.
5 Q Okay. And once the in-season begins, are you
6 involved in advising the Panel, you or somebody
7 else from your department, involved in advising
8 the Panel or the Technical Committee on the choice
9 of models in-season?
10 A No, not unless directly contacted by them.
11 Q Do you know if your predecessor, Mr. MacDonald,
12 was more involved in providing advice in-season?
13 A Yes, Dr. MacDonald was definitely more involved.
14 At the same time, though, it was during the
15 development and implementation, so there was very
16 good reason why he would be more involved.
17 Q When did he leave the program?
18 A In 2004.
19 Q Is there some reason why you didn't continue to be
20 involved in those Panel discussions or the
21 Technical Committee discussions in the same way
22 that he did?
23 A There was probably several reasons. I think,
24 first, he did a great job of actually educating
25 the Panel and Technical Committee on the actual
26 convincing them that there's a real relationship
27 between temperature, flow and in-river mortality.
28 There's changes in the actual Fraser Panel itself
29 in terms of whether the advice was necessary, and
30 also, I couldn't be in two places at once myself,
31 so I had other things, different priorities I
32 guess.
33 I mean we were in the business of developing
34 science tools for management. We weren't -- we're
35 not involved in the management itself. So, for
36 us, it was basically trying to get there and
37 develop these things and present them to them.
38 It's up to them to run them.
39 Q Has there been a reduction of resources to your
40 department? Like when Dr. MacDonald left, was he
41 replaced with an equivalent FTE?
42 A He had two hats, but no, not directly.
43 Q So the work that he was doing was now -- you're
44 doing, and you're doing what you were doing prior
45 as well.
46 A At the time, in 2004, yes. But he also had
47 another -- he is also the head of another program

1 and section as well, so I didn't take over all of
2 his responsibilities, Dr. MacDonald's
3 responsibilities, but those are -- especially with
4 this program, I took them all over, yeah.

5 Q Okay. We talked about how the panel chooses a
6 model, and MA model pre-season. Once that's
7 model's been chosen pre-season, is it used
8 consistently in season, or could it change in-
9 season? Could they choose a different model in-
10 season?

11 A No, they're likely to change it in-season.

12 Q And what would be a reason to change the model in-
13 season?

14 A The same predictor variables that are available
15 pre-season - we're talking about the 31-day mean
16 averages - may not necessarily be the same ones
17 that provide the best fit or model performance to
18 the ones that be in season, so there are
19 legitimate reasons for switching from a pre-season
20 model to an in-season model.

21 Q When would be circumstances where you would use
22 the temperature only model?

23 A The temperature only model would be -- if, for
24 example, we had gone through a process -- I
25 personally just be careful I don't -- I'm not
26 giving these models out in-season, but I would use
27 a temperature only model if the rationale and the
28 justification for doing so was there, or you could
29 switch over temperature of a model if, for
30 example, you hadn't -- flow data was not
31 available. And systems do break down, they may
32 not be available.

33 Or, for example, if you're into new territory
34 where you've got a combination of temperature and
35 flow that you've never seen before, in which case
36 you have to rely on sort of judgment, biological
37 judgment, I guess, on whether you think it makes
38 more sense to use temperature only versus
39 discharge.

40 There'd have to be pretty clear reasons by
41 you'd want to switch. But if, ahead of time, you
42 accepted one model which seems to be the best for
43 getting at what you wanted to do.

44 Q All right. And do you know what the decision-
45 making is within the Fraser Panel as to choices of
46 different models in season? Is advice given? Are
47 you part of that process?

1 A No, I'm not part of that process, not in-season.

2 Q So is it transparent, then, how different models
3 get chosen in-season or changes are made to model
4 selection in-season?

5 A Well, no, not from where I sit, but I'm not there,
6 so I haven't seen any documentation about that.

7 Q Is there a way to develop certain criteria for
8 model selection that would provide a more
9 transparent and consistent way of selecting
10 models?

11 A We have explored looking at different performance
12 measures to basically match what the management's
13 objectives are with the types of models that you
14 we like to use. This would be done sort of before
15 the fishing season starts, where you can sit down
16 and evaluate what it is you want, your objectives
17 are, and then you can then make decisions on what
18 your model selection should be based on
19 performance criteria. So not just model fit, but
20 also other -- like model bias or precision are two
21 different things that you could be trading off.

22 But if you knew ahead of time what they were,
23 then you could actually help. Different models
24 perform differently, depending on what your
25 objectives are.

26 Q What are some examples of the kinds of objectives
27 that could be set before the season began, and
28 that would help you to determine performance
29 measures for the models?

30 A Well, I'm not really in a position to -- I'm not
31 going to -- I don't know what exclusively the
32 objectives in management are going to --

33 Q But what are -- what kinds of objectives? Like
34 what can you give as examples so we know what
35 you're talking about?

36 A If you were looking for -- right now, if you're
37 looking for a model that would -- basically you
38 looked at the existing data and said, okay, look,
39 you know, we've got 20 years of data here and it
40 shows a good relationship between temperature and
41 loss. On this relationship, this seems to be the
42 best model you want to be doing, it's got the
43 tightest fit in terms of the r-squared value.

44 However, if you go back and you look at how
45 well that model performed in the past through
46 time, you may notice actually it has a bias in it
47 and the bias might be in the direction of maybe

1 overestimating the amount of harvest you need to
2 take out, or even opposite, you could be under-
3 estimating spawning escapement.

4 So if your long-term goal, or your goal was
5 to avoid certain outcomes, then you'd pick a model
6 that had the least amount of bias in that case, or
7 you'd pick a model that was biased away from your
8 -- 'cause in some cases, it's not about -- I mean,
9 the objectives may see that, you know, get the
10 spawning ground and get the harvest, but in many
11 cases it can be a (indiscernible) outcomes as
12 well.

13 So how the -- different models will take you
14 down -- if you look at them over a long period of
15 time, they can take you in a different direction.
16 So it's not just about how well the models did in
17 the past, but also how well they can perform on a
18 continuous basis.

19 I'm not the expert on this sort of stuff, but
20 the guy what was involved in this, Randall
21 Peterman (phonetic), as done a lot of work on this
22 work.

23 Q Okay. So just to help, to see if I'm
24 understanding, so you could -- if you had a model
25 that tended to bias in a way that you didn't get
26 enough fish on the spawning grounds, or that seems
27 to be an outcome, and your objective was to make
28 sure that you had always enough fish on the
29 spawning ground, you could choose a different
30 model that biased the other direction, that biased
31 perhaps putting too many fish on the spawning
32 ground rather than too little.

33 A Yes, although it's -- yeah.

34 Q And right now, there's not a clear method that's
35 established in the Panel, or you haven't provided
36 advice on the specific method to identify those
37 objectives and present performance indicators for
38 the models that would allow those objectives to be
39 met or not met.

40 A I think, in fairness, I mean, this is an evolving
41 process where we are -- we have presented this
42 idea to the panel, but this is sort of a work in
43 progress issue where things take time, right? You
44 start to -- you know, they adapted the MA, they
45 adapt the MA with environmental conditions.
46 They're looking at different model fit now. It's
47 a sort of a progression, I suppose, in terms of

1 where we can go with this MA modelling.

2 Q I'll come back to something in a minute. I just
3 want to cover off a recommendation that was made
4 in the Williams review. That's in Exhibit 14
5 which is probably sitting beside you, but not in
6 the binder you're looking at.

7 A Is it on here?

8 Q Yeah, it'll be on the screen in a minute. It's at
9 page 260 of this binder. This is a table that
10 Canada has prepared. It sets out all the
11 recommendations from prior inquiries and their
12 responses from Canada to those recommendations.
13 So recommendation number 13 says:

14
15 The estimate of accumulated degree days
16 should be considered as an approximation of
17 the environmental stress experienced by
18 migrating Fraser River sockeye salmon to
19 inform in-season management decisions.

20
21 Is the work that you're doing related to that
22 recommendation? Like has that recommendation been
23 complied with and, if so, is your work part of the
24 work that was done?

25 A The short answer is yes. We have done a lot of
26 work on this. In the case of how informative this
27 actually is for the in-season, we looked into the
28 feasibility, we did a pretty big study where we
29 actually compared performance of using a model,
30 looked at accumulated thermal units versus a more
31 simple model that we use now, and we realized that
32 although it may help in terms of describing and
33 after the fact where the mortality differences
34 are, it just really wasn't pragmatic for in-season
35 use for many reasons. Probably some of the more
36 notable are that you have to have much more
37 detailed information on migration rates. These
38 fish go to -- each different stock would have its
39 own different accumulated thermal units. You'd
40 have to have much better assessment DNA. It's a
41 trade-off, right, and a lot of these things are
42 just not available in-season.

43 We also found out that the actual
44 relationship between the lower river temperatures
45 and the upper river temperatures are very good, so
46 we can feel more confident about what we're
47 actually doing in the first place. But there's

1 very good reasons for doing it.

2 We also did a lot of work on the biological
3 side, looking at mortality associated with the
4 temperature and how the relationship between
5 temperature and time and fresh water is critical
6 for predicting mortality.

7 You could inform management in the sense that
8 we could feel much more comfortable about the
9 decisions we're making in terms of adjusting
10 harvest because of temperature. However, using
11 this explicitly is probably not a viable option at
12 this point.

13 Q Staying with the same exhibit, page 260, 261, this
14 is recommendation 14 of the Williams, 2004. I
15 can't see which is which number on your screen, if
16 you could make it a little smaller. Okay, there
17 we go. So this one says:

18
19 The factors contributing to the discrepancy
20 between gross escapement at Mission and
21 spawning ground escapement...should be
22 separated from proved data collection and
23 modelling. In the interim, the EMA model
24 should be renamed to eliminate the perception
25 that it only accounts for environmental
26 factors.

27
28 Is the EMA model what we now call the management
29 adjustment model, or is it something different?

30 A No -- yes. No, it's -- hold on. The EMA is
31 essentially the MA.

32 Q It used to be called an environmental management
33 adjustment?

34 A It did. Once we started using environmental
35 information to adjust the management adjustment,
36 then we started to call it the EMA. Because, as I
37 mentioned earlier, the regional MA model was just
38 based on the stark discrepancy. That name was
39 changed. It was sort of semantics as far as I was
40 concerned.

41 Q All right. But the main thrust of the
42 recommendation was that you should separate out
43 the factors for the discrepancy, so separate out
44 river temperature, river flow, et cetera. Has
45 that been done?

46 A I can't really speak to the -- you're talking
47 about the four sources of discrepancy here, the

1 Mission escapement estimates, the in-river catch
2 estimates, spawning escapement estimates and then
3 the actual in-river mortality part. I mean, I can
4 speak about that in a second, but I just maybe --
5 I think Brian's earlier testimony talking about
6 the Legacy program and the count on the salmon I
7 think is part of what I would consider sort of
8 DFO's -- part of DFO's response to the bigger
9 picture of parsing it out.

10 So, I mean, it's not my area, but I think
11 that's kind of -- in the general sense, I think
12 this is where the actual -- the general picture
13 now in terms of what we have done in terms of
14 looking at in-river mortality, we've been involved
15 in a lot of work in the last five or six years. I
16 think if you look at the work through Scott Hinch
17 and Tony Farrell and Steve Cook and some of the
18 other colleagues at DFO, Christie Miller and Steve
19 MacDonald, I mean, there's a lot of work being
20 done looking at getting drilling down to what are
21 those environmental factors and the connection
22 between fish mortality.

23 So I think we've definitely done a lot in
24 that case. In terms of what's the data needed and
25 things like that, I mean, we increased some of the
26 temperature monitoring. But really, we're getting
27 at trying to remove some of the uncertainty with
28 regards to the impacts of temperatures on fish
29 survival and potential interaction with fishing
30 gear and things like that.

31 Q And are we yet at a point where we can break those
32 things out and understand them, or are we still in
33 a learning process?

34 A Yeah. Are we at a point in terms of being able to
35 parse out each of the different components within
36 the DBE?

37 Q Right.

38 A I would say no. We are probably at a point where
39 we can take a look independently and separate from
40 the DBE, because with the DBEs, you're tying it up
41 with four potentially large sources of
42 uncertainty. So trying to piece out and break
43 them all up at one time is a tricky thing to do.
44 However, I think, because of all the other
45 research on the side, we've done a much better job
46 of actually understanding the in-river mortality
47 component and what are the factors that drive it.

1 We can come up with an independent estimate of -
2 I'm not going to say a point estimate here - but
3 independent estimate of migration survival and
4 mortality.
5 MS. BAKER: Mr. Commissioner, it's four o'clock. As
6 you know, I was hoping we'd finish with this
7 witness today. I don't think that's going to
8 happen. I don't know how late you'll want to sit
9 today. We'll definitely have to ask Mr. Patterson
10 to come back on another day, though, because I'm
11 not going to finish in ten minutes, and nobody
12 else has had a chance to talk.
13 THE COMMISSIONER: We'll have to arrange for him to
14 come back, then, Ms. Baker. I don't know when
15 that will be.
16 What follows next week?
17 MS. BAKER: Monday we have test fishing and that's
18 followed by a decision-making panel. Then we're
19 moving into stock assessment and another decision-
20 making panel. So one suggestion, if people would
21 want to consider this, would be to have Mr.
22 Patterson come back in a morning, maybe start a
23 little bit early at 9:30 and see if we could
24 perhaps cover it off. Tuesday might be a good day
25 for that because we hopefully will have finished
26 test fishing by then.
27 THE COMMISSIONER: What is your time estimate for your
28 remaining time with this witness?
29 MS. BAKER: I think I have probably got 15 minutes.
30 THE COMMISSIONER: And probably half an hour or so of
31 cross?
32 MS. BAKER: I'm not sure. Before, at the break -- that
33 would be an outside, unless people's estimates
34 have changed.
35 THE COMMISSIONER: Well, if in total we have another
36 hour, let's say, Mr. Patterson, we can try and fit
37 that in one day by starting at 9:30 one morning
38 next week, and then break at 10:30 and bring the
39 next panel on.
40 MS. BAKER: Okay.
41 THE COMMISSIONER: Does that make sense?
42 MS. BAKER: I think so, yeah. We may have to add
43 another half hour here and there in the week to
44 get it done, but I think that would probably make
45 the most sense.
46 THE COMMISSIONER: Maybe that's the way to go.
47 MS. BAKER: Okay.

1 THE COMMISSIONER: All right. Well, then, we'll
2 adjourn for the day.

3 MS. BAKER: Okay. Thank you.

4 THE REGISTRAR: The hearing is now adjourned for the
5 day and will resume on Monday at ten o'clock.

6
7 (PROCEEDINGS ADJOURNED AT 4:00 P.M. TO
8 JANUARY 31, 2011, AT 10:00 A.M.)
9

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13 I HEREBY CERTIFY the foregoing to be a true
14 and accurate transcript of the evidence
15 recorded on a sound recording apparatus,
16 transcribed to the best of my skill and
17 ability, and in accordance with applicable
18 standards.
19

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21
22 _____
23 Irene Lim
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25 I HEREBY CERTIFY the foregoing to be a true
26 and accurate transcript of the evidence
27 recorded on a sound recording apparatus,
28 transcribed to the best of my skill and
29 ability, and in accordance with applicable
30 standards.
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34 _____
35 Karen Acaster
36

37 I HEREBY CERTIFY the foregoing to be a true
38 and accurate transcript of the evidence
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41 ability, and in accordance with applicable
42 standards.
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47 Pat Neumann

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