

**February 10, 2011**  
**Cohen Commission Hearings**  
**Cross Examination by Phil Eidsvik**  
**(B.C. Fisheries Survival Coalition and Area E Gillnet Fishermen)**

**MS. BAKER:** Thank you, Mr. Commissioner. Mr. Eidsvik is next for the Southern Area E Gillnetters and B.C. Fisheries Survival Coalition.

**MR. EIDSVIK:** Thank you, Mr. Commissioner. Philip Eidsvik on the record for the Area E Gillnetters Association and the B.C. Fisheries Survival Coalition.

**Q** *I want to start off with a couple of general questions. And it kind of goes to the key of science for me. I know doctors have kind of a "do no harm" principle and we've talked a lot about the great experiment. And I'm trying to understand the scientific process because I'm a fisherman; I'm not that smart about this stuff and it's a bit intimidating to be here with the gods of fishery science on the Fraser. With respect to the experiment that we did on the Fraser River, Dr. Woodey, perhaps you can answer, Fraser River is one of the biggest sockeye systems in the world; is that correct?*

**DR. WOODEY:** Mr. Commissioner, the Fraser Sockeye, as a composite stock grouping would only be second to the Bristol Bay stock grouping.

**Q** *And at the time the experiment was done, you were probably aware that there were tens of thousands of fishermen, large processing plants, Aboriginal groups fishing it for food, a smaller recreational fishery but still a recreation fishery, so the stakes on how the experiment turned out were fairly high. Is that fair to say?*

**DR. WOODEY:** Mr. Commissioner, the term "experiment" perhaps was not the best. It's an inadvertent result of a policy that was initiated by the Department of Fisheries and Oceans in order to provide for conservation of Late-Run Sockeye, which were coming upstream at a much earlier time and consequently dying en route. And in order to address that issue, the Department of Fisheries and Oceans reduced the harvest rate, depending upon the year. And those harvest rates on Late- Run Sockeye only, that's where they were applied, were, in some years, as low as 13 to 15 percent; in other years, 30 percent or higher. But considerably lower than historical harvest rates.

What was difficult about that application was that the majority of the catch was allowed to be taken in the outside marine area fisheries and at times by the timely regulation to open the Fraser River for fishing at a later date arrived that harvest of late-run fish had been taken and so any fish that then entered the Fraser was allowed to migrate upstream. Both late-run fish, early migrating late-run fish and the co-migrating summer-run fish.

And it's the summer-run fish that became the experiment, under my terminology, that is, the escapement levels of particularly Quesnel Sockeye in 2001 and 2002 were very large and, thus, the "experiment" has shown that the over-escapement, that I term over-escapement as, has resulted in disastrous results for the Quesnel Sockeye run.

*Q That helps. I was going to get into that a bit later but we're here now. And you call this problem, I think you called it, the "elephant in the room"?*

**DR. WOODEY:** Well, the Late-Run Sockeye, yes, is the elephant in the room because not only are we seeing a reduction of the productivity of Quesnel Sockeye, as a result of the management decisions on the basis of Late-Run Sockeye, but also we're seeing, of course, decreased abundance of several of the late-run stocks, which are subject to this pre-spawning mortality: Cultus, Weaver and some of the other stocks.

Fortunately, the large late Shuswap stocks, Adams River and lower Shuswap River and associated stocks have been migrating at a later time. A lower fraction of their run has come up during the summer and subsequently have not had excessively high mortalities. So their strength has been maintained, their population sizes and, in fact, in 2010, the late Shuswap stocks have, I believe, come up close to the record level of abundance.

*Q Now, did you give advice to DFO on how to deal with this problem back when it was being discussed when we were first aware of this early entry issue?*

**DR. WOODEY:** I gave advice to the Fraser River Panel in 2001 in the planning phase. We had been given the expected, forecasted returns. And then based on the experience of the timing of Late-Run Sockeye in 2000, my recall isn't precise but I believe we essentially assumed that their migration would be early in 2001 again. And in the modelling, and this is a simulation modelling of fisheries that the Pacific Salmon Commission uses to assist the Fraser River Panel in managing the sockeye resource that those simulation models indicated that a large fraction of the summer-run fish would escape to the spawning grounds. That was the dominant year of the Quesnel runs and, therefore, very large excess escapement was forecast to occur. And other summer runs as well.

So our approach, that is, Pacific Salmon Commission staff approach, was, because we knew from experience that the late-run fish in the river, migrating in the river in August had very low expectation of survival that fishing should occur in the Fraser River to harvest primarily the surplus summer-run fish that were being allowed to go upstream or would be allowed to go upstream, if the fishery was closed. And there wasn't a targeting of the late-runs, to catch those fish; it was to allow the summer-runs to escape at more MSY levels, as opposed to the expected surpluses that would be anticipated.

*Q What did you expect the mortality of those early entry fish would be? Are we talking 10 percent you expected to die? Fifty percent? Ninety percent? Can you help us on that?*

**DR. WOODEY:** The expectation, I don't recall specifically, but the experience that we had in 2000 was that very roughly 95 percent of the late run fish in that year migrated upstream in August and we made a calculation that the en-route mortality based on the numbers of fish that were estimated to have passed the Mission hydroacoustic site and the numbers that reached the spawning grounds in particularly Weaver Creek that year, less the pre-spawning mortality of the fish that did reach the spawning grounds, the mortality prior to spawning was about 95 percent. In other words, only 5 percent of those fish did survive.

And my recommendation was that we could probably fish in the Fraser River until about August 25<sup>th</sup> without having a major impact on the numbers of late-run fish that would survive to spawn. And that would have allowed fisheries to capture primarily the summer-run fish, which were excess to escapement requirements. That recommendation was not adopted.

Some of the things that would have been difficult to work with were that Canada had gear allocation requirements where each gear type, seines and Area B seines, Area D gillnets, G and H Troll and so on, outside marine area fisheries, would not get a share of this catch of surplus fish in the Fraser River unless there was some mechanism developed to attain it, primarily to take those surplus fish. I'm not the one to decide or determine how Canada allocated its catch but the harvest of some of those excess fish would have been very desirable, from my point of view, and would have, if it had been adopted, perhaps mediated the decline in the Quesnel stock and if it had been adopted and used as policy subsequently.

**Q** *So I think if I understand you correctly then, the early entry late-run fish were coming in over a period of about 30 days and the fish at the early part of that were more likely to die than the fish at the later part of the run. Have I got that correct?*

**DR. WOODEY:** Yes, that's correct. I mentioned yesterday that the Fraser Sockeye, on average, most stocks don't reside in freshwater for more than about six, seven weeks and, in fact, late-run stocks, on average, reside in freshwater more in the order of three to four weeks. And in the year 2000, Weaver sockeye migrated upstream seven weeks early. So those that were coming in during August, in my estimation, were those that principally were mortality. The question of mortality versus timing was addressed by radio tagging on the Adams River sockeye in year 2000, 2003 and 2006. And the results of those tagging records and subsequent tracking resulted in essentially showing that a very high proportion of sockeye that migrated into the Fraser River before about August 20th, on average, died en route.

What was missing in the radio-tagging was the assessment of pre-spawning mortalities once they got to the spawning grounds. DFO, through Timber Whitehouse, stock assessment biologist for the Fraser River, tagging at Ashcroft with disk tags, showed that, in fact, the earliest component of the run had survival of down in the 1 percent

range. So there was a good deal of information that gave evidence that the late-run fish that migrate into the river during August, at least to the 20th or 25 of August, have relatively low success of survival in spawning.

**Q** So if I understand --

**THE COMMISSIONER:** Mr. Eidsvik, I'm sorry. I note the time.

**MR. EIDSVIK:** 12:30.

**THE COMMISSIONER:** So perhaps we will take the break.

**MR. EIDSVIK:** Thank you, Commissioner.

**THE REGISTRAR:** The hearing is now adjourned until two o'clock.

(PROCEEDINGS ADJOURNED FOR NOON RECESS)  
(PROCEEDINGS RECONVENED)

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

**MR. EIDSVIK:** Good afternoon, Commissioner. Philip Eidsvik still on for the Area Gillnetters and the B.C. Fisheries Survival Coalition.

CROSS-EXAMINATION BY MR. EIDSVIK, continuing:

**Q** *Before the break, Mr. Woodey, we were talking about the early entry problem, what you call the elephant in the room, and we got to the point where we were discussing the events in 2001, where there was awareness of a problem and you had proposed a solution, and we were talking about the results. And if I understand correctly, we put a lot of fish up the river in 2001 from the Summer run and from the Late run, an excess on Summer, 28 and 90 or 95, or even higher percent of fish that would have died from the early entry Late run which we could have harvested, and this had deleterious impacts on the following cycles.*

*I'm a little bit interested, now, on just how the advice on that were, because there must have been a debate inside the commission on what to do, and you've said your solution, and you said you advised the Fraser Panel.*

*What was the Fraser Panel's reaction to your advice, do you remember?*

**DR. WOODEY:** Mr. Commissioner, the details were in the Fraser River Panel annual report to the PSC, the commission for 1991 -- 2001, excuse me, and the issue was not resolved on the Fraser River Panel level because the U.S.

side and the Canadian side could not agree on the strategy that Canada was proposing, and they bumped it up to the commissioners, to the Salmon Commission members themselves, and there was negotiation there, and the Canadian side made an adjustment on the proportion percentage of harvest permitted on Late run stocks, but that was some adjustments – I can't remember the numbers - from 15 percent harvest to 19 percent harvest, and that was accepted by the Pacific Salmon Commission and implemented, then, by the Fraser River Panel.

**Q** That's helpful. On the Fraser River Panel, of course, the chair of the panel is a DFO staff person in recent years; is that correct?

**DR. WOODEY:** I'm sorry, I didn't hear?

**Q** I'm sorry. The chair of the Fraser River Panel, is that usually a DFO official?

**DR. WOODEY:** The chair of the panel rotates between the Canadian side and the U.S. side, and traditionally, when the chair is on the Canadian side it would be a DFO member, a DFO staff member, and the person that was the chair of the panel at that point, I can't -- I have a report I could check, but it wasn't -- it's not in my memory bank.

**Q** That's fine. The position that industry took in 2001, do you remember that? When I say "the industry" I refer to the public commercial fishery representatives on the panel. Do you remember their position?

**DR. WOODEY:** No. I was never given anything but a basic rejection of my proposal.

**Q** Okay.

**DR. WOODEY:** And at that time the caucus, the Canadian caucus then developed their policy and presented it to the U.S. side.

**Q** *We'll deal with that in, perhaps, one of the many hearings coming up. I have a couple of questions that are a bit off topic. An earlier witness before the commission said that two sockeye stocks had gone extinct - I think Terry Glavin was a witness - and he referred to the Alouette and Coquitlam Rivers, but we never did get an explanation of why those rivers went extinct, the Alouette and Coquitlam. Do you know why they went extinct?*

**DR. WOODEY:** The Alouette and I believe the Coquitlam both went extinct because dams were build in the -- well, certainly the Alouette, I believe, was the mid 20s, 1920s, and that dam was high enough that it was not fitted with a fish ladder, and at that time the powers that be, the provincial fisheries manager at that time, or responsible person, agreed that due to the power production demands, that the sockeye run would not be protected.

And the Coquitlam, I think, was primarily a water source dam, reservoir for water source. The details are not –

**Q** Thank you. I had one more question on escapement. Now, in the mid '60s the Fraser River sockeye were at very low levels, and obviously there was a fishing industry that was quite active, with lots of vessels, and probably in the commission – and you can correct me if I'm wrong - you always had, "Okay, how do we balance our desire to increase the run with our desire to maintain fisheries."

Did you have an escapement policy that accomplished those goals? I mean, obviously the runs were rebuilt from the '60s/'70s/'80s, there was a viable fishing industry. Did you have an escapement policy during that period? I don't really understand what happened then.

**DR. WOODEY:** I was not aboard the commission staff until '71, and therefore I can't necessarily answer the question relative to the '60s. But in the '70s the Pacific Salmon -- the International Pacific Salmon Fisheries Commission definitely had a policy of ensuring that the conservation of the stocks was foremost, but at the same time, they recognized the economic and social values that were posed through the commercial fishery. And I say "commercial fishery" because their responsibility was strictly with the commercial fishery, and Canada's responsibility was for the First Nations Aboriginal fisheries.

**Q** Thank you. I have one more question. If we could turn to Exhibit 75, and it's the book by John Roos, called, *Restoring Fraser River Sockeye*, and we're at page 303. And if we go to page 303, the very last sentence in that paragraph, and I'll read it:

*The Commission's ability to get the job done was primarily related to the simplicity of its mandate and the efficient manner in which it was permitted to implement the decision making process.*

*Do you agree with that statement, Dr. Woodey?*

**DR. WOODEY:** Yes. The power delegated by the countries to the International Pacific Salmon Fisheries Commission were, if you will, nearly absolute; in other words, both countries delegated all responsibility to the commissioners, three from each country and, therefore, when the commission made a decision about an issue, it became implemented on both sides as part of the responsibility of the countries to undertake for the implementation of regulations. But the fact that it was a very short line of command then led to, let's say, a more efficient operation.

Some of those people that were instrumental were Senator Bill Reid, a senator from New Westminster. He was a senator of the Canadians, you know, federal senate. And on the U.S. side people that were either from Washington, D.C. or had direct contact with people in Washington, D.C. that then made the lines of decision-making very quick, very short.

So say when money was needed to build the Hell's Gate fishways in the early '40s, even during the war period it was deemed sufficiently important that both countries funded that request of the commissioners in 1942/'43, and that was the -- you would expect that that would have been very difficult, but it was done because it was deemed to be a very high priority issue, to rebuild the Fraser River stock.

**Q** Now, so in those days, if you were faced with a decision like you were faced with in 2001, it would have been easier to make a decision because there wasn't so many people involved in the room, I guess is what you're saying, in essence? It's easier when there's a direct line of communication?

**DR. WOODEY:** It was a different world back then, but I can't honestly relate, because I wasn't there in the '40s, and I would say certainly there were, from the IPSFC perspective, only one -- only two clients; the fish and the fishermen, the commercial fishermen. And they had an advisory committee, members from the fishing – commercial fishery, sport fishery advisory group at that time.

**Q** Now, at page 33 of this book there's a quotation and a discussion by a De Witt 1 Gilbert, and it's about there was a strong debate in those days whether the Hell's Gate ladders needed to be built. And in his book he says:

*Here was the Great Fallacy into which men fell so readily:*

1. That the block at Hell's Gate had been removed by the subsequent excavation;
2. that pre-1913 conditions had been restored;
3. that such conditions were wholly satisfactory for the migration of sockeye;
4. that all salmon which escaped the commercial fishery spawned effectively
- 5 that overfishing was the sole cause of the continued low level of sockeye abundance;
6. that the situation could be corrected by controlling men and their fishing.

*So even back in, I guess this is from the pre-1940s, there's a debate about whether over-fishing is solely responsible, but is it fair to say that the success of the Hell's Gate ladders proved that Dr. Gilbert is right, when he was saying we needed to solve the Hell's Gate ladder issue? Maybe can I rephrase that, Dr. Woodey, if that's a problem? That was a bit of a ramble question. Or do you have an answer you want to give?*

**DR. WOODEY:** Mr. Commissioner, the people in the -- after 1913, did an extraordinary amount of engineering work to try to restore Hell's Gate to a pre-slide condition. When I say "pre-slide" that means that there was a great amount of rock that came into the river that then constricted the flow of the river, made it difficult for fish to get through, and they removed a lot of that loose rock, which was dumped into the river by the construction of the CN track running through the canyon.

And it remained, after it had been so-called "cleaned up", the people locally said, "Well, we've done our job," and therefore it didn't need to be done, and so it was part of a controversy, and when the engineering people went in, from the IPSFC, went in and looked at the velocities that were at the Hell's Gate at various water levels, determined - they actually built a whole model of Hell's Gate at the University of Washington Engineering Hydrology Department, in the engineering department, and looked at the velocities at different water levels and so on, and the result of that was a determination that there were, in fact, blockage conditions at certain water levels and certain locations, and where rock was protruding into the river and causing difficulty with fish passage. That convinced the engineers that needed the fishways. Fishways were built beginning – the first one being completed in 1945. And other fishways that were what we call "higher level fishways", operational at higher water levels, into the early '60s. They proved very successful in passing fish with little delay and, in fact, after the extinction of the IPSFC at the end of 1985, the Department of Fisheries and Oceans did construct additional facilities. So there was recognition, certainly, that those fishways were required and were certainly justified.

*Q So there was two debates at that point. If we had focused on simply controlling the alleged over fishing by the marine fishing fleet and not built the Hell's Gate ladders, would we have had the success in rebuilding the runs that we had enjoyed prior to, say, 1990?*

**DR. WOODEY:** I'm probably not competent to answer that question. I do know that, for example, in 1941, with the original configuration of the natural, if you will, restored system, that there was a certain range of water levels in the canyon that was impassable to fish. And normally the river dropped through that range fairly quickly and wouldn't delay fish for very long, but in 1941, that water came down into that range and stayed in that range for six weeks.

And it was during the upstream migration of the Chilko sockeye and Quesnel sockeye. And we don't know the numbers of Quesnel sockeye in total, there wasn't any racial ID work, but only 1,000 fish were estimated to have reached the spawning grounds that year, and nearly extinguishing the stock. And from that 1,000 fish in 1941, with virtually no fish in any other line years, the Quesnel run was rebuilt to where it produced over 10 million fish in 1993.

*Q I think that's a sufficient answer. When the IPSFC turned over the fishery to the Pacific Salmon Commission compared to when they got it, is it fair to say that was a pretty remarkable achievement that anybody involved could be proud of, in terms of rebuilding Fraser River sockeye?*

**DR. WOODEY:** I think certainly anybody that worked with the IPSFC felt that they had done a good job in fulfilling the mandate that the IPSFC had been given by the countries.

**Q** Thank you, Mr. Woodey. I have a few questions for Dr. Walters. Are you still there, Dr. Walters? Thank you. It's the question that I want to clarify from this morning that Mr. Rosenbloom raised, and I'll see if I can put it fairly simply.

*After 100 years of fishing at an 80 percent exploitation rate, according to what you saw, only three sockeye stocks were declined by about 1990; do I have that correct?*

**DR. WALTERS:** I just looked at the more recent data period, from 1950 to 1995, where there were high exploitation rates over that period. But I looked at two different datasets; one of them involved 28 stocks, a database that DFO, Paul Ryall, put together in the PSC database, and there were three declining stocks out of the 28, I guess it was, or 27. Then I looked at a much larger database with 106 time trends in it, and a lot of them are spawning areas that we wouldn't necessarily consider to be distinct stocks. And in that database I found 11 stocks declining over that period.

In both cases, whether aggregate or disaggregated data, it's about 10 percent of the stocks were declining, and a much higher percentage increasing or stable or increasing, with some really remarkable rebuilding or recolonization/rebuilding particularly in the Early Summer runs of the Shuswap region.

**Q** Thank you, Dr. Walters. I want to go to the issue of Cultus Lake, because it comes up again and again. And we know that Cultus Lake sockeye have been in trouble, and they're a unique fish in that they actually spawn in the lake and stay in the lake; do I have that correct?

**DR. WALTERS:** That's right. They're shoal spawners. Well, yeah, I don't think the actual spawning locations are well understood, but yes, they're pretty weird.

**Q** Now, were you aware that in the 1950s copper sulphate was dumped into the lake to try and reduce swimmer's itch?

**DR. WALTERS:** No, I wasn't.

**Q** *You're laughing. Does that mean you know what copper sulphate is?*

**DR. WALTERS:** The stock was relatively healthy. It was relatively stable in abundance, so it didn't show cyclic patterns. It wasn't until the '70s that it started the decline and moved into a cyclic pattern. At least according to the escapement records of the Salmon Commission.

**Q** *Fairly heavy population pressure on Cultus Lake; is that fair to say?*

**DR. WALTERS:** Yeah.

**Q** *Recreational development, such as boating, cabins?*

**DR. WALTERS:** Yeah.

**Q** *Docks, a boat-launching site right next to one of the preferred beaches for the sockeye?*

**DR. WALTERS:** Yeah, yeah, and a whole bunch of other things impacting them, like a conservation hatchery that's supposed to save them that's a scary possibility that it's hastening their demise. Lots of things wrong with Cultus, yes.

**Q** Now, DFO, there was a successful predator removal program there at one point, as well as a milfoil program, but I gather that that program just ran for a few years and then stopped for a long time. Can you tell me about that a little bit? Are you familiar with it?

**DR. WALTERS:** I don't know about the milfoil program. As far as I understand, the predator control program, I believe it's still continuing. It did appear to increase survival rates in the lake, perhaps fairly substantially. But with the overall declines going on in the stock and so on, it's really hard to separate out the effects, the positive effects of that control program.

**Q** Those are my questions on Cultus, and I expect that we'll get back to that as we move through the process.

The last bit of questions I have to you is on the exhibit that was entered this morning, the ***Biological and Fishery-Related Aspects of Over-escapement in Alaskan Sockeye Salmon***. Are you familiar with the report, Dr. Walters?

**DR. WALTERS:** Yes.

**Q** *I'm not going to go through it in detail, but I thought at page 15, on the second paragraph, there's a sentence, and I just need to know if you would kind of agree with what you might see.*

*Twenty-two of 29 stocks exhibited a decrease in average yield when over-escapement occurred. Averaged across all 29 stocks, yields decreased 48% when over-escapement occurred relative to when the current escapement goal was met. On average, variability in yields increased 278% as over-escapement occurred.*

*Is that the type of issue that we were talking about in the concern this morning about over-escapement?*

**DR. WALTERS:** In part, yes. There's certainly an obvious increase in variability of returns when spawning stocks are high. By their definition of over-escapement, there had to be a decrease in yields, right? So I guess you'd call it a circular argument.

**Q** *Yeah.*

**DR. WALTERS:** Their definition is oriented and built around a presumption that the fundamental goal of management, in relation to your earlier discussion, is for the fisheries, and that definition is a fisheries management definition of over-escapement.

**Q** *That's very helpful.*

**DR. WALTERS:** It basically says, "Don't waste fish."

**Q** *As you go down the page a little bit, I was recalling the discussion about the impact of nutrients in the system, and down the page a little it says:*

*Reduced sockeye salmon production was associated with a decline in macrozooplankton density from 3,590 per cubic metre...when escapements were within the current escapement goal range 1 to 140 per cubic metre...*

*So a major decline in nutrients in the system. Is that a surprise?*

**DR. WALTERS:** No. The Alaskans have done a lot of really good research work on this whole business of *marine-derived nutrients* in the role of productivity, and they have a lot more case examples than we do of systems where the MDN effects seem to be large.

In fact, the very first research that I know of, by Ole Mathisen on the Kvichak stock in Bristol Bay, he insisted, and the data certainly seemed to continue supporting that marine-derived nutrients were critical to the health of that largest sockeye stock in the world.

But one of the reasons we -- we have to be really careful about that in B.C. because we have at least a couple of our bigger stocks that don't have those benefits, because they're spawning at outlets, Chilko and Adams. And as I mentioned yesterday, at least some of the MDN effects are already represented when we do the stock recruitment analysis in the sense that the recruitments we observed have been impacted by those MDN effects.

One of the things we expect to see, if the marine-derived nutrient effects are really large an expect that recruitment rates ought to increase disproportionately as spawning stock goes up from very low levels. We see very little indication of that kind of acceleration and productivity at lower stock sizes in the Fraser stock. That was along way of saying, "Yeah, it's neat stuff."

**Q** *Near the end of the paper they just have a conclusion, they say:*

*Over-escapement, in general, is not sustainable, as it causes returns and yields to decrease in the next generation, which also result in lower escapements.*

*The authors of the paper, Robert Clark, Mark Willette, Steve Fleischman, and Doug Eggers, are they credible scientists?*

**DR. WALTERS:** Yes, they are. Doug Eggers, in particular, has been a 1 real leader in the development of salmon biology and salmon research and population dynamics over the years. He started out, like Jim Woodey, working on Lake Washington and developed a lot of our fundamental understanding about how fish interact with the plankton communities in the lakes and the really neat adaptations that predator and prey have to one another. I don't know the other people. I've met them, but I can certainly say that Doug Eggers is a major leader.

**MR. EIDSVIK:** Thank you. I think those are my questions, Mr. Commissioner.

If I could only ask one thing, and it's if we could have Dr. Woodey and Dr. Walters back at some point?

Dr. Woodey's the only scientist, so far, to appear before this commission that has had almost a perfect record of Fraser River sockeye management. In our little circles we call him the Steve Nash of Fraser River sockeye, and I think he can offer an awful lot on management decision-making processes, much more than the subject he was confined to, today.

Thank you, Commissioner, and thank you, the witnesses.

**DR. WALTERS:** I'm sorry, before you leave the seat, sir --

**MR. EIDSVIK:** Yes?

**DR. WALTERS:** -- Mr. Eidsvik, I'd just like to say, I'd be happy to come back. I'm going to be giving a lecture tomorrow to the University of Florida students about decision-making processes in fisheries, and I'm going to use the contrast between the Pacific Salmon Commission's management approach that you've asked Jim to describe, with relatively clear, relatively simple objectives.

I'm going to compare and contrast that to what I heard about the DFO management system as described to the Cohen Commission this last fall, and I would really like to speak more to that.

That DFO system is a structured decision-making process that, in my view, is pathological.

**MR. EIDSVIK:** Thank you, Dr. Walters.

**MS. BAKER:** The next participant is the West Coast Trollers Area G, with Mr. Watson.

**MR. WATSON:** Thank you, Mr. Commissioner. Again, it's Chris Watson, for the West Coast Area G and the United Fishers and Allied Workers Union.

CROSS-EXAMINATION 1 BY MR. WATSON:

**Q** *At the risk of blowing my time estimate out of the water, Dr. Walters, I'm very curious for you to pick up on the very last point that you made about the DFO system and it being **pathological**. Could you describe for the commission, please, what you meant by that?*

**DR. WALTERS:** That system is what we call a structured decision-making process in which a group of scientists, DFO staff and so on, work with stakeholders to try to reach some kind of consensus on matters like the TAM rules, the harvest policy rules, and at least as it was described by DFO staff last fall, also in in-season decision-making. My experience with those kind of processes is that –

**MS. GAERTNER:** Mr. Commissioner --

**DR. WALTERS:** -- what happens is that --

**MS. GAERTNER:** -- I wonder if I could --

**DR. WALTERS:** -- in the science (indiscernible - overlapping speakers)

**MS. GAERTNER:** -- speak to this before he answers this question?

**MR. WATSON:** Dr. Walters, just hold on a moment, thank you.

**MS. GAERTNER:** I'm loathe to become argumentative on this matter, but we're having a difficulty staying on topic. That's been something we've been asked to be encouraged to do this entire commission. There are a zillion topics.

If Mr. Walters' opinion on this is valuable to the commission, I suggest it be provided when we're dealing with this topic and not dealing with the topic of delayed density dependency. And we can't keep cross-examining on new topics, on new ideas, in the moment, and try to get finished today's topic, never mind others. We've been encouraged all along through this commission to stay on topic.

**MR. WATSON:** Mr. Commissioner, I'm very much in your hands on that. This is a dynamic process, of course. Dr. Walters is here. If there's an opportunity for him to come back to elaborate, then that would be –

**DR. WALTERS:** Well, let me make it really -- just to give you a really quick answer. It related to the issue of low exploitation rates in recent years and possible over-

escapement. As I see the way that decision process works, people that are involved in it are thrown a huge variety of statistics and models and calculations and so on like that, a bewildering variety that I, even, as an analyst who develops those kind of models, would be at a loss to advise about policy in those settings. It's just too complex.

I think an outcome of that kind of process is **extreme decisions**. People grab onto simple objectives, like, "Let's protect Cultus," and they cling to those objectives, rather than looking broadly at the impact, economic and impacts on fishermen and other things. More than that, I think those processes are vulnerable to inadvertent or deliberate abuse by the science staff through the way the information is presented.

So, for example, the *Wild Salmon Policy* information, as it was presented to the commission this last fall, involves these red light/green light/yellow light things for a large number of stocks. That kind of way of presenting information invites misinterpretation. **It invites poorly balanced decision-making**. There's a need to return to simpler overriding objectives, clear priorities, a hierarchical objective and decision with regard to allocation among user groups, always with conservation first.

There are a lot of ways to improve the decision process, simplify and improve the decision process to make it look -- work more like the Salmon Commission's process did.

**Q** Okay. Thank you, Dr. Walters. I have just a couple of questions for you, Dr. Walters, and really following from your evidence, yesterday, to bring clarification, at least to me. In direct examination of you by Ms. Baker, you were asked to:

...clarify the experiment to rebuild the off cycle years, -

-- and that's the strategy that --

- is that the strategy, -

-- you were asked --

- that we've heard being called the Rebuilding Strategy?

and you said:

That's right. The one that seems to be failing, and that if we had paid closer attention to [Dr. Woodey], and if we'd paid closer attention to other long-term analyses done by Pacific Salmon Commission staff, like Gilhousen, we probably would not have recommended.

So if you can recall, Dr. Walters, what was being said at that point in time - I understand this would be 1985, '86 or '87, in that range -- by Gilhousen, Dr. Woodey, that if you had been paying attention to the rebuilding strategy would not have been recommended?

**DR. WALTERS:** The key mistake I believe we made came out in a paper by Jeremy Collie and I, and Randall Peterman, in 1990, and that's when we sort of officially recommended the off-cycle rebuilding experiment and talked about how to do that in terms of the timing groups. In that paper, we did a formal decision analysis, did a kind of cost benefit/risk analysis-type calculation of whether it was worth pursuing the experiment, because there would be immediate losses in fishing and so on.

And we overtly discounted the possibility of strong delayed density dependent effects. We said, "We just don't believe the Larkin model, we don't believe the delayed effects could be so large."

And had I known about and had we looked at the Gilhousen order - I guess it wasn't out quite then - if we'd looked even more carefully at Ricker's older work and seen the violence of the original cyclic behaviour of these populations, I'd have taken Jim Woodey's warnings a lot more seriously. We'd have left the Larkin model in our decision analysis and it would have very likely told us that the downside of potential loss of the experiment exceeded its potential benefits.

**Q** Okay. Thank you.

**DR. WALTERS:** We would have proceeded with much more cautious recommendations about the possible downsides of the experiment.

**Q** Thank you, Dr. Walters. My other question stems from a question from Ms. Baker further along, yesterday, and it started being addressed to Dr. Woodey about maximum sustained yield, MSY, and after Dr. Woodey said what he had to say, you said that:

*It was discovered in the early 1970s that, in general, maximum average yield is a better word than sustained yield. Maximum average yield for long periods of time is obtained by following a fixed escapement policy, not a fixed harvest rate policy, and not any other more complex rule.*

*So if we could underscore "fixed escapement policy", and I want to ask you, sir, what you mean by "fixed escapement policy"?*

*Do you mean a hard cap on the number of fish escaping, or is a percentage, and if it's a percentage at what rate?*

**DR. WALTERS:** It's a spawning stock number, "X" million fish, and when the total run is less than that number, you take nothing; when the run is above that number, you take all of the surplus above the number.

**Q** All right.

**DR. WALTERS:** In other words, you try to hold the spawning stock at that single target level and let all of the variability and recruitment be absorbed by the fishery. So it turns out that the maximum average yield policy also maximizes variability seen by fishermen.

**Q** All right.

**DR. WALTERS:** It's a peculiar result. It can be proven mathematically that for a really wide range of population dynamics models and so on it's a very robust result. It's been confirmed through optimization and simulation studies repeatedly since then.

We also found, at that time, and we just published a couple of years ago an analysis of the Fraser River sockeye, in historical data, losing the historical variability to look at different harvest strategies, that with a relatively minor loss in long-term yield, about less than 10 percent, it can move to a fixed harvest rate policy, a fixed proportion harvest in each year.

So that causes over-harvesting in some years relative to the optimum spawning stock, and in other years you under-harvest a bit.

It results in a minor loss in yield, but it dramatically stabilizes fishing opportunities, and it's much simpler to implement in the field. We can implement fixed harvest rate strategies simply by fixing the times and areas of fishing at locations where we have reasonable confidence about what proportions of the stock will be at risk to harvest, and you let the fishermen take essentially everything that's in those areas at those times.

That's really what made the historical management system successful in the first place, was that fisheries took place in restricted times and areas that where they took a relatively stable and predictable proportion of the runs.

**Q** Thank you, Dr. --

**DR. WALTERS:** *Long answer?*

**MR. WATSON:** Thank you, Dr. Walters. Those are my questions.

**MR. LOWES:** It's J.K. Lowes, for the B.C. Wildlife Federation and B.C. Federation of Drift Fishers. Just a couple of questions.