COMMISSION OF INQUIRY INTO THE DECLINE OF SOCKEYE SALMON IN THE FRASER RIVER

In the matter of Her Excellency the Governor General in Council, on the recommendation of the Prime Minister, directing that a commission do issue under Part I of the *Inquiries Act* and under the Great Seal of Canada appointing the Honourable Bruce Cohen as Commissioner to conduct an inquiry into the decline of sockeye salmon in the Fraser River

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B.C. SALMON FARMERS ASSOCIATION

REPLY SUBMISSIONS

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The B.C. Salmon Farmers' Association ("**BCSFA**") disagrees with the characterization of the evidence by several participants and replies on a number of points set out in detail below.

The submissions that remain critical of aquaculture do not give adequate weight to the farm-by-farm analysis of fish health data by the Commission's contracted expert for Project 5, Dr. Noakes, or the weight of evidence of the fish health professionals, veterinarians, and other experts who testified that the risks salmon farming pose to wild salmon are low and are effectively managed on a precautionary basis. Dr. Connors agreed with Dr. Noakes that the 2010 returns would have had a positive effect on his analysis if he had included them, meaning there is no evidence to support Dr. Dill's conclusion of a possible effect.

The BCSFA says that the Aquaculture Coalition's position that disease is the primary factor affecting Fraser River sockeye salmon and that ocean conditions may have played a role clearly illustrates their disregard for all evidence that does not accord, or in fact contradicts, their particular theory. Throughout their Submissions the Aquaculture Coalition has selectively quoted exhibits and testimony to edit out anything that weakens their claims, in fact changing the meaning of what was written or said. They interpret fish health data in a manner contrary to that advised by statisticians and modelers such as Dr. Korman and Mr. Marmorek, and present unlikely "conspiracy" theories as the only means to explain the difference between Ms. Morton's inexpert interpretation of fish health data and that of veterinarians and fish health professionals specialized in detecting and diagnosing diseases. The BCSFA says this demonstrates the Aquaculture Coalition's interpretation of the evidence is demonstrably unreliable.

The participants opposed to aquaculture, largely on the basis that there science cannot conclusively prove there is absolutely no risk posed by salmon farms to wild salmon, do not recommend the closure of hatcheries and salmon enhancement projects on the same grounds. The Heiltsuk Tribal Council ("**HTC**"), for example, recommends experimental fallowing of salmon farms because of scientific uncertainty, but simultaneously proposes funding for new hatcheries and enhancement projects. The HTC does not refer to Technical Report 1A by Dr. Stephen, which identifies the unknown risks of pathogens from hatcheries and ongoing fish health problems at many smaller hatcheries. The Aquaculture Coalition refers to that report but applies its conclusions and reasoning solely to aquaculture, ignoring the issue actually addressed by Dr. Stephen. The Conservation Coalition acknowledges the potential competition effects of hatchery salmon and recommends multi-lateral discussions between nations, but also fails to acknowledge Dr. Stephen's report or its own inconsistent approach to pathogens in aquaculture and hatcheries.

The BCSFA submits that the evidence strongly supports the conclusion that salmon farming has not affected Fraser River sockeye salmon declines, and poses a minimal risk overall.

BCSFA REPLY SUBMISSIONS

1. Aquaculture is the only industry named in the Commission's Terms of Reference to be examined to determine if it may be a possible cause of the decline of sockeye salmon in the Fraser River. Given the long history of polarized debate over salmon farming in British Columbia ("**BC**"), and the iconic nature of the sockeye salmon, it is no surprise that some of the public attention and submissions to the Commission were focused on this issue. As numerous media publications outside the Commission demonstrated, the Commission sometimes appeared to be "about" aquaculture even when the hearings themselves were addressing other issues of serious import to the Fraser River sockeye salmon.

2. In these reply submissions, the BCSFA will address the claims made by several other participants on the issue of aquaculture on a participant-by-participant basis. With respect, the BCSFA says that the submissions that remain critical of aquaculture do not give adequate weight to the analysis of fish health data conducted by Drs. Korman and Noakes in the Commission's Project 5 Technical Reports, either because those reports do not support their theory, or are misunderstood because of their highly technical nature, or both. The BCSFA says that a thorough review of Dr. Noakes' report, Exhibit 1536, *Cohen Commission Technical Report 5C - Noakes, Impacts of Salmon Farms on FRSS: Results of the Noakes Investigation*, June 2011 ("**Exhibit 1536, *Noakes Report 5C*, 2011**") and his testimony during the hearings shows that his approach was objective, scientific, and supportable based on an impressive amount of data available during a period of high contrast in Fraser River sockeye salmon which gave his analysis more statistical "power".

3. Several participants suggest that the reports of Dr. Dill and Dr. Connors should be preferred to Dr. Noakes. Dr. Connors agreed with Dr. Noakes that the 2010 returns would have had a positive effect on his analysis if he had included them, meaning there is no evidence to support Dr. Dill's conclusion of a possible negative effect. Dr. Connors did not look at the 2010 returns, a fact he acknowledged would affect his conclusions, because he did not have the final numbers. Dr. Noakes pointed out that it was not necessary to have a precise number to see the lack of an effect of salmon farms on sockeye salmon, and that by only including data up to the 2009 return, Dr. Connors' analysis exaggerated the negative effects, and that the 2010 data would exert significant positive leverage, which Dr. Connors agreed with:

> 41 [NOAKES] But the reason I say the 2005 and talk about
> 42 the leverage on the 2010 is it goes back to a
> 43 point where I made before where we may have a
> 44 short time series, but **we have a time series which**
> **45 includes the highest and the lowest values that**
> **46 we've ever seen in terms of returns to the Fraser**
> **47 in terms of sockeye.** So what happens is when you
> 1 have a data point which is far away from the mean,

it's like a lever on a wheelbarrow. The further away you get from the wheel, the easier it is to lift it up. **So when you have data points that are far away from the mean, they exert high -- it's called high leverage on the relationship. So a data point that's particularly low will tend to pull the relationship towards that point**, the way the statistical estimation procedure works. So a data -- for instance, **the 2009 would tend to exaggerate a negative effect whereas the 2010, because you've got an exceptionally high, it would counter-balance that.** Essentially what it would do is it would tend to pull the relationship in the other direction because it's exerting high positive leverage in terms of that. So as I say, **it's quite powerful to have those two points there, even though they only have a few years of data. It gives us extremely high contrast**.

Q And Dr. Connors?

DR. CONNORS: Just to follow up on that, and **I don't disagree with Dr. Noakes' characterization of that.** I do want it just clear for the record that **there was no election to not include any data in this analysis.** I used all the available information that was there for me. …

DR. NOAKES: …

… whether it's a 25 million in terms of the residual or it's a 20 million, it's a very high leverage point**. I don't think there's any question that it would exert high positive leverage.**

Transcript, August 26, 2011, p. 80 ll. 41 – p. 82 ll. 2 [emphasis added]

4. The precautionary approach is not a "zero risk" approach. It necessitates informed decision-making based on credible science and socio-economic considerations. The BCSFA submits that the credible evidence shows that salmon farms have not been a causal factor in the long term declines or the 2009 return of the Fraser River sockeye salmon.

BCSFA Submissions, paras. 44-51

5. As the BCSFA's reply submissions show, the arguments of the various participants against aquaculture generally misapply the precautionary approach, ignore the weight of evidence that shows salmon farming is not related to the decline of Fraser River sockeye salmon, and fail to acknowledge the primacy of Dr. Noakes' analysis to that of Dr. Connors, and of his objective approach to the speculative approach of Dr. Dill.

6. Where possible, the BCSFA replies to other participants' recommendations separately from their arguments.

8. Aquaculture Coalition

7. The Aquaculture Coalition's submissions can be reduced to the following arguments, all of which the BCSFA says are untenable and are either based on little or no evidence, or are directly contradicted by the evidence before the Commissioner. In sum, the BCSFA says that Aquaculture Coalition's argument, provided in italics within the proper evidentiary context, reads as follows:

   (a) Notwithstanding the Commission's Technical Reports, the weight of evidence, and testimony of numerous experts on climate change and differential factors in the marine environment in the early 1990s and between 2007 and 2008, as well as a detailed analysis of fish health events from 2003 until 2010 showing that there have been no disease outbreaks on the migratory route that would have affected Fraser River sockeye salmon at the population level — *disease from salmon farms is the only possible explanation for the long term decline of Fraser River sockeye salmon as well as the decline in 2009*.

   (b) Despite the Aquaculture Coalition's support of the Project 5 statistical analysis of fish health data from the BCSFA, Province, and Canada, — *those results should be disregarded in favour of the "ecological" approach of Dr. Dill*, who speculated, without looking at the data actually produced, that notwithstanding the absence of evidence that pathogens from salmon farms **had** played a role in the decline *they **could potentially** play a role* (provided his underlying assumptions are all true).

   (c) All qualified fish health experts and veterinarians who conduct the routine monitoring, testing, reporting, and auditing diligently recorded all potential signs of disease, and explained that based on their clinical diagnoses using other evidence and their expert knowledge that those signs did not amount to a disease — *but in the opinion of Ms. Morton they have uniformly failed to detect a disease which is easily diagnosed and lied to the Commission.*

   (d) Although Dr. Miller's research has evolved significantly and rapidly, and Dr. Miller and other experts doubt her earlier speculation as to connections between the genomic signature and plasmacytoid leukemia, *the Commissioner should accept a portion of her research conducted in a narrow window of time in 2009 as evidence that aquaculture is responsible for plasmacytoid leukemia*, while disregarding her more recent findings and her own testimony that tend to disprove such speculation.

   (e) Notwithstanding the express consideration of the risks of pathogen transmission from salmon farms to migrating wild salmon in the environmental assessment and site approval process and the precautionary mitigation measures put in place by the Province and Canada to ensure Fish Health Management Plans were diligently followed to reduce those

risks and area management should occur between salmon farms — *the risks of pathogen transmission from salmon farms to migrating wild salmon have never been expressly considered in the site approval process.*

(f) Disregarding the strong correlation between the introduction of Fish Health Management Plans ("**FHMPs**") in 2003 and the beginning of the statistically significant decline in high risk disease events in salmon farms, as well as the vaccinations and measures expressly laid out in FHMPs to improve farm fish health to prevent diseases such as improved husbandry and deal rapidly with disease outbreaks to minimize pathogens in and around the farms — *there is nothing in FHMPs that can be said to reduce the risk of pathogen transmission to wild salmon*.

(g) The application of the precautionary approach and adaptive management to aquaculture regulation and management by both the Province and Canada to reduce all risks of salmon farms to wild salmon, whether real or perceived, despite the absence of evidence that they pose a risk and to continuously study and improve the environmental performance of the industry based on evolving knowledge, should be ignored – rather, "DFO has proceeded on the basis that aquaculture poses no disease risk to wild salmon".

8. The Aquaculture Coalition persists in its misinterpretation of the fish health data notwithstanding the testimony of numerous fish health experts. Significantly, it continues to misrepresent all "open" diagnoses as infectious diseases, with the implicit assumption that any potentially undiagnosed or unknown diseases are high risk, and furthermore that interpreting pathological signs is a simple mathematical exercise rather than one requiring the knowledge and expertise of fish health professionals. The Aquaculture Coalition also asserts that Chinook farms were not present in the Discover Islands in 2008 and that marine anemia was present in Conville Bay – both of these suggestions were proven wrong in testimony. The BCSFA says the testimony given by numerous fish health professionals and other witnesses clearly refutes the Aquaculture Coalition's assertions, a point made clear by Ms. Morton's suggestion that all experts who did not agree with her were corrupt or lying. The BCSFA notes that the *Veterinarians Act* (BC) prohibits non-veterinarians from practicing veterinary medicine, thereby providing a clear legal distinction between those who are able to interpret and diagnose disease in fish such as Dr. Sheppard, Dr. McKenzie, and Dr. Saksida, and those who purport to do so such as Ms. Morton.

Morton, September 7, 2011, p. 106 ll. 9 - 25;
Morton, September 8, 2011, p. 51 ll. 3 – p. 51 ll. 20;
Veterinarians Act, SBC 2010 c. 15, s. 1, 46, 74

9. The Aquaculture Coalition's submissions are an unreliable interpretation, if not an outright misrepresentation of the evidence. The BCSFA suggests these submissions were written for an audience less familiar with or less likely to check

the underlying evidence. Most telling is the partial quotation from Mr. Marmorek's testimony in which he replies that there is strong empirical evidence that explosives explode, followed by an assertion by the Aquaculture Coalition that there is strong empirical evidence that fish farms harbour and amplify disease. Fully quoted in the BCSFA's Final Submission, **Mr. Marmorek's in fact went on to disagree with that very same proposition in the very same sentence that is only half-quoted by the Aquaculture Coalition**. The BCSFA says that this illustrates an extremely subjective and unreliable interpretation of the evidence throughout the Aquaculture Coalition's argument. It is not always clear what "evidence" is being referred to in support of the various assertions made in the Aquaculture Coalition Submissions, making it onerous for other participants to guess at the source in order to provide an adequate reply.

Aquaculture Coalition Submission, p. 9;
BCSFA Submission, para. 117

10. The BCSFA also notes that Ms. Morton herself appears to have authored the Aquaculture Coalition's submissions, although no-one has signed the document. As a participant who has demonstrated a tendency throughout these proceedings and her own testimony to disregard inconvenient truths, Ms. Morton makes numerous accusations against individuals, organizations, and levels of government that are clearly not supported by, or are contradicted by the evidence. The BCSFA submits that Ms. Morton has clearly exceeded mere subjective opinion of the available evidence and is misrepresenting the evidence before the Commission. Her submissions are furthermore prejudicial to the reputations of numerous individuals. She in fact testified that she feels justified in saying anything to "defend" against the threats she perceives from the aquaculture industry.

Transcript, September 8, 2011, p. 77 ll. 46 – 79 ll. 28

A. Weighing Evidence and Likely Factors

11. The Aquaculture Coalition relies on evidence from other jurisdictions to prove a risk from salmon farms to wild salmon (which it calls the "ecological approach"), claiming such studies "cannot be ignored" and criticizes exerts such as Dr. Kent and Dr. Noakes for not relying on them. No adverse inference can be drawn against experts such as Dr. Kent and Dr. Noakes for not referring to them. Dr. Noakes explained at length how some publications have resulted in the polarization of the aquaculture debate, that unlike Norway, Scotland, and eastern North America, BC has "many more (by orders of magnitude) wild and hatchery salmon in the Pacific Ocean than salmon on farms", and that all diseases detected on salmon farms are endemic to BC. The BCSFA says that evidence of research conducted in other jurisdictions is therefore of limited applicability and more weight should be given to the testimony of local experts on the state of knowledge in BC.

Aquaculture Coalition Submissions, p. 3-5;
Exhibit 1536, Noakes Report 5C, 2011, *supra* p. i, 16, 24

12. Furthermore, the BCSFA Submissions note that Dr. Kent and Mr. Marmorek both questioned the utility of international papers. Dr. Kent, asked to comment on Exhibit 1482 *Rimstad, Examples of emerging virus diseases in salmonid aquaculture, Aquaculture Research*, one of the papers heavily relied on by the Aquaculture Coalition Submissions, said the paper was an "overstatement", "sensationalized", and "slightly incorrect" as written. Mr. Marmorek also explained that such literature would only be useful in assessing risk, not quantifying it. The BCSFA furthermore notes that Exhibit 1561, *Hammell et al., Salmon Aquaculture Dialogue - Working Group Report on Salmon Disease, Draft Mar 3 2009* **("Exhibit 1561, *Hammell et al. S.A.D. Working Group Draft*")** on numerous occasions cites BC as an international model of how to properly manage fish health.

Aquaculture Coalition Submission, p. 3-5;
BCSFA Submission, para. 118, 116, 223-224;
see e.g. Exhibit 1561, *Hammell et al. S.A.D. Working Group Draft*, p. 42, 53-54, 59-60.

13. As an example of the Aquaculture Coalition's reliance on international literature, they cite Exhibit 1487, *A Global Assessment of Salmon Aquaculture Impacts on Wild Salmonids* by Ford & Myers, 2008, several times as proof of the fact that wild salmon are "in exceptional decline wherever there are salmon farms worldwide". As noted in the BCSFA's Submissions, Drs. Beamish, Noakes, and Saksida all agree that this paper is misleading for a variety of reasons including the fact the paper comes to a different conclusion than what it claims in the abstract, and that it reaches that conclusion by excluding pink salmon from the

Fraser River which are increasing in abundance notwithstanding their migratory route past salmon farms. Furthermore, the dialogue between Drs. Noakes and Connors regarding proper modelling techniques shows the simple correlation in this paper is likely wrong. The BCSFA says that the international literature cited by the Aquaculture Coalition is unreliable and is of limited applicability or value to the Commissioner considering the aquaculture industry in BC.

Aquaculture Coalition Submission, p. 1, 5, 11, 16;
BCSFA Submissions, paras. 204-207

14. The Aquaculture Coalition suggests that salmon farming is the "best-fit variable" that explains the timing of the decline, the specific stocks affected, the onset of early entry migration timing, the "viral indicators" found by Dr. Miller, and the reversal of the decline in 2010 and 2011. The BCSFA suggests this theory only holds water in the absence of all other available evidence before the Commissioner, in particular the conclusions of multiple Technical Reports prepared for the Commission and expert testimony that climate change and the marine environment are the likely causes. As explained in the BCSFA submissions, a regime shift in the marine environment appears to have occurred either in 1989/1990 or 1992 which coincides with the recent long-term decline of Fraser River sockeye salmon. The specific salmon stocks affected include those which are not affected by salmon farms. Dr. Miller's research suggests the mortality-related signature which she **hypothesizes** could cause early entry timing – Exhibit 557 *Proceedings, Conference on Early Migration & Premature Mortality in FR Late-Run Sockeye Salmon, Jun 16-18, 2008* in fact presents a number of other hypotheses including an "environmental link" – is leading her to believe the signature and parvovirus is coming from a freshwater source, and there was no change in salmon farms that could explain the returns in 2009 to 2011. Instead, research shows extreme and anomalous conditions in the marine environment including low food abundance, high temperatures, wind conditions, and heterosigma blooms in 2007 that did not occur in 2008. The BCSFA says that this theory ignores the best available evidence and must be rejected.

Aquaculture Coalition Submission, p. 1-2;
BCSFA Submissions, paras. 6-37;
Exhibit 557 *Proceedings, Conference on Early Migration & Premature Mortality in FR Late-Run Sockeye Salmon, Jun 16-18, 2008* p. 9

15. The Aquaculture Coalition also claims that the evidence shows mortality occurred within 20 to 30 days of smolts, presumably Fraser River sockeye, passing through Johnstone Strait. No evidence is cited for this suggestion. The BCSFA notes that if Dr. Welch's study is the source for this information, that he himself testified that he had no knowledge of when those fish died after passing his last POST tracking station, whether 20 days, or a year and a half later. The BCSFA says that there is no such evidence for the Aquaculture Coalition to rely upon.

Aquaculture Coalition Submission, p. 2;
BCSFA Submissions, para. 29;
Welch, Transcript July 7, 2011, p. 78, ll. 33 – p. 79 ll. 6

16. The Aquaculture Coalition's submission leaps from the hypothetical "If" a disease caused the 2009 returns, to a conclusion that there was an epidemic from salmon farms. As Mr. Marmorek noted, salmon farms report diseases and are audited – he disagreed with this theory when it was put to him on the grounds that such an epidemic sufficient to have caused the 2009 returns would have been detected. Diligent monitoring and reporting by salmon farm veterinarians, robust auditing by the Province's veterinarians and fish health experts, and a thorough analysis of the BCSFA's "impressive" database by three of the four Project 5 researchers found no evidence of any disease which could possibly have had an effect on the 2009 return. Dr. Korman explained why interpreting the number of lesions reported in the databases is a matter that must be left to qualified veterinarians. The Aquaculture Coalition's fervent belief that this is incorrect based solely on Ms. Morton's inexpert interpretation of the fish health data shows she is incapable of accepting evidence that conflicts with her personal beliefs.

Aquaculture Coalition Submission, p. 2;
BCSFA Submissions, para. 251-253

17. The Aquaculture Coalition suggests that the most obvious source of mortality is a "new disease agent" from salmon farms, and that "no other significant causal agents have been identified during the Commission's hearings". Considering the volume of evidence on climate change, food abundance and quality, heterosigma blooms, and natural early marine mortality, the BCSFA says this statement is untenable. In fact, "new" diseases are considerably more likely to be old diseases recently discovered, particularly in light of the long-standing and stringent rules regarding the importation of eggs for aquaculture. As Dr. Hammell et al. observe:

> … Many of the rules around the movement of animals for trade as established by the OIE are built on steps to prevent the introduction of non-indigenous pathogens into a receiving country. It is, however, **challenging to differentiate a disease newly discovered in a fish farming region from an introduced disease**. For example, in the early days of salmon farming in British Columbia, **many apparently new diseases were "discovered" in salmon farms. None were indeed new** rather they had gone **undetected due to lack of study of wild adult salmon** (Stephen and Iwama, 1997).

Exhibit 1561, Hammell et al. S.A.D. Working Group Draft,
p. 39 [emphasis added]

18. Some of the evidence which the Aquaculture Coalition claims to support its position only does so on a superficial review of the passages quoted in their Submissions. However, the BCSFA notes that two of the exhibits relied upon by

the Aquaculture Coalition to show the risk of disease transmission from aquaculture to wild stocks in fact favour the BCSFA's position that those risks can be effectively managed through adaptive management and application of precautionary measures such as Fish Health Management plans and area management of salmon farms by the companies. Furthermore, as noted above, the reliability or applicability of some of these papers was questioned by Dr. Kent and Mr. Marmorek. The BCSFA submits that the Aquaculture Coalition fails to establish that salmon farms in BC pose a high risk of amplifying diseases or acting as reservoirs, particularly in light of the Project 5 analysis of Drs. Korman, Conners, and Noakes, which show such claims are incorrect.

19. For example, two lines from the abstract of Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, are selectively quoted by the Aquaculture Coalition as "compelling" evidence that the rapid growth of aquaculture has resulted in new diseases. The BCSFA notes that the ellipsis in the quotation omits that portion of the abstract which suggests other factors than aquaculture are responsible for this phenomenon, and omits the preceding sentences regarding the importance of the aquaculture industry not only to the economy but also to reducing exploitation pressures on wild fish populations. The abstract reads, with the Aquaculture Coalition's quotations in italics:

> Driven by population growth, rising demand for seafood and a levelling of production from capture fisheries, the practice of farming aquatic animals has expanded rapidly to become a major global industry. **Aquaculture is now integral to the economies of many countries.** It has provided employment and been a **major driver of socio-economic development in poor rural and coastal communities**, particularly in Asia, and **has relieved pressure on the sustainability of the natural harvest from our rivers, lakes and oceans.** However, *the rapid growth of aquaculture has also been the source of anthropogenic change on a massive scale*. Aquatic animals have been displaced from their natural environment, cultured in high density, exposed to environmental stress, provided artificial or unnatural feeds, and a prolific global trade has developed in both live aquatic animals and their products. **At the same time, over-exploitation of fisheries and anthropogenic stress on aquatic ecosystems has placed pressure on wild fish populations.** *Not surprisingly, the consequence has been the emergence and spread of an increasing array of new diseases*. …
>
> Aquaculture Coalition Submission, p. 3;
> Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, p. 1 [emphasis added]

20. Contrary to what the Aquaculture Coalition claims several times in its Submissions, aquaculture is not the only possible source of new diseases. Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp* in fact explains that "anthropogenic factors unrelated to aquaculture" can cause the emergence of

pathogens, "such as the movement of pathogens or hosts via ballast water in ships, movement of bait by anglers and unintentional movement in other biotic or abiotic vectors." Notably, it does not recommend the removal of salmon farms from the marine environment and instead concludes that effective regulation of aquaculture and continued improvements in diagnostics, surveillance, and health management and surveillance will mitigate these risks:

> … there is a growing awareness of the importance of emerging diseases of aquatic animals and it is likely that the risks of future disease emergence will be mitigated somewhat by the development of improved diagnostic methods and surveillance efforts, increased regulatory oversight of aquaculture with greater levels of health inspection for fish, shrimp and their products involved in international trade, and the development of novel vaccines and therapeutics.

Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, p. 16-17

21. Similarly, the Aquaculture Coalition cites Exhibit 1483, Robertsen et al, *Can we get the upper hand on viral diseases* in an overly selective way, suggesting that it shows a significant disease problem in aquaculture. In fact, the BCSFA notes that the paper establishes that diseases in salmon farming can be properly managed. For example, only the first sentence of a two-sentence paragraph is quoted – the quoted portion shown in italics:

> *It is now well accepted that horizontal transmission is the main route of the spread of viral diseases in salmon farming*. In fact, **stopping further horizontal viral transmission** is and has been **a major success factor in Norwegian salmon farming**.

Aquaculture Coalition Submission, p. 4;
Exhibit 1483, Robertsen et al, *Can we get the upper hand on viral diseases*, p. 128 [emphasis added]

22. Exhibit 1483, Robertsen et al, *Can we get the upper hand on viral diseases* proceeds to outline the importance of biosecurity, area management, and a suite of other tools common to the BC aquaculture industry, as the means by which Norway has been able to stop horizontal transmission of diseases such as IHN and ISA. Elements common to BC and Norway are emphasized in bold:

> … The combat principles include maintaining **appropriate distances between fish farms,** practicing **separation of generations** by the 'all-in-all-out' principle, non-use or UV treatment of seawater in the freshwater phase, a **ban on transportation of fish to and from infected sites**, **stamping out of infected stocks**, allow **several months of fallowing** between outbreaks, **disinfection of well boats**, **screening of**

> **smolts for viruses**, **avoiding fish escapes** and making the **disease notifiable to veterinary authorities**.
>
> Exhibit 1483, Robertsen et al, *Can we get the upper hand on viral diseases*, p. 128 [emphasis added]

23. It is suggested by the Aquaculture Coalition that wild salmon "in general live in equilibrium with disease" and that the concentration of pathogens is low. The BCSFA refers to the testimony of Dr. Kent who pointed out the fallacy of this "assumption," noting that farmed salmon have less disease than wild salmon notwithstanding higher densities:

> Q Yes. And fish farms by their very density are great places for the emergence of disease, aren't they?
> DR. KENT: Well, there's the densities, there are -- densities would play a role in directly transmitted diseases. This is kind of a -- **there's an assumption that's made out there** that farm fish are under more stress and more disease than wild fish, and **actually, if you look, wild fish have a higher prevalence and abundance of pathogens than farm fish.** Density is one thing that would be in a negative favour towards fish in net pens, but **there's many other factors that are basically, and they're positive for there to be less disease, such as controlled diseases, as a control of freshwater diseases as they're put into the pens. The opportunity to vaccinate, remove sick fish from -- dead fish quickly from the environment, et cetera.**
> So, yeah, crowding would be one that would be shifting more towards more diseases, but **this should be put in context because there's a lot of other factors that would actually be in the favour of farm fish to have less diseases.**
>
> Aquaculture Coalition Submissions, p. 5;
> Kent, Transcript August 23, 2011, p. 42 ll. 29 – p. 43 ll. 5

24. The Aquaculture Coalition also refers to the problem of diseases that "emerge" on salmon farms. Dr. Kent attempted to clarify what is meant by an "emerging" disease and why they are often first detected on salmon farms during his cross examination by counsel for the Aquaculture Coalition. He said:

> Q Yes. And many of the current diseases known to wild salmon have first shown up in fish farms.
> DR. KENT: **They were first detected in fish farms, and there should be some clarification on this**. And this is some from direct work that we've done.

Often **these viruses don't spontaneously emerge in these farmed fish**. What happens is -- or pathogens in general, what generally happens is that the scenario would be that **these pathogens are occurring in these wild fish. They're not being detected. Particularly the pathogens that would be occurring in the marine environment, no one's looking at diseases in the marine environment of salmonids, or very little has been done.** And then the -- then the fish are starting -- are **raised in captivity, as you said, under more close scrutiny, under denser conditions, and then these pathogens emerge. Subsequently we -- the general scenario would be you go back and actually these diseases occurred in the wild fish.**

A good example is the ISA virus, which was first detected in the Atlantic, I believe in Norway, then Scotland. Subsequently they went back and determined that there was -- that it did occur in the wild marine salmonids and other fishes. So it needs a little bit of clarification. Yeah, that's -- yes, **you're correct in saying the first detection or description of diseases that affect wild fish often are first described in farm fish. But jumping to the conclusion that then they're** -- what often happens is a mistake, is that people say, well, oh, so then **subsequently we went back and looked at the wild fish and it was in them, and therefore it must have come from the wild fish.**

And this is where we can -- I can contend in my Recommendations part about this understanding of the baseline, **having baseline information would help this situation a lot more**.

Transcript, August 23, 2011, p. 45 ll. 18 – p. 46 ll. 10 [emphasis added]

25. The Aquaculture Coalition criticize Dr. Noakes for stating that 2% mortality was "quite low" relative to 3% per day mortality in the early marine environment stage of wild salmon. The BCSFA notes that the conclusion that this evidence was "proven to be mistaken" is based on the Aquaculture Coalition's own calculations which they say Dr. Korman agreed with. In truth, Dr. Korman agreed that such calculations **could be done**, but he **doubted they produced a better result**, merely a different number based on the assumption that all old or poor performing fish die of disease rather than other reasons:

DR. KORMAN: Well, I think, like any assumption, it should be looked at and questioned and that's legitimate that you're doing that**. I don't think**

it's fair to say that all old fish or all poor performers died of disease at all. But I do agree with your argument that the percentage could be larger than what's in the report. That's a possibility. **There's also some of those fresh silvers that could have died due to other reasons due to disease, though, right?**
Q Fair enough.
DR. KORMAN: So they're all estimates.
…
Q So if we add in those poor performers, or some percentage of them, and the old and the matures, the number of -- and add them to the fresh silvers, the number that are dead or possibly dead of disease doubles from 2 percent to 4 percent.
DR. KORMAN: Just glancing at this spreadsheet I could see that being **possible**. And then **you'd have a set of assumptions in there with the caveat that all old fish and all poor performers are assumed to have died from disease, as are fresh silvers**. So you'd have a number, 4 percent that was bigger with a set of -- one set of assumptions. We have a lower number with another set of assumptions. You know**, is your number better than the number -- you know, it's higher, but I'm not actually sure it's more accurate.**

Aquaculture Coalition Submission, p. 6;
Korman, Transcript August 29, 2011, p. 19 ll. 30 – p. 20 ll. 18

26. It is noteworthy that when the Aquaculture Coalition asked Mr. Marmorek to comment on the open diagnoses in the fish health data, Mr. Marmorek also replied that 2% or 5% is a fairly small proportion, independently corroborating Dr. Noakes' opinion:

Q Did you read the cross-examination of the Project 5 and Project 1 reports?
A Parts of it. It's pretty long. I didn't read all of it.
Q Were you aware that there were diseases found in that database that were -- **that 60 percent of the time were identified as unknown or open**?
A Yes, I read that portion.
Q That's a pretty significant fact, isn't it?
A Again, we're talking -- yeah, I believe that -- I think it was **something like it went from two percent to five percent in the total number of fish**, or something like that, wasn't it? **So that seems a fairly small --**
Q The question is --

7 A **-- it seems a fairly small proportion, to me**.

Marmorek, Transcript September 19, 2011, p. 80 ll. 39 – p. 81 ll. 7 [emphasis added]

27. Furthermore, Dr. Noakes expressly acknowledged in testimony and in his report, Exhibit 1536, *Noakes Report 5C*, 2011, that he was comparing a 2% mortality rate to mortality in wild salmon. Dr. Noakes did admit he was not an expert in fish health and said that he would defer to veterinarians, as did Dr. Korman who repeatedly explained that the expertise of a veterinarian is necessary to interpret the fish health data, which suggests the Aquaculture Coalition's interpretation of the data is unreliable. Dr. Korman furthermore explained an important caveat on the Aquaculture Coalition's theory that disease-related mortality is higher than 2%, which is that farm-level diagnoses result in treatment of the fish, and that Dr. Noakes found very few farm-level disease events in the Inside Passage:

4 The only caveat I'd say is that we have these
5 farm-level diagnoses that are done during the
6 audit and by the salmon farmers, okay, and they
7 actually include fish that aren't dead, right?
8 They're just fish that are diseased and showing
9 signs of a pathogen. **They show signs of disease**
10 and they're treated. And so if there was a whole
11 bunch of disease that wasn't resulting in
12 mortality, then **it would show up as many farm-**
13 level disease events, which, you know, in Dr.
14 Noakes' reports, **once he splits those out by area,**
15 we don't see a lot of those farm-level disease
16 events, you know, in the Inside Passage. So
17 that's -- that's the only caveat to indicate on
18 your remarks.

Noakes, Transcript, August 29, 2011, p. 23 ll. 44-45;
Exhibit 1536, *Noakes Report 5C*, 2011, p. 25;
Korman, Transcript, August 29, 2011, p. 47 ll. 21 – 32
Korman, Transcript, August 29, 2011, p. 28 ll. 4-18

The assertions that the rate of disease on salmon farms is "grossly unacceptable" is therefore based on a subjective and inexpert interpretation of the available fish health data contrary to the advice and cautions by Dr. Korman.

Aquaculture Coalition Submission, p. 7

28. The claim that the "wild environment … would otherwise have low pathogen levels" is appealing, yet unsupportable idealism. To suggest that without salmon farms there would be little disease in the wild, the Aquaculture Coalition must blind itself to both Technical Report 1, Exhibit 1449, *Cohen Commission Technical Report 1 Infectious Diseases and Potential Impacts on Survival of Fraser River Sockeye Salmon*, ("**Exhibit 1449, *Kent Report 1,* 2011**") and 1A, Exhibit 1454, *Cohen Commission Technical Report 1A - Hatchery Diseases, Jul*

2011, ("**Exhibit 1454, Stephen Report 1A, 2011"**) which note there is disease in the wild and in hatcheries, but that conclusions as to their prevalence or impacts on wild salmon populations cannot be drawn because of insufficient information from the hatcheries themselves. Not only is the rate of disease in the wild not known, but there are sources other than salmon farms which pose disease transmission risks which the Aquaculture Coalition chooses to ignore, such as hatcheries, ballast water, and recreational fishing. Dr. Stephen also observed numerous occasions where diseased hatchery fish have been released into the wild. As Dr. Stephen writes:

> A health standard of no infectious or parasitic microorganisms or diseases in Fraser River sockeye salmon is unattainable because; **infection and disease are normal in wild fish populations** and a **variety of infectious agents are ubiquitous in aquatic environments** or common in cultivated or wild fishes.

Aquaculture Coalition Submission, p. 7;
Exhibit 1449, Kent Report 1, 2011;
Exhibit 1454, Stephen Report 1A, 2011, p. 2
Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, p. 16

29. In performing their own data analysis of the fish health databases, and based on Dr. Korman's statement that "Approximately 25%" of fish health events per year were caused by bacterial and viral diseases, the Aquaculture Coalition comes to the conclusion that on average, either 1 in 4 or 1 in 3 farms experience a disease event every year. The BCSFA notes that Dr. Noake's report shows which farms actually experienced disease events – it is not necessary to average out over all farms. Furthermore, the Aquaculture Coalition then leaps to the conclusion that this means "the odds are high that in any given migration it is inevitable that the sockeye will pass through at least one disease outbreak." The BCSFA says that it is unreasonable in the extreme to disregard Dr. Noakes' analysis of where disease events actually occurred, and to characterize every disease event as an "outbreak."

Aquaculture Coalition Submission, p. 9

30. The precautionary approach from the Rio Declaration is applied to aquaculture management and regulation. Both governments and the industry recognize the potential risks and take actions to prevent environmental harm. It does not necessitate draconian action, particularly where available evidence suggests that risks are low. Socioeconomic considerations also factor into management decisions. The BCSFA disagrees with the Aquaculture Coalition's interpretation that disease from salmon farms is an "unavoidable risk" that necessitates removal of farms from the migration route.

Aquaculture Coalition Submission, p. 9;
BCSFA Submissions, Part II; para. 116

B. Project 5

31. The Aquaculture Coalition suggests some participants may abuse the absence of conclusions from the reports of Dr. Kent and Dr. Stephen to exonerate salmon farming. An important distinction must be made between Dr. Kent's report and those of Drs. Noakes, Dill, Connors, and Korman, specifically the absence of data available for the former, and the "impressive" amount of information available for the latter as Dr. Korman referred to it in his report. Dr. Noakes does not say that disease from salmon farms cannot plausibly cause disease in wild Fraser River sockeye salmon, a conclusion for which the Aquaculture Coalition applauds Dr. Stephen, but rather that the available evidence "suggests that disease originating from salmon farms has not contributed to the decline of Fraser River sockeye salmon" because of the infrequent occurrences and geographic location of disease events. Although information on wild salmon would have assisted the analysis, the BCSFA says that the Aquaculture Coalition is confusing the matter by suggesting the absence of this information limits Dr. Noakes' conclusion that disease from salmon farms is an "unlikely" cause.

Aquaculture Coalition Submission, p. 12;
Exhibit 1543, (formerly SS) - Korman, *Cohen Commission Technical Report 5A, Summary of Info for Evaluating Impacts of Salmon Farms on Survival of FRSS*, May 2011 ("**Exhibit 1543 *Korman Report 5A*, 2011**") p. 9;
BCSFA Submission, para. 5;
Exhibit 1536, Noakes Report 5C, 2011, p. ii

32. There is an interesting statement contained in the Aquaculture Coalition's submissions which, although not directly relevant to Fraser River sockeye salmon, deserves a reply. The Aquaculture Coalition says that the BCSFA opposed having a single neutral scientist author a single Project 5 report. This is untrue. Brian Harvey had initially been selected by the Cohen Commission to author this report, and only quit after the Conservation Coalition made an application to have him removed. The Aquaculture Coalition, Conservation Coalition, and BCSFA were asked by Commission Counsel to recommend potential replacements, and these three participants were unable to agree on a single researcher. The BCSFA suggests such warrantless accusations are unhelpful.

Aquaculture Coalition Submission, p. 13

33. The Aquaculture Coalition questions the Commission's decision to search for "statistical proof" through Project 5 on the grounds that disease occurs unpredictably, is not necessarily subject to precise patterns, and cannot find a "predictable pattern". With respect, pursuant to the fact-finding mission mandated by the Commission's terms of reference, Project 5 assessed whether salmon farms **had** caused the long-term decline or 2009 decline based on available evidence. Dr. Noakes did his own analysis of the data to make this

determination, whereas Dr. Dill looked for evidence to support his belief that salmon farms could have an effect, citing Dr. Connors' analysis as that evidence despite its many weaknesses identified by both Dr. Dill and Dr. Noakes. The statistical analysis has in fact shown that salmon farms were not the cause of the decline of Fraser River sockeye salmon.

Aquaculture Coalition Submission, p. 14

34. To clarify the record, the BCSFA says that the Aquaculture Coalition's description of the BCSFA's data is not accurate. The BCSFA produced as long a time series of the requested fish health data as it had in its possession and control. As explained in the Commissioner's Ruling of December 8, 2010, annexed to Exhibit 1536, Noakes Report 5C, 2011, prior to the early 2000s, there was no requirement to report or keep fish health data, and records were kept or destroyed by individual aquaculture companies, most of whom no longer exist. The BCSFA also notes that the Aquaculture Coalition at that time fully supported the statistical analysis of fish health data by the Project 5 researchers. This position changed some time between the application for fish health data and final submissions, presumably once the Project 5 reports found salmon farming is not the cause of the Fraser River sockeye salmon declines.

Aquaculture Coalition Submission, p. 14;
Exhibit 1536, Noakes Report 5C, 2011, p. 69-94

35. In suggesting that Dr. Dill's report should be preferred over that of Dr. Noakes, the Aquaculture Coalition says that the latter was "clearly biased" because he published Exhibit 779, Noakes et al. *On the decline of Pacific salmon and speculative links to salmon farming in British Columbia*, 2000, which, the Aquaculture Coalition claims, "without evidence excused aquaculture." With respect, this is also incorrect. Dr. Noakes and his co-authors Drs. Beamish and Kent, did not engage in a separate analysis of aquaculture, but rather expressly compared the environmental impacts of salmon farming **as it had been recently assessed by the BC Environmental Assessment Office in the Salmon Aquaculture Review** to other factors such as climate change and hatcheries. A substantial amount of evidence was considered in that review which concluded that salmon farming poses a "low overall risk to the environment":

> …The British Columbia Environmental Assessment Office undertook **a thorough evaluation of salmon farming and considered the key issues of escaped farm fish, fish health, waste management, interactions with other species such as marine mammals, farm siting, as well as various socio-economic factors**. The 18-month public review process resulted in a report to the British Columbia government in August 1997. The overall conclusion of the review was "**that salmon farming in BC, as currently practiced and at current production levels, presents a low overall risk to the environment**" (Anonymous, 1997).

> In their review, the Environmental Assessment Office focused on **information, scientific or otherwise, that was directly related to salmon farming** in British Columbia. Indeed, that was their mandate and report and the associated recommendations were thorough and comprehensive within that context. The review was not intended to, nor did the review specifically address issues related to the decline of Pacific salmon stocks or the fishery. **This paper extends the scope of the Environmental Assessment Review to consider various factors that could have contributed to the decline of wild and hatchery salmon stocks in British Columbia.** The issues considered include the effects of climate change on salmon production in the north Pacific including stocks in British Columbia, the implications of various enhancement activities, and salmon farming.

Aquaculture Coalition Submission, p. 14;
Exhibit 779, Noakes et al. *On the decline of Pacific salmon and speculative links to salmon farming in British Columbia*, 2000, p. 365

36. The BCSFA says that Dr. Dill's "Ecological Approach" touted by the Aquaculture Coalition relies on a selective quotation of literature and excessive reliance on international literature whose reliability is questionable as explained above. He ignored available quantitative evidence when stating opinions, and did not even look at the data made available to him before erroneously criticising it for being aggregated. Dr. Dill also did not interview a single person from the salmon farming industry. Given these numerous failings, it is not surprising that he was willing to accept Dr. Connors' report as "weak support" for his theory that salmon farms are related to Fraser River sockeye salmon declines. As noted in the BCSFA's submissions, Dr. Connors' long-term time series analysis is extremely problematic for a variety of reasons and should not accorded any weight.

Aquaculture Coalition Submission, p. 15;
BCSFA Submissions, paras. 154 – 171;
Exhibit 1540, *Cohen Commission Technical Report 5D - Dill, Impacts of Salmon Farms on FRSS: Results of the Dill Investigation*, June 2011 ("**Exhibit 1540, *Dill Report 5D*, 2011**"), p. 81

37. The Aquaculture Coalition says that Dr. Korman accepted a number of limitations of his approach in his testimony, although no transcript references are given. Regarding his apparent admission that he ignored "open" diagnoses, figure 5 in Exhibit 1543 *Korman Report 5A*, 2011 in fact records "No Diagnosis" and Dr. Korman himself said that he reported on open cases and that his opinion that fresh silvers were relatively healthy was based on testing:

> 25 So there is the vet himself, Dr. Korman,
> 26 suggesting that some of these cold cases, or some

> of these open diagnoses may, in fact, be infectious diseases that haven't been identified yet.
> **DR. KORMAN: Right. And that's why they're representatives sort of other or no diagnosis in -- I mean it's not like we haven't reported on that.**
> **Q No, no, absolutely you have.**
> **DR. KORMAN: Right.**
> Q But you have, I thought, today made what I thought were relatively **subjective statements** that there was lots that the fresh silvers that were audited, except for a very small percentage, were **all relatively healthy**.
> **DR. KORMAN: Well, it wasn't subjective. It was based on the 800-and-some-odd samples from the PCR testing,** which includes VHS. I think there were only two cases from the random testing of fish, I think I was referring to that, so it was very rare. So **that wasn't subjective. That was based on pure numbers**.

Aquaculture Coalition Submission, p. 15;
Korman, Transcript August 29, 2011, p. 48, ll. 25-47

38. The Aquaculture Coalition suggests the open diagnosis represents a severe underestimation of disease. As Dr. Sheppard explained, the open diagnoses means it is unlikely the fish died of an infectious agent:

> Q So when you're giving a diagnosis of an open diagnosis, you're not saying there's no disease on that farm, you're just saying there's no consistent disease across the farm; is that fair?
> DR. SHEPPARD: That's correct. Within the open diagnosis there's no significant findings, or no findings in the laboratory at all. **The open diagnosis would suggest that we're -- the fish obviously had been diseased possibly by trauma or something else, not likely an infectious agent that we found, or that we didn't find.** So we would call it an open diagnosis because we're unable to conclude why those fish, the silvers that we collected that day, may have ended up in the dead pile.
> Q So an open diagnosis could result, even though there were a number of clinical signs of possible diseases identified in the histopathology?
> DR. SHEPPARD: Again we would take all bits of evidence on that particular case into consideration, and we do make that distinction between is there a

> 19 presence of a pathogen here, is there an infection
> 20 that's evident, what are the findings on the
> 21 individual level versus what are the findings of
> 22 the population level. So the indigenous pathogens
> 23 that we do find just exist naturally in
> 24 populations. …

Aquaculture Coalition Submission, p. 15;
Sheppard, Transcript, August 31, 2011, p. 85 ll. 45 – p. 86 ll. 24 [emphasis added]

39. As noted above, Mr. Marmorek was of the opinion that the "open" diagnoses was a "fairly small proportion" in any event. Not only is it disputed whether Dr. Korman actually accepted these limits as the Aquaculture Coalition suggest, Mr. Marmorek's testimony suggests this is not the "significant underestimation" claimed, and Dr. Sheppard's testimony suggests the open diagnosis is not significant at all.

Aquaculture Coalition Submission, p. 15

40. Dr. Noakes' report is, unlike that of Dr. Dill, evidence-based rather than speculative. The suggestion that Dr. Noakes jumped to a conclusion without evidence because Dr. Stephen said no conclusion was possible with respect to the effects of pathogens from hatcheries on wild salmon shows a fundamental misunderstanding of both reports. As noted above at para. 28, Exhibit 1454, *Stephen Report 1A*, 2011 was primarily limited by the absence of both literature on the disease risks of hatcheries as well as consistent quality data collection by hatcheries, in addition to limited data on disease in wild salmon. Dr. Noakes' analysis was not limited by a lack of literature or salmon farm data, and his analysis, unlike that of Dr. Connors, did a geographic analysis of fish health events to assess risk as suggested by Dr. Stephen. Although disease data from wild fish would be helpful to determine effects on wild salmon populations, Dr. Noakes was able to conclude pathogens from salmon farms did not play a role because where they actually occurred means they are unlikely to have an effect on wild salmon populations. The lack of data on wild fish only meant Dr. Noakes was unable to say why Fraser River sockeye salmon died.

Aquaculture Coalition Submission, p. 16;
Exhibit 1454, Stephen Report 1A, 2011, p. 1-4;
Exhibit 1536, Noakes Report 5C, 2011, p. 26

41. Unlike Dr. Dill, Dr. Noakes refused to speculate on risks in the absence of information, which is why his consideration of Dr. Miller's research simply said it may or may not be relevant to salmon farms. He explained the state of her research to date, and noted that tests had not been conducted on pink, chum, or Atlantic salmon. He did not "dismiss" her research as suggested.

Aquaculture Coalition Submission, p. 16;
Exhibit 1536, Noakes Report 5C, 2011, p. 31-32

42. By suggesting that Dr. Noakes' report is "at odds" with the DFO workshop and PSC workshop which concluded that disease was a likely or very likely factor, the Aquaculture Coalition demonstrates an inability to differentiate the issue of disease in wild fish from the issue of disease in salmon farms. The fish health data produced to the Commission by the BCSFA and Province show that if disease is a likely cause of the decline of wild salmon, it is not originating from salmon farms, and is not being transmitted to salmon farms.

Aquaculture Coalition Submission, p. 16

C. Fish Health Data

43. The Aquaculture Coalition says that the record should show that along with the Province and Canada, counsel for the BCSFA "fought to protect [fish health information] from becoming an exhibit." It is again unclear what this is based on or who the intended audience is. The record clearly shows the BCSFA supported the marking of the BCSFA's fish health data as an exhibit at the time the Project 5 reports which used that data were themselves marked, thereby making them public in the context of the hearings:

> … B.C. Salmon Farmers' position, Mr. Commissioner, is that the salmon farming documents can be made public and we don't oppose them being marked as a full exhibit. They've been used by the authors of the various reports here today. Dr. Korman and others have looked at them in some detail and we think it's in the public interest that the public has access not just to the reports, but to the underlying documents. We haven't been able to come forward with that position in part because of the issue around public and private, and the various concerns of some of the levels of government has been something that my client has been respectful of, and it seems as though today we may have worked out a procedure to deal with, in particular, the province's concerns which certainly make sense on a chill effect argument, as Mr. Taylor outlined it.
>
> **So we have no opposition to B.C. Salmon Farmers fish health database becoming a full exhibit.** Thank you.

Aquaculture Coalition Submission, p. 17;
Transcript, August 26, 2011, p. 6 ll. 11-32

44. The Aquaculture Coalition alleges that witnesses persisted in the fallacy of saying that disease is not a problem on fish farms despite evidence to the contrary. The BCSFA says that the near-unanimous opinion of qualified experts testifying before the Commission is that the fish health databases show disease is not a problem in salmon farms. The Aquaculture Coalition's accusation that these experts were lying, on the basis of Ms. Morton's own inexperienced and agenda-driven interpretation, should be disregarded entirely. Characterizing the process of practicing veterinary medicine as "contrived practices" designed to "filter out any uncomfortable facts" is both misguided and wrong. As Dr. Marty explained:

> We want to report to CFIA things that are **actually**

> **43** **of concern** from our perspective as a pathologist
> 44 or as a clinician we think might be there. **To**
> **45** **report every time the fish had sinusoidal**
> **46** **congestion would not be helpful for the**
> **47** **international regulatory bodies**. That's why we're
> 1 experts. We're supposed to look at the whole
> 2 picture and come to a decision whether it needs to
> 3 be reported.

Aquaculture Coalition Submission, p. 17;
Marty, Transcript August 31, 2011, p. 60 ll. 42 – p. 61 ll. 3

45. Regarding the open diagnosis issue, the Aquaculture Coalition, despite being told by Dr. Korman and the fish health experts they are misinterpreting of the data, accuses the aquaculture industry of misleading the public by relying on diagnoses made by veterinarians. The BCSFA refers the Commissioner to sections 46 and 74 of the *Veterinarians Act*, SBC 2010 c. 15 which makes it an offence for anyone other than a registered veterinarian to perform veterinary medicine, which is defined in section 1 to include the diagnosis and treatment of animals for the prevention, alleviation, or correction of disease and other regulated services. The BCSFA, as well as Dr. Noakes and Dr. Korman, are entitled to rely on diagnoses made by the only people legally qualified to make those diagnoses. The purported 'diagnoses' of diseases by the Aquaculture Coalition based on spreadsheets which only constitute a part of the total evidence veterinarians use when making true diagnoses, should be disregarded.

Aquaculture Coalition Submissions, p. 18;
BCSFA Submissions, paras. 251, 85-86;
Veterinarians Act, SBC 2010 c. 15, s. 1, 46, 74

46. Dr. Sheppard explained that an open diagnosis can mean that while disease may be identified in an individual fish, in the context of how many fish did not die it is not relevant to the population of farm salmon as a whole. Also, as noted above at para. 38, Dr. Sheppard testified that the open diagnosis means the fish "obviously had been diseased possibly by trauma or something else, not likely an infectious agent." Despite Dr. Marty's email to Dr. Miller saying that "unknown causes" may be infectious diseases, the evidence shows that such open cases are not relevant to a consideration of population-level effects, which is what Dr. Noakes' study engaged in. The BCSFA says that Dr. Noakes' treatment of open cases, which as Mr. Marmorek noted are relatively very small, as generally benign was reasonable. Conversely, it would be unreasonable to treat 62% of open cases as unknown infectious diseases that could have population-level effects.

Aquaculture Coalition Submissions, p. 18-19;
Sheppard Transcript August 31, 2011, p. 85 ll. 3 – 86 ll. 32

47. The Aquaculture Coalition claims that if Infectious Salmon Anaemia ("ISA") is introduced it will have unknown impacts on wild sockeye salmon, and goes so far

as to claim that it "is present." The BCSFA notes that the Province dealt with ISA at length in its submissions, explaining not only that extensive testing has never detected the disease in Atlantic salmon which are extremely susceptible to it, but that Dr. MacWilliams' research showed that Pacific salmon "did not actually get sick" despite being given a "high dose of a very pathogenic strain of the virus".

Aquaculture Coalition Submission, p. 21;
Province Submissions – Aquaculture, para. 78-93

48. Regarding the claim that Dr. MacWilliams said if ISA is found in Pacific salmon in BC "it will be because of aquaculture (at a farm or by importation)", with respect that is not what she actually said. After Dr. Kent explained how emerging diseases are often first found on salmon farms having come from the wild, suggesting that if ISA were found in BC, without any further evidence, he would suspect it came from wild fish, Dr. MacWilliams disagreed. She said she would presume that in such a situation ISA would have come from a breach in biosecurity:

> DR. MacWILLIAMS: I would say that I would disagree. If ISA were detected here, I would **presume** it came from a break in biosecurity, **either at a farm level or through international transport**. I would not presume it's coming from wild fish in B.C., because there have been tests, and people have looked for ISA with very sensitive micro tests and it has not been found. So I would presume that that was an iatrogenic introduction, that a break in biosecurity somewhere along the line.

Aquaculture Coalition Submission, p. 21;
Transcript, August 23, 2011, p. 47 ll 41 – p. 48 ll. 3

49. The BCSFA says that there is a significant difference between the words "will be because of aquaculture" and "would presume it came from a breach in biosecurity". The latter clearly suggests that the presumption can be rebutted through investigation, as Dr. Kent suggested would follow in any event. Dr. MacWilliams did not conclude that ISA, if detected, "will" have been introduced into BC by aquaculture, particularly in light of other potential means of introduction and the lack of information on what pathogens already exist in the wild. Such an unqualified statement without further investigation would be completely speculative.

Aquaculture Coalition Submission, p. 21;
Transcript, August 23, 2011, p. 48 ll. 14 - 31

50. The BCSFA says that the claim that there is no formal testing program for ISA is wrong. The provincial audit tested for ISA more than five hundred times every

year between 2003 and 2009. It is misleading to compare the number of ISA tests to the number of farmed salmon present in BC annually, particularly because Atlantic salmon are extremely susceptible to ISA and would show high mortality. Furthermore, Exhibit 1567, *International Response to Infectious Salmon Anemia: Prevention, Control and Eradication, pp 26-30,* cited by the Aquaculture Coalition for a "proper" testing procedure, proposes testing approximately 60 fish per farm to determine the presence or absence of ISAv **in individual salmon farms in Atlantic North America where ISA is endemic**, and **not to detect whether ISAv is present in a region**. As explained by the Province and BCSFA, the FHASP formerly run by the Province and extensive PCR testing of Atlantic salmon, which are highly susceptible to ISA, gives a very high confidence level that ISA is not present in salmon farms in BC. There is a statistical difference between the sampling program used by the province and the "60 fish" theory for testing. The "60 fish" theory is based on testing healthy fish and finding disease, whereas the provincial audit program targeted moribund fish (sick fish) and therefore the chance of finding a disease is greatly increased (more sensitive) over testing 60 healthy fish. The addition of regional testing by the Province, and now DFO, makes the program exceed international standards.

Aquaculture Coalition Submission, p. 22;
Exhibit 1567, *International Response to Infectious Salmon Anemia: Prevention, Control and Eradication, pp 26-30;*
BCSFA Submissions, paras. 79-86;
Province Submissions – Aquaculture, paras. 89-91;
Marty, Transcript August 31, 2011, p. 60 ll. 8-13;
Exhibit 1471, *Publicly Available PCR Test Results for ISAV in BC Farmed Salmon*, 2003-2010;
Exhibit 1668, *A Review of the British Columbia Ministry of Agriculture and Land's Fish Health Audit and Surveillance Program;*
McKenzie, Transcript August 31, 2011, p. 56 ll. 7 – 41

51. There is no strong evidence for true vertical transmission of ISA, meaning within the egg as opposed to 'vertical transmission' on the surface of the egg which proper disinfection can eradicate. Drs. Kent and McKenzie, both experts and knowledgeable of egg importation, agreed with Dr. Hammell in Exhibit 1982 that the egg importation protections have reduced the risks of introducing exotic pathogens to "low to extremely low" overall, and "extremely low to remote" from 1995 onwards, including for diseases not yet discovered. Dr. Kent said, based on his own expertise, the policy significantly reduced the risks. The Aquaculture Coalition's allegation of "criminal negligence" on the part of Canada is offensive and wrong.

DR. KENT: Yes, it's extremely significant in that by
having an eggs-only policy, not allowing
importation of live salmonid fishes into the
province, that you're going to avoid a tremendous
number, variety of pathogens to enter the

> province. So that was our logic behind that. **There are vertically transmitted diseases and these are screened for** -- there is still some risk of maternal transmission either in the egg or outside of the eggs, but at least you're confining it to a much -- you're basically **narrowing the bottleneck significantly, tremendously, as far as preventing the introduction of pathogens**.
>
> So this idea of the eggs-only policy in my opinion, and the opinion of many others, is that you are **dramatically reducing the opportunity of introduction of an exotic pathogen into the province.**

Aquaculture Coalition Submission, p. 22;
Kent, Transcript August 23, 2011, p. 18 ll. 5-22 [emphasis added];
BCSFA Submissions, para. 278 citing Kent, Transcript, August 23, 2011, p. 23 ll. 1-31, and Exhibit 1982, Hammell, *Qualitative Assessment of Risk, and Mitigation of Importing Exotic Disease through Eggs, rev Aug 18 2011* ("**Exhibit 1982, Hammell, *Qualitative Assessment of Risk 2011***") PDF 2-3, 5;
Exhibit 1676, *Manual of Diagnostic Tests for Aquatic Animals 2009 - Chapter 2.3.5 Infectious Salmon Anaemia*, s. 2.3.1

52. Counsel for the Aquaculture Coalition suggested to Dr. Kent that the fish health databases showed 1,100 classic lesions of ISA. Dr. Kent replied the lesions were not pathognomonic for ISA, and that interpreting them as "ISA-like" was a misrepresentation, and that the sign of sinusoidal congestion is also a classic sign of vibriosis, which is endemic to BC. Notwithstanding this admonishment, the Aquaculture Coalition's submissions persist in reporting "symptoms consistent with ISA… 1,100 times in the fish health databases". The BCSFA adopts Dr. Kent's words in saying this is a misrepresentation of the evidence:

> DR. KENT: It's a histopathological change that's not inconsistent with ISA. **So just jumping to saying that it's ISA-like lesions is really misrepresentation of a histopathological report**, because there are many other causes of these non-specific lesions.

Kent, Transcript August 23, 2011, p. 38 ll. 39-44 [emphasis added];
Aquaculture Coalition Submissions, p. 23

53. On cross-examination by the Aquaculture Coalition, Dr. Korman testified that a fish health veterinarian is needed to properly interpret the fish health databases, as it is "not a statistical issue". Despite this caution, the Aquaculture Coalition in their submissions proposes, based on its own calculations that 2 million fish die from disease each year, and that number of symptoms detected in audits are

"significant" despite no disease having been found in most cases by the veterinarians. The Aquaculture Coalition continues to "jump" to conclusions and correlations based on their misrepresentation of the databases, which numerous witnesses such as Dr. Kent, Dr. Korman, Dr. Noakes, Dr. Marty, Dr. Sheppard, and Mr. Marmorek, told them were misinterpretations throughout the hearings. The BCSFA says that the Aquaculture Coalition's graphs and arguments about "ISA-like lesions" and "Marine Anemia symptoms" are groundless conjecture refuted by expert evidence and must be discarded.

Aquaculture Coalition Submissions, p. 24;
Korman, Transcript August 29, 2011, p. 47 ll. 21— 32;
See e.g. BCSFA Submissions, paras. 251 - 257

54. Ms. Morton identifies herself as the sole author of the Aquaculture Coalition submissions – the submissions are unsigned. Ms. Morton claims that the CFIA's response to her reporting of her suspicions of ISA were insufficient:

> The letter from the CFIA responding to **my** reporting of BCMAL ISAv lesion diagnostics suggests the sum total of their response was to call the salmon farm vets.

Aquaculture Coalition Submission, p. 25 [emphasis added]

55. The CFIA contacted salmon farms, obtained additional information, and on the basis of all the evidence concurred that there was no risk of ISA from any of those cases. As Dr. Marty said, one of the responsibilities of veterinarians is to ensure that only things actually of concern should be reported to CFIA. Ms. Morton is not only not a veterinarian qualified to diagnose disease or constrained by their professional ethics, she is an activist who testified that she is willing to say whatever she feels she needs to say to "defend" BC from the aquaculture industry. The BCSFA says this admission calls into question any evidence or arguments she has put before the Commission.

Exhibit 1666, *Aquatic Animal Health Division Canadian Food Inspection Agency Record of Decisions*, p. 1-2;
see above, para. 44;
Transcript, September 8, 2011, p. 77 ll. 46 – 79 ll. 28

56. The suggestion that emerging "new" diseases are caused by salmon farms, and that plasmacytoid leukemia is exotic and that it may have been imported, is wild speculation and a baseless allegation, particularly in light of the studies by experts in this field who concluded otherwise, which the Aquaculture Coalition expressly disregards. As explained above there are other far more likely anthropogenic means by which exotic pathogens may be introduced, some of which are noted in Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, particularly in light of the stringent controls BC has had in place for importing eggs for aquaculture purposes. As Dr. Hammell explains and Dr. Kent agrees, even diseases not yet known would be detected through screening, testing, and

quarantine process used for importing eggs as described in detail by Dr. McKenzie.

Aquaculture Coalition Submission, p. 25, section (e) Other Exotic Diseases;
Exhibit 1486, Walker, Winton, *Emerging viral diseases of fish and shrimp*, p. 16;
BCSFA Submissions, para. 278;
Exhibit 1982, Hammell, *Qualitative Assessment of Risk* 2011, *supra*, PDF 5;
McKenzie, Transcript, August 31, 2011, p. 30 ll. 2 – p. 32 ll. 13

57. Although the causative agents of exotic diseases such as Heart and Skeletal Muscle Inflammation ("HSMI") may have only recently been discovered, Dr. Miller testified that HSMI has been known and under study for over a decade. The BCSFA says that the rigorous pre-importation and post-importation testing and quarantine would detect any such pathogens before they were entered into the marine environment. Notably, Exhibit 1982, Hammell, *Qualitative Assessment of Risk* 2011, *supra* considered the risks of exotic diseases such as ISA, IPNV, Salmon Alphavirus, and HSMI, and concludes that the risk of importing these diseases is "extremely low to remote":

> … recent molecular epidemiology studies in Norway have not supported vertical transmission of low virulent ISAV with subsequent mutation to higher virulence as a source of ISA disease outbreaks (Lyngstad et al, 2011). **Although conclusions regarding vertical transmission of ISAV are difficult to make at this time, the weight of evidence suggests that it does not occur**.
> …
> The primary concern from a biologic and economic consequence perspective is the potential to introduce ISAV, IPNV, SAV (or Pancreas Disease, PD), or Heart and Skeletal Muscle Inflammation (HSMI, associated with a novel Reovirus (Palacios et al, 2010)). **As there is no evidence to support egg involvement in transmission for SAV/PD** (Rodger and Mitchell, 2007) or for HSMI (Kongtorp et al, 2006), neither is considered for its potential consequence. … Although IPNV has not been shown to cause mortality in Pacific salmon (except in rainbow trout), the virus can affect multiple species (Hill and Way, 1995), and so may represent a potentially serious, but unproven, threat to farmed or wild naïve BC salmonid populations if it were introduced and established (i.e. not detected or contained). **However, it should be noted that the quarantine practices and FHPR testing regimes mentioned previously had multiple opportunities to detect any IPNV that may have been present.**

Aquaculture Coalition Submission, p. 25;
Miller, Transcript August 24, 2011, p. 90 ll. 18-29;
Exhibit 1982, Hammell, *Qualitative Assessment of Risk* 2011, *supra*, PDF 2-4

58. The Aquaculture Coalition says that Dr. Sheppard alone evaluates the risk of fish health events on salmon farms. Dr. Marty explained that there is a "diagnostic team" of veterinarians specializing in fish health in BC:

> 30 The other point that's important here is I
> 31 just have a limited amount of information on the
> 32 farms. So I provide -- I am part of a diagnostic
> 33 team that helps diagnose animal health in the
> 34 province, so I'm providing my results to the
> 35 veterinarians, and they use their expertise, as
> 36 Dr. McKenzie described, to look at mortality
> 37 patterns and other things that he has described,
> 38 to determine is this, indeed, what we call
> 39 reportable suspicion of ISA.

Aquaculture Coalition Submission, p. 26;
Marty, Transcript August 31, 2011, p. 60 ll. 30 - 39

59. Ms. Morton fails to grasp the legal consequences of her litigation which transferred jurisdiction of salmon aquaculture in BC from the Province to Canada when she says that "Norwegian companies" – presumably referring to the BC aquaculture industry – "have constructed their own disease management process that fades completely away from public scrutiny as they step outside the government audit process" and accuses the industry of halting government access to dead fish and complaining that the provincial audit process ended. These events occurred because of Ms. Morton's own legal challenge. The BCSFA in fact acted responsibly by having an independent third party, the Centre for Aquatic Health Services ("**CAHS**"), collect and audit fish health data while the Province's involvement in regulating the industry ended and the DFO was not yet prepared to conduct audits. The contract with CAHS is no longer necessary now that DFO is running the audit program.

Aquaculture Coalition Submission, p. 26;
BCSFA Submissions, para. 76;
PPR #20, paras. 67-69, 200;
Sheppard, Transcript, August 31, 2011, p. 106 ll. 6-14

60. The Aquaculture Coalition says there have been "unprecedented requests" to Dr. Marty for PCR tests to rule out ISA. All have tested negative. This should increase the Aquaculture Coalition's confidence that ISA is not present in salmon farms, rather than suspicion.

Aquaculture Coalition Submission, p. 26

61. Two facts are presented for which the Aquaculture Coalition does not cite any exhibit or testimony, specifically the details of the memorandum of understanding for area management between BC aquaculture companies (again, calling the industry "Norwegian companies") and the cessation of egg importations in 2010.

These show the industry is acting responsibly by engaging in area management of fish health and is relying on its own genetic programs and broodstock rather than egg importations. This does not establish that aquaculture companies are responding to the threat of an exotic virus. If anything, it shows precautionary measures being implemented proactively by the industry to reduce the risk of pathogen transmission.

Aquaculture Coalition Submission, p. 27;
BCSFA Submissions, para. 125, 199, 219;
McKenzie, Transcript August 31, 2011 p. 70 ll. 22 – p. 71 ll. 10

62. The Aquaculture Coalition specifically cites Appendix VIII, page 35 of Exhibit 1594, *Finfish Aquaculture Licence 2010 Under the Pacific Aquaculture Regulations* as "the only evidence required of a disease", in order to support the conclusion that DFO will not be provided with information and there will be no transparency. This overlooks the detailed answers given by Ms. Parker in response to the cross-examination by counsel for the Aquaculture Coalition who tried several times to prevent Ms. Parker from refuting this very same suggestion. It was even suggested to Ms. Parker that "**if**" page 35 was the only reporting requirement, then it would be inadequate, which Ms. Parker pointed out is unreasonable because it is not the only reporting requirement. The BCSFA notes that in addition to sections 4, 5, 6 and 7 referred to by Ms. Parker, section 9 also requires monthly fish health reporting. The Aquaculture Coalition's assertion is therefore unsupportable:

> **Q Can we go to page 35 of that document. This is, as far as I can tell, the sum total of the obligations to report in relation to fish health events, fish health and fish mortality events.**
> Ms. Parker, you're shaking your head. Is there another part of the licence I should be looking at?
> MS. PARKER: Can we go to -- I think it's section 4 of the licence …
> …
> Yeah, so **within section 4 there is recording and reporting requirements, which have to do with fish transfer, fish health certifications**, I think that's 4.1(b)(iv), risk assessment, diagnostic reports, stock compartmentalization, biosecurity measures. I think if you scroll a bit more, then again in 4.4 there's information, fish health information, age/life, species, proposed date of transfer. Then there's the actual **Fish Health Management Plan**, and so we should probably -- and **Sea Lice Monitoring, so section 6, as well**. If you go to the **appendix related to section 5 -- oh, appendix 4, as well, is reporting requirements.** There's a lot of reporting requirements.

Q Well, the only actual document that I could find that engages what the report is, is page 35. Let's just go there.
MS. PARKER: There's --
Q Is there another appendix here that I'm missing?
MS. PARKER: Well, you asked about reporting, and there's **monthly fish health reports**, there's **fish health attestations,** all those are **embedded in the text of the documents, and they are contingent reporting.** So some of the reporting is **monthly**, some is **quarterly**, some is **event-based**.
Q Right. But fish health management, let's look at the document that has to be completed for each individual health event, at Part C. Are you saying that there's some other document that the fish farmers have to supply under the licence, relating to a fish health event?
MS. PARKER: **Relating to the fish health event, this is the actual form that needs to be filled out**.
Q Right.
MS. PARKER: **But there's supplementary information that must be provided with it**.
Q This is the form that DFO gets, and the only form that they will have to put up on their website. Under "Diagnosis" there's a small line. Now, this is -- Dr. Morton, what do you have to say about this, compared to the hundreds of pages of database that we've seen --
MS. PARKER: Excuse -- excuse me.
Q Let me come back to you, Ms. Parker.

…

MS. PARKER: **This form does not represent the sum total of information that needs to be reported in support of a fish health event, or in support of fish transfers, fish movements, all of those have fish health reporting. DFO would hold all of that information and could report on that.**

…

Q Ms. Parker --
MS. PARKER: And that wouldn't preclude reporting to CFIA, et cetera, on OIE reportable diseases.
Q You'd agree with me, wouldn't you, that this is completely inadequate for public reporting, if that's all there is.
MS. PARKER: That's not all there is, so I can't really agree with that.
Q If that's all there is, that would be completely

inadequate in your view, isn't it?
MS. PARKER: You're asking me to suppose that that would be the only thing?
Q All right. Well, **maybe you can go off tonight and figure out what extra stuff there is**, because I think we'll be seeing --
MS. PARKER: **I could run through it now**.
Q **No, no, let's go to -- let's go to Mr. Backman**. Do you agree that that's completely inadequate?

Counsel for the BCSFA and Canada objected and Ms. Parker was allowed to continue:

MS. PARKER: Well, we can start back with -- sorry, we can start back with section 4.
Q **Section 4 relates to "Transfer of Fish". I've asked about fish health events.** Could we just answer the question I've asked.
MS. PARKER: Section 4.1(b) says:

> (b) the licence holder has obtained written confirmation, executed by the source facility's veterinarian or fish health staff; that, in his/her professional judgment:
>
> (i) mortalities...

Which is the fish health concern -

> ...have not exceeded 1% per day due to any infectious diseases, [or] for any four consecutive day period during the rearing period;
>
> (ii) the stock to be moved from the source facility shows no signs of clinical disease requiring treatment;

Q **This not a fish health event, is it, it's a transfer of fish**.
MS. PARKER: **This is fish health reporting**.
Q What I'm asking for is a fish health event, a disease in your fish farm, when you have a disease outbreak, what do you have to report other than the form that we looked at on the licence.
MS. PARKER: If you can scroll down to the section where it refers to the fish health event form, which I think is -- I might not be that fast, Mr. Lunn. I think if you go a little bit farther -- so **all of section 7.1, of 7, is fish health reporting.**
Q No, **7.1 is Fish Health Record Keeping, is it not?**

> It's what the fish farmers have to keep records of, not what they have to report.
> …
> MS. PARKER: "**Undertake the following measures to determine" -- where it refers to the fish health event report, it also says that you must put the diagnostic records with it, mortality records, et cetera.**
> Q So that's it. Do you think that that's adequate, compared to the disease records that we've seen in this Commission?
> MS. PARKER: I think that **the level of fish health reporting -- the level of animal health reporting in salmon farming far exceeds that in any other food production**, and I think it's a fantastic start. I think it's very transparent, and I think **the fact that the information is -- will be available to the regulator in full, because of the detailed records that must be kept and can be provided upon request, is frankly quite robust.**
> Q You think that's robust, that's your evidence.
> MS. PARKER: Yes, I do.

Aquaculture Coalition Submissions, p. 27;
Parker, Transcript September 7, 2011, p. 92 ll. 5 – p. 96 ll. 12;
Exhibit 1594, *Finfish Aquaculture Licence 2010 Under the Pacific Aquaculture Regulations,* sections 4, 5, 6, 7, 9 and appendices

63. In the "timeline" the Aquaculture Coalition sets out, which the BCSFA says is a misrepresentation of the evidence, Ms. Morton suggests that the presence or absence of Chinook farms on the migratory route, which she suspects harbours unreported plasmacytoid leukemia, is responsible for the difference in Fraser River sockeye salmon returns of 2009 and 2010. Dr. McKinnell's report found a regime shift in 1992. As the fish health panel on August 31, 2011 explained, there have been no unreported plasmacytoid leukemia outbreaks – the signs don't lead to a diagnosis of the disease. Mr. Backman noted Chinook farms, which are not BCSFA members and were not asked by the Commission to produce data, are still located in the Discovery Island area. Mr. Marmorek criticized the Aquaculture Coalition's theory because there was no 14- or 15-fold change in fish health events between 2007 and 2008. Dr. Miller herself notes that Atlantic salmon are not susceptible to plasmacytoid leukemia, and that Chinook farms are unlikely linked to the expansion of the disease as they are "infinitely smaller" than the Atlantic salmon farming industry:

> It is clear that Atlantic salmon, the key farmed salmonid species in BC, is not susceptible to SLV. Direct challenge studies did not result in significant disease in Atlantics, and there have been no reports of mortality associated with SLV in Atlantic salmon world-wide. **The size of the Chinook aquaculture industry in**

> **BC is infinitely smaller than that for Atlantic salmon**; given the fact that broodstock for this industry is generally obtained from BC enhancement hatcheries, **it is unlikely that these small scale farming operations are directly linked to expansion of this disease.**

Aquaculture Coalition Submission, p. 30;
BCSFA Submissions, para. 15;
Province Submissions – Aquaculture, paras. 126-137
Backman, Transcript, September 7 2011, p. 84 ll. 6 – 10;
Marmorek, Transcript Sept 19, p. 79 ll. 14 – p. 80. ll. 38;
Exhibit 1523, Miller, *Epidemic of a Novel, Cancer-causing Viral Disease*, Oct 7 2009, p. 3 – 4 [emphasis added]

The BCSFA says that based on the available evidence Ms. Morton's theory stretches the limits of the imagination.

64. The suggestion that Dr. Kent and Dr. Stephen have "clearly" shown the presence of a virus is in fact contradicted by the excerpt from Exhibit 1564 that is pasted immediately above this assertion. Exhibit 1564, *Supplemental Appendices to Province of BC Annual Report Fish Health Program, 2009*, says that plasmacytoid leukemia may be caused by a retroviral infections "**and/or** an intranuclear microsporidian, *Nucleospora salmonis*." The debate is certainly not "clear", and as the Province explained, the parasite may be the more likely cause. The Aquaculture Coalition's repeated claims plasmacytoid leukemia "was proven to be a virus" are wrong.

Aquaculture Coalition Submission, p. 31, 39;
Province Submissions – Aquaculture, para. 125

65. The statement: "There is no reason to believe that salmon leukemia is any less prevalent (on Chinook farms) than it was in the 1990's" overlooks the simple fact that the size of the Chinook farming industry, as described by Dr. Miller, is "infinitely smaller" than Atlantic salmon farming, and is very unlikely to be related to the expansion of plasmacytoid leukemia. Dr. Sheppard also said that since the early 1990's they see "next to no signs of plasmacytpoid leukemia in chinook or coho salmon".

Aquaculture Coalition Submission, p. 32;
Exhibit 1523, Miller, *Epidemic of a Novel, Cancer-causing Viral Disease*, Oct 7 2009, p. 3 – 4, *supra* para. 63;
Sheppard, Transcript August 31, 2011, p. 89 ll. 39-41

66. A graph prepared by Ms. Morton an included in her submissions is titled "Marine Anemia lesions diagnosed Chinook farm salmon in DFO Region 3", even though the graph itself only presents "marine anemia symptoms". It appears that Ms. Morton is suggesting a diagnosis of marine anemia was made. Ms. Morton is not

a veterinarian and cannot herself make diagnoses, nor should she be presenting her simple counting and graphing exercises as a diagnosis of disease.

Aquaculture Coalition Submission, p. 33

D. Miller's Research

67. The Aquaculture Coalition suggests that notwithstanding all of the uncertainty and speculation surrounding Dr. Miller's research, it is "clear" that the MRS signature is associated with 'early entry'" and that early entry behaviour "goes back to 1995, began with the generation which, as smolts, were first exposed to the dramatic increase of fish farms along their migratory route." Dr. Miller testified that early entry behaviour started in 1996, meaning the brood stock was from 1992, the same year that Dr. McKinnell says a regime shift occurred in the marine environment.

Aquaculture Coalition Submission, p. 38;
Miller, Transcript August 24, 2011, p. 97 ll. 1-15;
BCSFA Submission, para. 15, citing Exhibit 1291, McKinnell et al. *Cohen Commission Technical Report 4 - Marine Ecology - Feb 2011* ("**Exhibit 1291, *McKinnell Report 4*, 2011**") p. 144

68. Dr. Miller now doubts that the MRS is plasmacytoid leukemia, as do fish health experts, which Dr. Miller is not. The Aquaculture Coalition appears to conflate these two separate issues for the purpose of relating Dr. Miller's MRS to aquaculture notwithstanding the absence of evidence. As explained by the Province and BCSFA, this is not supportable. The BCSFA furthermore says the precautionary approach is already applied to the regulation and ongoing management of aquaculture.

Aquaculture Coalition Submission, p. 39;
Province Submissions – Aquaculture, para. 124;
BCSFA Submissions, paras. 17, 263-266

69. It is strange that the Aquaculture Coalition suggests an "absence of any other change-agent of note, to which sockeye have been consistently exposed since the mid-1990's". Considering the evidence relating to regime shifts in the marine environment in 1989/1990 or 1992, evidence of changed zooplankton bloom timing since the 1980s which may be affecting hatchery returns, evidence of recent changes in the outmigration timing of numerous salmon stocks, and harmful algal blooms in the Southern Strait of Georgia that are highly correlated with long-term declines, the BCSFA says that the Aquaculture Coalition must be wilfully blind.

Aquaculture Coalition Submission, p. 39;
BCSFA Submissions at paras. 11, 15, 21-35

70. The Aquaculture Coalition cites Exhibit 1458, MacWilliams, *Update on Science Review, 2009 Fraser Sockeye* as evidence that DFO sought to "'tone down' or 'alter her views'". The BCSFA notes Dr. MacWilliams expressed concern at Dr.

Miller's "unsubstantiated assumptions" and over-interpretation of her findings, noting for instance that a fish health veterinarian should be involved in future work to avoid biased language such as "unhealthy", errors such as interpreting an anti-viral signature as a disease, and finding "lesions" that were not discerned by qualified pathologists and could have been a sampling artefact. The BCSFA says that it is not unreasonable to suggest that Dr. Miller, who is not a veterinarian, be assisted in interpreting fish health information to avoid making such errors and to avoid speculation on links to salmon farms in the complete absence of evidence.

Aquaculture Coalition Submission, p. 40;
Exhibit 1458, MacWilliams, *Update on Science Review, 2009 Fraser Sockeye*

71. It is claimed that Dr. Welch's tagging study suggests "mortality [of tagged Cultus lake hatchery salmon] occurred at least 20 to 30 days after passing the fish farms in Johnson Strait." Dr. Welch admitted that although he said 20 to 30 days in his submission, he had no idea when the tagged salmon actually died once they passed the last POST station. The BCSFA suggests that Dr. Welch was needlessly speculating on a potential link to disease from salmon farms, possibly to encourage research funding for a project, and that under oath acknowledged that the salmon could have died more than 16 months later.

Aquaculture Coalition Submission, p. 42;
BCSFA Submissions, para. 29 citing
Welch, Transcript July 7, 2011, p. 78, ll. 33 – p. 79 ll. 6

72. It is not without some irony that the Aquaculture Coalition accuses Dr. Beamish of failing to follow the scientific method by forming a hypothesis then seeking evidence to support it. Ms. Parker in fact had to teach Ms. Morton the scientific method on the witness stand:

> 43 MS. MORTON: It's the testing of hypotheses. So you
> 44 start with a hypotheses (sic) and then you go out
> 45 and you try to understand the validity of it as
> 46 best you can.
> 47 Q And --
> 1 MS. PARKER: Excuse me. I'm sorry to interrupt, but
> 2 research begins with a null hypothesis and then
> 3 you go out and try to disprove it.

Aquaculture Coalition Submission, p. 42;
Transcript, September 8, 2011, p. 73, ll. 43 – p. 74 ll. 3

73. As Mr. Marmorek testified, recent research now supports both Dr. Beamish's and Dr. McKinnell's work. Dr. Miller's genomic research also supports Dr. Beamish's theory of poor food conditions in the Strait of Georgia in 2007. It is therefore interesting to note that the Aquaculture Coalition ignores this portion of Dr. Miller's research and writes off Dr. Beamish's research entirely, and solely accepts the evidence of Dr. McKinnell. It is apparent that the inflammatory

language and accusations levelled against Dr. Beamish are unwarranted and misguided.

Aquaculture Coalition Submission, p. 43;
Marmorek, Transcript Sept 19, p. 89 ll. 33 – 90 ll. 24;
Exhibit 1294, *Beacham et al., Ocean Conditions Inside and Outside the Strait of Georgia are Important Contributors to the Fraser Sockeye Situation, April 2011* p. 44-46, 49

74. The BCSFA says that the evidence shows ocean conditions including poor food abundance and anomalous temperatures, as well as heterosigma blooms, are sufficient to explain the 2009 return. This conclusion is consistent with the various Technical Reports prepared for the Commission and expert evidence. It is not reasonable to claim that these factors merely exacerbated a hypothetical disease.

75. The Aquaculture Coalition makes several unsupportable statements in section 9 of its arguments. First, the suggestion that diseases and symptoms of diseases are "disproportionately prevalent amount (sic) Chinook farms" is not based on evidence but on Ms. Morton's inexpert and subjective interpretation of fish health data. Second, the Aquaculture Coalition claims Dr. Noakes relied on Dr. Korman's "lumping together of all farms", notwithstanding the fact that Dr. Noakes testified he did his own analysis, and furthermore that unlike Dr. Connors who did aggregate data, he did a **farm-by-farm analysis**. Third, the Aquaculture Coalition claims that "marine anemia" was present in Conville Bay and based on histopathology reports in complete disregard of multiple witnesses testifying not only that diagnoses can't be made by non-veterinarians, that a sign consistent with plasmacytoid leukemia is not sufficient to make a diagnosis, and furthermore that there was no marine anemia diagnosed at Conville Bay. Fourth, the Aquaculture Coalition claims there were no Chinook farms present in the Discovery Islands in 2008 and that they have "returned to the area", even though Mr. Backman clearly said two Chinook farms "continue to operate".

Aquaculture Coalition Submission, p. 44-45;
Noakes Transcript, August 25, 2011, p. 103 ll. 16-23,
August 26, 2011, p. 95 ll. 35 – p. 96 ll. 45;
BCSFA Submissions, paras. 251 - 255;
Province Submissions – Aquaculture, paras. 121, 126 – 137;
Backman, Transcript September 7, 2011, p. 83 ll. 41 – p. 84 ll. 10

76. The Aquaculture Coalition provides a graph showing what they say is a "remarkable spike in mortality" in Marine Harvest farms which Mr. Backman explained was due to harmful algal blooms in late 2006 and the entry of smolts into the marine environment with a corresponding mortality. The BCSFA notes that the Aquaculture Coalition has not only altered Exhibit 1985 in their submissions, noted only with "(corrected)" in the title, but also misrepresents the graph in the description saying it demonstrates "significant trends in the

symptoms diagnosed of diseases that pose large and unknown threat to Fraser River sockeye salmon". The graph is of mortalities, not diagnosed diseases, nor symptoms of disease. The Aquaculture Coalition is clearly trying to create a false impression of the evidence.

Backman, Transcript September 7, 2011, p. 39 ll. 13 – p. 40 ll. 20

E. Siting and Migratory Routes

77. The Aquaculture Coalition makes repeated assertions to the effect that there was a "complete absence of consideration of disease impacts on wild salmon" or of "potential risks within the Fraser River Sockeye migration routes." Specifically, they write: "The simple fact is that wild salmon impacts were not considered at the time of the original siting decisions (including in s. 35 of the Fisheries Act or CEAA assessments)…" This is disproven on the facts. CEAAs expressly considered risks of pathogen transmission from farmed salmon to migrating wild salmon and where scientific certainty was lacking took precautionary steps to mitigate those risks such as using FHMPs and turning off lights during migration times. These facts are summarized at length in the BCSFA's submissions.

Aquaculture Coalition Submissions, p. 47-50
BCSFA Submissions, paras. 185-192, 213-214, 217

78. The Aquaculture Coalition asserts that while FHMPs can reduce the frequency of disease in farms, that nothing in FHMPs can reduce the effects of disease on wild populations. With respect, FHMPs provide detailed management protocols for dealing with disease events and outbreaks. Vaccinating and caring for farmed salmon to prevent disease, treating farmed salmon to eradicate disease when it appears, and the mass slaughter of farmed salmon in serious outbreak situations are all measures that reduce the effects of disease transmission from farmed to wild salmon. As explained by Ms. Parker, farms have a rapid response to such events.

Aquaculture Coalition Submissions, p. 52;
BCSFA Submissions, paras. 218-219, 232, 236, 244, 324;
Transcript September 7, 2011, p. 30 ll. 13 – p. 32 ll. 15,
September 8, 2011, p. 85 ll. 45 – p. 87 ll. 33;
Exhibit 1561, *Hammell et al. S.A.D. Working Group Draft*, p. 41

79. The Aquaculture Coalition complains that aquaculture sites will not undergo CEAA assessments, suggesting this is legally "questionable", and says that "it is of serious concern to exempt farms from section 35 and any consequent CEAA." The BCSFA says that this is a further legal outcome of the BC Supreme Court's decision in *Morton v. British Columbia (Minister of Agriculture & Lands), 2009 BCSC 136* which defined salmon aquaculture as a fishery. As DFO states in Exhibit 1588, *BC Aquaculture Regulatory Program Licensing Approach*, Jun 17 2011, the aquaculture fishery is being regulated in a manner consistent with the capture fishery:

> **Consistent with the approach to capture fisheries in British Columbia**, the program has been designed so that habitat impacts are managed through the aquaculture licence with no separate Fisheries Act section 35 authorizations. As a result, in

> the context of aquaculture activities authorised under the Pacific Aquaculture Regulations, there is no longer a *Canadian Environmental Assessment Act* (CEAA) trigger associated with HADD authorisations.

According to the Federal Court of Canada and the Federal Court of Appeal, licensed capture fisheries do not require CEAA assessments or section 35 HADD authorizations. The BCSFA notes, however, that Mr. Thomson explained aquaculture sites will trigger CEAAs under the *Navigable Waters Protection Act* (Canada) and environmental impact assessments monitoring is now a condition of licence.

Morton v. British Columbia (Minister of Agriculture & Lands), 2009 BCSC 136;
Exhibit 1588, *BC Aquaculture Regulatory Program Licensing Approach*, Jun 17 2011, p. 6;
Kwicksutaineuk/Ah-Kwa-mish Tribes v. Canada (Minister of Fisheries and Oceans) (2003), 227 F.T.R. 96, aff'd. (2003), 313 N.R. 394 (F.C.A.);
Ecology Action Centre Society v. Canada (Attorney General) 2004 FC 1087**;**
BCSFA Submissions, para. 196,
citing Transcript, August 30, 2011, p. 108 ll. 7-20

80. The Aquaculture Coalition is critical of DFO's regulation of the aquaculture industry's waste under sections 35 and 36 of the *Fisheries Act* (Canada). The BCSFA notes that as Drs. Noakes and Dill both explained, waste from salmon farms pose a minimal risk to Fraser River sockeye salmon, or as Dr. Noakes said, "miniscule approaching zero". Dr. Dill similarly ruled out "lice, benthic and pelagic impacts, escapes, etc. … alone or in concert" as affecting long term declines or 2009 in particular. The BCSFA says that the Aquaculture Coalition's argument is irrelevant to the issue of Fraser River sockeye salmon returns. As explained above, aquaculture licences under the *Pacific Aquaculture Regulations* (Canada) are now used to regulate what formerly required section 35 authorizations.

Aquaculture Coalition Submissions, p. 56-60;
Exhibit 1536, *Noakes Report 5C*, 2011 p. 32;
Exhibit 1540, *Dill Report 5D*, 2011, supra., p. 34

81. The Aquaculture Coalition says that unlike Norway, BC has not established zones where fish farms are not permitted. First, the BCSFA says that a different approach is needed in BC which is geographically and oceanographically distinct from Norway, meaning migration pathways are also quite different. Second, as Mr. Backman testified while Ms. Morton was also on the stand, the Coastal Zone Management Plans put in place by the Province in fact limit the areas on the BC coast where salmon farms can be sited.

Aquaculture Coalition Submissions, p. 60;
BCSFA Submissions, para. 132;
Backman, Transcript September 7, 2011 p. 33 ll. 2-26

F. FHMPs and Pathogens

82. The Aquaculture Coalition's submissions on what they call the inadequacy of aquaculture licences and fish health management plans appear to misunderstand how the industry will be managed.

83. It is wrong to suggest that the audit process is treated as being voluntary. Exhibit 1682, *Email chain between Champagne, Mills and others, April 30, 2010* which is cited by the Aquaculture Coalition on this point, expressly says the audit process will continue, and applauds Marine Harvest Canada for submitting fish health reporting to an independent third party, CAHS, run by Dr. Saksida. In fact, the entire BCSFA contracted CAHS to continue to manage the BCSFA's fish health records during the regulatory transition. The BCSFA is unable to locate anything in the PPR#20 that suggests auditing by the regulator was voluntary.

Aquaculture Coalition Submissions, p. 62;
Exhibit 1682, *Email chain between Champagne, Mills and others, April 30, 2010*

84. The Aquaculture Coalition also overlooks the required FHMPs when it claims that section 8 of the Aquaculture licence is the only section that determines responses to fish health events and that there are no clear and enforceable standards. Consequently, the suggestion that "the sum of these provisions" is not sufficient is based on an erroneous belief that this is all that manages health events. In fact, Exhibit 1594, *Finfish Aquaculture Licence 2010 Under the Pacific Aquaculture Regulations* provide that salmon farmers must "**have in place and follow** a Fish Health Management Plan (FHMP) containing the elements listed in Appendix V." FHMPs are themselves clear, written standards for responses to diseases including outbreaks. Because a breach of the conditions of licence is an offence under the *Fisheries Act* (Canada), a failure to follow the FHMP an enforceable offence.

Aquaculture Coalition Submissions, p. 62;
Exhibit 1594, *Finfish Aquaculture Licence 2010 Under the Pacific Aquaculture Regulations* s. 5, Appendix V, p. 8, 29-30 [emphasis added];
Exhibit 1664*, Template for Development of Facility - Specific Fish Health Management Plans British Columbia Revised May 2006*, ("**Exhibit 1664, *FHMP Template 2006***");
BCSFA Submissions, paras. 70-71

85. The suggestion that there should be a "prohibition" on disease events and penalties for the transfer of disease to wild fish is unnecessary. Salmon farmers are already required to do due diligence in following FHMPs, thereby preventing disease events and transmission between wild and farmed fish, as part of their conditions of licence. Because the prevalence of pathogens in wild fish is not known and it can neither be proven nor disproven whether a pathogen has been

transferred from a wild fish to a farmed fish or vice versa, the standard proposed by the Aquaculture Coalition would be unworkable in terms of an evidentiary burden of proof. Given the testimony by numerous witnesses that the transfer of disease cannot be "prohibited", the BCSFA says it is unreasonable to suggest such a standard.

Aquaculture Coalition Submissions, p. 62

86. The Aquaculture Coalition calls the Province's constitutional power over property and civil rights under section 92.13 of the *Constitution Act*, 1982 a "purported jurisdiction". This is clearly wrong at law.

Aquaculture Coalition Submissions, p. 63

87. The Aquaculture Coalition concludes FHMPs are insufficient to protect wild salmon and that salmon farms must be removed from the migration route of Fraser River sockeye salmon. As summarized by the BCSFA, the expert witnesses testified that FHMPs and biosecurity protect wild salmon from the risk of pathogens occurring on salmon farms, and that removing farms from the marine environment is not necessary, nor justified by the evidence. Even Ms. Morton has published research showing that sea lice on salmon farms is well managed and that coordinated fallowing does not affect salmon returns. The BCSFA says that there is no credible evidence that salmon farms must be removed from migration routes, and that there is credible evidence that they pose at most minimal risks.

Aquaculture Coalition Submissions, p. 63;
BCSFA Submissions paras. 103-124

88. The Aquaculture Coalition refers to Exhibit 1684, *2004 Fish Health 2*, to state that broodstock imported from Stofnfiskur was destroyed on one occasion "seemingly because of concern regarding the presence of a virus." Other more likely explanations (supported by documents not in evidence) are that the egg quality was poor. A page later the Aquaculture Coalition goes on to exaggerate its claim that this shipment "was destroyed after hatching in BC due to viral issues not revealed." Exhibit 1684 in fact contains a letter from Mark Higgins saying the health test results were "found to be satisfactory" and that the aquaculture company could apply to import more eggs from Stofnfiskur again in the future.

Aquaculture Coalition Submissions, p. 65 - 66;
Exhibit 1684, *2004 Fish Health 2*

89. As explained above, Dr. MacWilliams did not say, and could not conclude with any certainty, that an introduction of ISA "will be because of aquaculture" as alleged by the Aquaculture Coalition – rather she was asked to state what she would presume in the absence of all other evidence. Also, with respect to the comment by Dr. Sheppard on egg importations, see the BCSFA's interpretation

on this point – his comments must be taken in context that he is aware of egg importations.

Aquaculture Coalition Submissions, p. 65;
BCSFA Submissions, para. 286

90. The suggestion that there is "no visible requirement for salmon farmers to report exotic diseases in their farms, including infectious salmon anemia" makes no sense. As explained in Canada's submissions, ISA is a reportable disease listed in the schedule to the *Reportable Diseases Regulations* SOR/91-2 under the *Health of Animals Act* (Canada). Section 5(1) of the Act clearly says that salmon farmers would have to report the presence of reportable diseases immediately. The BCSFA says the "presence" of a disease is distinguishable from a non-pathognomonic symptom being recorded in histopathology findings. Section 5(2) says that suspicions of disease are reportable by people who are qualified to make diagnoses:

> 5. (1) A person who owns or has the possession, care or control of an animal **shall notify the nearest veterinary inspector of the presence of a reportable disease** or toxic substance, or any fact indicating its presence, in or around the animal, **immediately after the person becomes aware of the presence or fact**.
>
> (2) Immediately after **a person who is a veterinarian** or who analyses animal specimens **suspects** that an animal is **affected or contaminated by a reportable disease** or toxic substance, the person shall so notify a veterinary inspector.

Aquaculture Coalition Submissions, p. 65;
Canada Submissions, para. 154;
Reportable Diseases Regulations SOR/91-2;
Health of Animals Act (Canada), SC 1990, c. 21, s. 5 (1) – (2)

91. The Aquaculture Coalition suggests that it was either inappropriate or illegal for Dr. Richards to allow the importation of eggs from a facility in Stofnfiskur, Iceland, which did not have the necessary FHPR certification. The BCSFA notes that Exhibit 1683, *2004 Fish Health 1*, which is a briefing note for the regional director, refers to section 4 of the *Fisheries Act* (Canada) which expressly contemplates granting such importations if the risks are acceptable and had been frequently used in Atlantic Canada. Dr. Richards made the recommendation to allow the importation subject to a full risk assessment under the National Code on Introductions and Transfers.

Aquaculture Coalition Submissions, p. 66;
Exhibit 1683, *2004 Fish Health 1,* p. 2-4

92. The BCSFA notes that SLICE is a therapeutant, administered through feed, and not a pesticide which would be released directly into the environment. A veterinarian is required to write a prescription for its use, and very little is released into the environment. Although potential resistance to SLICE is a concern, a number of factors have contributed to the decreased risk of sea lice developing resistance in BC. The BCSFA says that because research has demonstrated sea lice are not having an effect on wild salmon populations, the prophylactic use of SLICE to treat farmed fish should be re-evaluated to require fewer treatments. DFO should also assist the BC aquaculture industry to gain access to new therapeutants and treatments.

Aquaculture Coalition Submissions, p. 74;
BCSFA Submissions, paras. 151-152

G. Precautionary Approach

93. Were it not for the obvious disregard for the evidentiary record throughout their submissions, the Aquaculture Coalition's suggestion that DFO ignores the precautionary approach and proceeds on the basis that aquaculture "poses no disease risk to wild salmon" would otherwise be difficult to understand. As explained by witnesses including David Bevan, Sue Farlinger, Gavin Last, Dr. McKenzie, Dr. Sheppard, Mr. Thomson, Ms. Hoyseth, Ms. Dansereau, Ms. Parker, Mr. Backman and others, the DFO, the Province, and the industry all recognize that risks exist and apply a precautionary approach to regulate and manage salmon farms and mitigate against real and potential risks notwithstanding scientific uncertainty. As explained above and in the BCSFA's submissions, these risks, including cumulative impacts, have been and will continue to be considered through CEAA screenings and the new Integrated Management of Aquaculture Plans.

Aquaculture Coalition Submissions, p. 76;
BCSFA Submissions, paras. 54 – 75, 199, 217

94. Regarding Appendix "A" of the Aquaculture Coalition's submissions, it remains unclear how the Aquaculture Coalition reasonably believes it was precluded from producing independent reports to the Commission, as this was expressly provided for in the Commissions Rules for Procedure and Practice, rules 31.1 and 31.2. The BCSFA followed the contemplated procedure, gave the required notice of expert reports to all participants, and Commission counsel elected not to call any of those experts as witnesses, but permitted the BCSFA to use those reports in the hearings and notified all participants of this decision. Counsel for the BCSFA furthermore advised all participants during the hearings that it intended to have these reports adopted by the BCSFA's expert witnesses called by the Commission.

Aquaculture Coalition Submissions, p. 77-78;
Transcript, August 26, 2011, p. 91 ll. 13-29

95. Although the Aquaculture Coalition complains there was not enough time dedicated to aquaculture, the BCSFA notes that nine days of hearings is substantially more time dedicated to a single topic than most other issues. Four Technical Reports were also prepared for this topic, whereas Climate Change received a single report and two days of hearing time. The Aquaculture Coalition says there was only time to get "a few exhibits in"; whereas approximately 400 exhibits, and 367 fish health databases, were entered in the nine days of hearings on this topic alone. Although the Commissioner himself suggested this was not meant to be an "aquaculture judicial inquiry," the BCSFA says that aquaculture was more thoroughly analysed than any other factor named in the Terms of

Reference and that the evidence shows salmon farming is not a cause of the decline.

Aquaculture Coalition Submissions, p. 77-78;
Transcript, September 7, 2011, p. 58 ll. 17-24

96. Finally, as explained above, the Aquaculture Coalition's interpretation of the fish health data is inherently unreliable. Appendix "B" persists in subjectively interpreting fish health data in the absence of the necessary context and the necessary qualifications by the person purporting to diagnose diseases from those spreadsheets.

Above, paras. 53

BCSFA Reply to Aquaculture Coalition Recommendations

97. As explained above, the Aquaculture Coalition's arguments are generally not supported by the evidence. Their recommendations should be disregarded in their entirety. To be clear, the BCSFA disagrees with all of the recommendations made by the Aquaculture Coalition, including any made directly in the body of their argument and not duplicated in Appendix "D", and failure to address any of them should not be taken as agreement.

98. With respect to siting, the BCSFA disagrees with these recommendations that salmon farms should be removed from the migratory routes until further studies are conducted. The evidence does not support the removal of salmon farms. Despite years of research specifically geared to finding an effect of salmon farms, including the analysis of the Commission's Project 5 Reports, there is no evidence that any fish farms in BC are having any effects on wild salmon populations including those from the Fraser River. The Fraser River sockeye salmon runs of 2010 and 2011 are convincing evidence that salmon farms are not negatively effecting wild salmon populations in BC. Furthermore, the precautionary approach is not a zero-risk approach; adaptive management also plays a role. For example, farm salmon represent the greatest economic wealth generation from Salmon in BC and the precautionary approach must also preserve the value of farmed salmon and the economic activity created by salmon farming.

99. Regarding reporting and monitoring, the BCSFA disagrees with these recommendations. The DFO already has a rigorous system for requiring independent disease and sea lice monitoring and auditing. This DFO system of disease and sea lice monitoring needs to be extended to both wild and feral (hatchery) fish as suggested by Dr. Noakes. The availability of data on disease should be the same as for other farmed animals. Funding of various programs in DFO need to be managed by DFO. DFO already has the ability to test fish for disease without consent as part of their fish health audit program.

100. On the issue of research, the science branch in DFO does research to support management decisions. Management decisions by their nature are a hybrid of scientific information and political requirements. Fisheries allocations are an excellent example of the hybrid nature of combining science and socio-economic requirements. The vast majority of research done by DFO is research on wild fisheries and wild fisheries do not typically pay for the research. Only a small part of the DFO research budget is spent on aquaculture and the majority of what is spent is to develop scientific information for the management of aquaculture. To manage aquaculture DFO needs in-house expertise developed through active research programs. The BCSFA notes that most of the specific projects recommended are already underway. As DFO is the lead agency it must also support production-based research much as Agriculture Canada supports for other

farmed species. This research has kept Canada competitive in global markets and supported the production of affordable food, for Canadians.

101. The BCSFA disagrees with the recommendation that research conducted by DFO that shows the aquaculture industry is a low risk activity and on improving aquaculture practices should be discontinued. The BCSFA notes that DFO has a dual role for all fisheries and has had a dual role for many years. If this is to be split it would have to apply to all fisheries.

102. Considerations of sections 35 and 36 are embedded in the new aquaculture licenses. Based on the evidence which held that waste from salmon farms has not had any effect on wild Fraser River sockeye salmon populations, the BCSFA says that these recommendations are irrelevant to the issues being considered by the Commissioner. The BCSFA says that following the *Morton* decision, no longer applying section 35 of the *Fisheries Act* (Canada) to aquaculture is consistent with DFO's approach to regulating aquaculture as a fishery, through the conditions of licence.

103. Regarding the recommendation to prohibit disease transfer, for the reasons explained above, the BCSFA disagrees. No animal rearing systems, including the DFO enhancement systems, have such requirements. Pathogen exposure is a complex issue which cannot be managed with this simplistic approach. For example, DFO purposefully releases fish known to be sick from hatcheries and many smaller enhancement activities have no disease programs meaning the risk of disease transmission is a complete unknown. As all diseases detected in farmed salmon by the Project 5 reports and the fish health veterinarians are endemic, any program to attempt to manage pathogen exposure would have to be inclusive of all sections of the fishery not just farmed salmon.

104. Egg importations should be continued, but limited to ISA-free sources (Iceland) and continue to be subject to strict screening at source and quarantine in Canada to prevent introduction of ISAv.

9. Conservation Coalition

105. The Conservation Coalition attaches to its written submissions an Appendix criticising PPR #20 – Aquaculture Regulations. Many if not all of the Ringtail database documents referred to in that appendix are not marked as exhibits. The BCSFA says that this is an inappropriate attempt to put new evidence before the Commissioner after the close of evidence. Consequently, the entire appendix should be disregarded.

106. The BCSFA agrees with the Conservation Coalition's recommendation that Exhibit 8, *Canada's Policy for the Conservation of Wild Pacific Salmon* ("**Exhibit 8, the *Wild Salmon Policy***") be implemented, and that funding should be found to assist such implementation.

Conservation Coalition Submissions, paras. 14, 16;
BCSFA Submissions, para. 315

107. The Conservation Coalition suggests that DFO waits for a "full suite of information on CUs prior to taking action" and suggests that a precautionary approach should be taken with respect to aquaculture and fishing impacts. As noted in the BCSFA's submissions and above, a precautionary approach is already taken with respect to aquaculture, and actions are regularly taken by both government and the industry to mitigate risks notwithstanding an absence of absolute scientific certainty. The Conservation Coalition's assertion is unsupportable.

Conservation Coalition Submissions, para. 19;
BCSFA Submissions, Part II.A. – B

108. The Conservation Coalition recognizes that salmon aquaculture as well as capture fisheries are both industries which DFO both regulates and enables. However, the BCSFA disagrees with the characterization of the DFO's mandate with respect to aquaculture as "promotion". As explained by Mr. Swerdfager, aquaculture funding programs such as the Sustainable Aquaculture Program have a "strong environmental regulation component" and focus on third-party certification and sustainability. Furthermore, the federal *Aquaculture Policy Framework*, Exhibit 216, clearly explains how DFO will "enable" the industry:

> Enabling means improving the business climate for aquaculture development, to benefit Canadians. DFO will do this by:
>
> - ensuring that DFO's laws and regulations relating to aquaculture are clear,
> - efficient, effective, consistently applied and relevant to the sector;
> - investing in aquaculture science and research and development;
> - working in partnership with provinces and territories to develop a proactive siting process; and

> ■ considering support for industry development programs consistent with DFO's mandate and objectives.
>
> DFO will play an important role in aquaculture development by using this policy framework to help increase both sector competitiveness in global markets and the public's confidence that aquaculture is being developed in a sustainable manner…

Conservation Coalition Submissions, para. 23;
Swerdfager, Transcript August 30, 2011, p. 84 ll. 3-27;
Exhibit 216, Aquaculture Policy Framework, p. 5

109. Mr. Bevan and Ms. Dansereau also expressed the opinion that the *Morton* decision eliminated the need of having two separate federal agencies regulating and enabling the aquaculture industry. In their opinion, the DFO is now best positioned to fulfil both roles. Like capture fisheries, aquaculture :

> 6 MR. BEVAN: Yes, I think at that time there was a
> 7 debate going as to how we should be structured in
> 8 terms of the management. I think we've dealt with
> 9 that debate. **The determination in B.C.,**
> **10 particularly aquaculture as a fishery, has brought**
> **11 some of that to a conclusion**. The other issue is
> 12 that we look at the **management of aquaculture,**
> **13 wild fisheries and all of the other ecosystem**
> **14 responsibilities of the Department as an**
> **15 integrated whole.** We are looking at the use of a
> 16 marine ecosystem by various users, whether they're
> 17 extracting wild fish or growing aquaculture fish,
> 18 they're all having an impact on the ecosystem, and
> 19 we think it's better to have one regulator, and
> 20 that's we we've landed on the Department of
> 21 Fisheries maintaining the responsibility.

Bevan, September 26, 2011, p. 54 ll. 6-21

110. The Conservation Coalition suggests that the DFO fails to implement precautionary measures despite "substantial evidence" of "serious risk" posed by salmon aquaculture. The BCSFA disagrees. Not only does the evidence show few risks to wild salmon, but those risks are regulated and managed according to the precautionary principle.

Conservation Coalition Submissions, para. 40;
BCSFA Submissions, para. 133-152, Part II

111. The BCSFA says that salmon farms are continuously working to improve feed conversion rates and diminish the release of waste into the benthic environment. The BCSFA also notes that the Conservation Coalition overstates the comments made by Dr. Rensel with respect to the possibility that nitrogen particles from

salmon farms may end up in heterosigma. He said that the most harmful algal blooms are in areas without salmon farms, that salmon farms are unlikely to be located in bays where blooms often begin, and agreed with a paper which counsel for the Conservation Coalition put to him while preventing him from reading into the record the paragraph that explains it is the responsibility of every scientist to ensure that people understand that natural processes far outweigh the anthropogenic contributions in terms of causing heterosigma blooms.

Conservation Coalition para. 41;
BCSFA Submissions, paras. 212, 31-36

112. The Conservation Coalition quotes the same papers from international jurisdictions as does the Aquaculture Coalition. As described above, Dr. Kent called the paper specifically quoted by the Conservation Coalition, Exhibit 1482, *Examples of emerging virus diseases*, supra, "slightly incorrect" and "sensationalized". Those papers are not as useful in assessing the risks of salmon farming to wild salmon as the analysis of Dr. Noakes who specifically looked at data from salmon farms in BC and concluded that farms are unlikely to have caused the Fraser River sockeye salmon declines.

Conservation Coalition Submissions, para. 42;
Above para. 12;
Exhibit 1536, Noakes Report 5C, 2011

113. The Conservation Coalition suggests that "management decisions must comprehensively address the potential for horizontal and vertical transfer" of diseases, noting that disease is considered among the primary likely causes for the decline. As explained throughout the submissions of the BCSFA, management decisions are regularly made and both the Province and Canada provide a comprehensive program to address and minimize the risks of disease. Aquaculture companies use vaccinations, broodstock screening, husbandry, and siting farms in well-flushed areas to improve fish health on farms as well. Furthermore, an important distinction must be drawn between disease in wild versus disease in farmed fish – the latter is easily monitored and has been thoroughly reviewed by the Commission's Project 5 reports, and cannot be said to be related to the 2009 decline. In light of the empirical evidence, if disease remains a likely primary cause it did not occur on the salmon farms. As summarized by Canada:

> Also important, are multiple year surveys, data sets and scientific research on both farmed fish and wild stocks. The state of the science for understanding pathogens and disease on farmed fish is better than for wild stocks. Farmed fish are easier to study. Wild stocks are largely invisible to scientists and fish managers from the time they leave the river, or at least the inside marine areas, until they return two years later. The ocean is large, the fish migrate and it is difficult and expensive to track them. In many ways, information on farm fish health serves as a real-time

> marine laboratory and proxy for understanding the effects of sea lice and pathogens on wild stocks.

Canada Submissions, para. 676;
BCSFA Submissions, Part II. B-D, III. B-D; para. 302

114. Dr. Richards agreed that, if there is an "unnatural density", it is possible that salmon farms could amplify disease, but said that "disease could also be amplified by other stocks, like herring, which are in schools and in that area." The question posed presupposes disease occurring on salmon farms and posing a risk to wild salmon. The analyses of Dr. Korman, Dr. Connors and Dr. Noakes, and the testimony of the fish health veterinarians, shows that this assumption is inaccurate and that salmon farms are not correlated to sockeye declines. High risk fish health events are rare occurrences, have not occurred on the migratory route, and are easily detected and quickly dealt with pursuant to FHMP protocols to prevent disease transmission. As Dr. Kent's report Exhibit 1449 explained, and Dr. Johnson confirmed, "the mere presence of a virus does not constitute presence of a disease state". Not only does Dr. Garver note that diseases such as IHN are quickly killed by ultraviolet light, but the international Salmon Aquaculture Dialogue Working Group on disease commends BC's approach to managing fish health of salmon farms on an area basis as a condition of licence as an effective means of preventing disease transfer notwithstanding the potential widespread dispersal of pathogens. Although the occurrence of a fish health event on a salmon farm does not necessarily pose any risk to wild salmon, salmon farms are managed and regulated as though they do.

Conservation Coalition Submissions, para. 44;
Richards, Transcript September 26, 2011, p. 71 ll. 13-15;
Exhibit 1449, *Cohen Commission Technical Report 1 Infectious Diseases and Potential Impacts on Survival of Fraser River Sockeye Salmon*, ("**Exhibit 1449, *Kent Report 1,* 2011**") p. 5;
Johnson, Transcript August 22, 2011, p. 20 ll. 37 – p. 21 ll. 2;
Exhibit 1518, *Garver, Hypothesis - Diseases in Freshwater and Marine Systems*;
BCSFA Submissions para. 223, citing Exhibit 1561, *Hammell et al., Salmon Aquaculture Dialogue - Working Group Report on Salmon Disease, Draft Mar 3 2009,* p. 42

115. The Conservation Coalition claims that sea lice could be a significant cause of mortality of wild salmon based on Exhibit 1571, Costello, *How Sea Lice from Salmon Farms May Cause Wild Salmonid Declines in Europe and NA and Be a Threat to Fishes Elsewhere*, Jul 8 2009. Exhibit 1571 is written from a European perspective, and expressly thanks Ms. Morton and Dr. Krkosek for providing the author with information and suggestions on drafts of the paper. The papers cited on BC include Exhibit 1487, Ford & Myers, *"A Global Assessment of Salmon Aquaculture Impacts on Wild Salmonids* which Dr. Beamish, Dr. Noakes, and Dr. Saksida agree is flawed in a number of respects. The study by Krkosek and

Morton in 2007, which predicted the extinction of pink salmon due to sea lice, was severely criticised by numerous scientists, including Dr. Farrell who peer-reviewed Dr. Noakes' report, noting that Ms. Morton as one of the co-authors in fact excluded information on shedding rates of sea lice from that paper which she herself had published on. As explained by Dr. Noakes, it was "biased" and has since been "proven to be wrong". Dr. Krkosek and Ms. Morton, along with Dr. Connors and Dr. Dill, published Exhibit 1556, *Krkosek et al, Effects of Parasites from Salmon Farms on Productivity of Wild Salmon, 2010*, which as Dr. Noakes noted was not co-authored by any fish health professionals, and which Dr. Saksida and Dr. Jones severely criticised for numerous inconsistencies, erroneous assumptions, and generally making "no biological sense". The BCSFA says that Exhibit 1571 should be given no weight. Exhibit 1555, Marty et al. *Relationship of Farm Salmon, Sea Lice and Wild Salmon Populations*, 2010 ("**Exhibit 1555, *Marty et al., Relationship of Farm Salmon*, 2010**"), written by Dr. Marty and Dr. Saksida, found no population-level effects from sea lice, and was approved by Dr. Beamish and Dr. Noakes as the right way to do an analysis.

Conservation Coalition Submissions, para. 45;
Exhibit 1571, Costello, *How Sea Lice from Salmon Farms May Cause Wild Salmonid Declines in Europe and NA and Be a Threat to Fishes Elsewhere*, Jul 8 2009, p. 6;
Exhibit 1536, Noakes Report 5C, 2011, supra, p. 17-18, 99;
Exhibit 1556, *Krkosek et al, Effects of Parasites from Salmon Farms on Productivity of Wild Salmon, 2010;*
BCSFA Submissions, paras. 203-208;
Exhibit 1555, Marty et al., *Relationship of Farm Salmon*, 2010, supra

116. Relying on Mr. Price's testimony, the Conservation Coalition also claims "sea lice pose a significantly high risk to wild salmon stocks". Both Dr. Saksida and Dr. Jones testified that sea lice pose a low to moderate risk. Dr. Orr himself agreed that sea lice only pose a low to moderate risk. Based on the discussion of sea lice as a disease vector Dr. Orr said salmon farms may pose a "fairly high risk if we really don't control disease on salmon farms", but as the BCSFA observes, sea lice are not an effective disease vector, that disease is controlled on salmon farms. As Dr. Jones explained, Dr. Dill misunderstood the literature regarding sea lice as a disease vector, meaning Dr. Orr should not have based his opinion on Dr. Dill's report on this issue. This means that Dr. Orr concurs that sea lice pose a low to moderate risk and salmon farms are not a high risk. Furthermore, both Dr. Dill and Dr. Noakes concluded that sea lice have not affected Fraser River sockeye at a population level.

Conservation Coalition Submissions, para. 45;
Jones, Orr, Saksida, Transcript September 6, 2011, p. 24 ll. 7 – p. 25 ll. 24;
BCSFA Submissions paras. 165-171;
Jones, Transcript, September 6, 2011, p. 26 ll. 47 – p. 27 ll. 27;

117. The BCSFA notes that the Conservation Coalition refers to Mr. Chamut's testimony that the siting of salmon farms can be problematic. The BCSFA notes that Mr. Chamut was referring to actual sites with identified problems, and not a general principle that farm siting is problematic. As Gavin Last explained, the Province identified a number of older sites for assessment and potential relocation, and worked with the industry to improve the siting of those sites when the moratorium was lifted, and changed the operations of the rest to meet the regulatory requirements. Given the improvements in scientific knowledge and site design noted by Ms. Hoyseth, the BCSFA Mr. Chamut's comments should not be misapplied or misinterpreted as a blanket statement.

Conservation Coalition Submissions, para. 46;
BCSFA Submissions, para. 194, 63, 73;
Last, Transcript, August 30, 2011 p. 51 ll. 3 – 33;
Hoyseth, Transcript September 1, 2011, p. 22 ll. 12 – 23,
p. 22 ll. 37 – p. 23 ll. 26

118. The Siting criteria have been in a constant state of improvement and reassessment. It is important to understand that the siting criteria is only an initial screening tool for the aquaculture industry to select potential sites where they then conduct extensive environmental research and collect baseline information to determine if the site is appropriate for a salmon farm and would pass an environmental assessment. Mr. Thomson and Ms. Dansereau said it is a minor document relative to the environmental assessment process. As explained by Ms. Parker, it is expected that the siting criteria will be revised under DFO using an adaptive management approach. As the BCSFA explained, the migratory route of wild salmon is considered and the presence of salmon farms on the migratory route has not contributed to the decline of Fraser River sockeye salmon.

Conservation Coalition Submissions, para. 47;
BCSFA Submissions, paras. 185 – 189, 40, Part III

119. The Conservation Coalition interprets Exhibit 8, the *Wild Salmon Policy*, as requiring aquaculture to undergo CEAA screenings under section 35 of the *Fisheries Act* (Canada), and suggests that DFO is failing to meet "the requirements" of the WSP because aquaculture sites will no longer trigger section 35 authorizations. The BCSFA says that this page in the WSP described how aquaculture was regulated at the time of the drafting of the WSP, and does not itself create any new obligations over and above the statutory regime. As explained above, DFO plans to regulate the aquaculture "fishery" – so defined by the *Morton* decision – in a manner consistent with the commercial fishery. Legally, licensed commercial fisheries do not trigger CEAAs pursuant to section 35. Aquaculture sites will trigger CEAAs under the *Navigable Waters Protection Act* (Canada) and ongoing environmental impact assessment and monitoring is now a condition of the aquaculture licence.

Conservation Coalition Submissions, para. 48;
Above at para. 77

120. The BCSFA observes that both Exhibit 1536 and 1540, the reports of Dr. Noakes and Dr. Dill respectively, found no correlation between disease of salmon farms and population level effects on Fraser River sockeye salmon. The Conservation Coalition refers to the "potential" risk of disease while ignoring the actual quantitative evidence. As explained in the BCSFA's submissions, the precautionary approach is used alongside adaptive management to regulate and manage the industry, and there have been several comprehensive assessments including the Salmon Aquaculture Review and the Cohen Commission's Project 5 reports, which conclude salmon farms pose a low overall risk.

Conservation Coalition Submissions, para. 49;
BCSFA Submissions, paras. 40, 44 – 59, 65, 119, 127

121. The aquaculture industry has historically been found to have a high rate of compliance with regulatory requirements. Mr. Thomson attested to the industry's reputation for this high level of compliance as described to him by provincial agencies during the regulatory transition. Reports by the Province also show this fact. The BCSFA disputes the claim of "widespread non-compliance".

Conservation Coalition Submissions, para. 53;
Thomson, September 1, 2011, p. 47 ll. 24-44;
Exhibit 1716, *BC MAL and BC MOE, Regulatory Compliance of British Columbia's Marine Finfish Aquaculture Facilities 2009*, p. 5

122. As the BCSFA explained in its submissions, the precautionary approach is used in regulating and managing aquaculture. All impacts associated with farmed salmon are assessed and managed by DFO according to acceptable principles of risk management. Mr. Thomson for example said that risk management principles underlie the policies implemented by the DFO. The BCSFA says that the expansion of the aquaculture industry will not increase the risk to wild salmon.

Conservation Coalition Submissions, para. 56;
BCSFA Submissions, part II.B;
Thomson, September 1, 2011, p. 34 ll. 25 – p. 36 ll. 7;
Exhibit 1710, *Framework for Aquaculture Environment Management (FAERM)* v3.0, 2008

123. As explained in the BCSFA's submissions, removal of salmon farms is not justified based upon the assessment of risk to wild salmon by the Commission's Project 5 reports, the fish health data, or the current state of knowledge. Numerous experts testified that such an action is not required considering the evidence that is available, and that proper management of fish health through FHMPs, biosecurity, and area management will be effective in reducing risks of pathogens to wild fish.

Conservation Coalition Submissions, para. 57;
BCSFA Submissions, part II.D.3

124. Given the low risks of salmon farming to wild salmon and the stringent regulation and management, industry expansion is supported and appropriate. Proposing to stop the expansion of the aquaculture industry indefinitely based on literature from other jurisdictions which is "sensationalized", "slightly incorrect", based on biased information supplied to the author by activists, and is in any event of limited value when quantifying risks in BC is advocating a zero-risk approach which is inconsistent with the precautionary approach. The weight of credible evidence expert evidence is that salmon farms pose little risk, and they provide substantial socio-economic benefits to coastal communities and the provincial economy. The BCSFA notes that the Wild Salmon Policy itself necessitates a weighing of such factors.

Conservation Coalition Submissions, para. 58;
BCSFA Submissions, paras. 116-118, 90-102

125. The Conservation Coalition quotes Exhibit 1496, *Saksida, Infectious Haematopoietic Necrosis Epidemic in Farmed Atlantic Salmon, Oct 27 2006* to say that there is "strong evidence that farming practices significantly contribute to the spread of disease". Dr. Saksida, author of Exhibit 1496, herself said that Dr. Garver's work showing IHN is deactivated quickly in the marine environment has "countered" her opinions in that paper. Exhibit 1496 also credits improved farm practices, namely single year class stocking and fallowing, for limiting IHN outbreaks to a single occurrence per farm in 2001 to 2003 whereas there had been second occurrences of outbreaks in the 1992-1996 period. The BCSFA notes that FHMPs have been implemented since 2003 with no further IHN outbreaks. As summarized in the BCSFA's submissions, Dr. Garver's research shows aquaculture has not altered the prevalence of diseases such as IHN in regularly-monitored wild stocks. Furthermore, Drs. Noakes and Dill did not find a correlation with salmon farms and the decline of Fraser River sockeye salmon. Dr. Noakes did a thorough analysis of fish health data and concluded that salmon farms have not significantly contributed to the spread of disease. The BCSFA therefore says that no credible evidence was presented to support contention that salmon farming practices contribute to the spread of disease.

Conservation Coalition Submissions, para. 61;
Saksida, Transcript September 6, 2011, p. 104 ll. 24 – 37;
Exhibit 1496, *Saksida, Infectious Haematopoietic Necrosis Epidemic in Farmed Atlantic Salmon, Oct 27 2006*, p. 221;
BCSFA Submissions, para. 212, 238-39, 127

126. The BCSFA agrees with the Conservation Coalition that Dr. Miller's research must move ahead as suggested.

Conservation Coalition Submissions, para. 62

127. The BCSFA says that the weight of evidence is that ISA is not transmitted vertically within fertilised eggs. This is established both by Dr. Hammell's report Exhibit 1982, *Formerly for ID OO - Hammell, Qualitative Assessment of Risk, and Mitigation of Importing Exotic Disease through Eggs, rev Aug 18 2011*, noted above at para. 51, Exhibit 1676, *Manual of Diagnostic Tests for Aquatic Animals 2009 - Chapter 2.3.5 Infectious Salmon Anaemia*, and Exhibit 1483, *Robertsen et al, Can we get the upper hand on viral diseases* which says:

> …The recent outbreaks of ISA in Chile have increased worries about the transmission of viruses via fertilized eggs. Although **the survival of viruses within salmon eggs has yet to be proven**, this cannot be excluded… Viruses may thus spread with fertilized eggs that have not been successfully disinfected or possibly within eggs. **Both events are likely to be rare in modern aquaculture,** but the transfer of salmonid viruses between continents demonstrates that egg-associated transmission has occurred. Sequence analyses of genes from Chilean ISAV isolates obtained in 2007 and 2008 suggest that these ISAV strains have a European origin and therefore must have been introduced to Chile via embryos. **Whether this has happened in connection with aquaculture is, however, uncertain**. …
>
> To be on the safe side, precautions against vertical transmission need to be taken. **Disinfection of fertilized eggs is now a routine practice**, but screening of juveniles for virus may also have to be considered. **Virus-free broodfish stocks should be cultured** and the parental fish must also be examined for the presence of virus or viral genes before the eggs are released onto the market.

The BCSFA notes that Stofnfiskur, Iceland, uses virus-free broodstock and does not itself import broodstock, and that Iceland remains ISA-free. Egg importations should be limited to ISA-free sources (Iceland) and continue to be subject to strict screening at source and quarantine in Canada to prevent introduction of ISAv.

Conservation Coalition Submissions, para. 63;
Exhibit 1982, *Hammell, Qualitative Assessment of Risk, 2011*, supra PDF 2-3;
Exhibit 1676, *Manual of Diagnostic Tests for Aquatic Animals 2009 - Chapter 2.3.5 Infectious Salmon Anaemia*, s. 2.3.1
Exhibit 1483, *Robertsen et al, Can we get the upper hand on viral diseases*, p. 129;
Exhibit 1683, 2004 Fish Health 1, p. 2
Above, para. 51

BCSFA Reply to Conservation Coalition Recommendations

128. The Conservation Coalition's recommendation to remove salmon farms from the marine environment is not supported by the evidence and is not required by the precautionary principle. Experts called before the Commission said the evidence does not require draconian management actions. Mr. Price of the Raincoast Conservation Foundation, a member of the Conservation Coalition, said he would not condemn the industry based on everything that is known.

Conservation Coalition Submissions, para. Rec iv.1;
Above, para. 123;
BCSFA Submissions, para. 111 citing Price, Transcript September 6, 2011, p. , p. 101 ll. 36 – p. 102 ll. 6

129. The Conservation Coalition's recommendation to halt new farm sites or replacement of poorly located farms is not reasonable. Forcing the industry to remain in existing sites only prevents the ongoing improvement and mitigation of impacts arising from ongoing research and siting practices. Furthermore, the evidence shows that closed containment is financially non-viable and may not be technically capable of supporting grow-out production of farmed salmon. As Dr. Noakes said, "the evidence certainly from a disease risk perspective doesn't warrant that kind of drastic action."

Conservation Coalition Submissions, para. Iv 3;
Backman, Transcript September 7, 2011, p. 56 ll. 26 – p. 57ll. 33;
BCSFA Submissions, para. 115
D. Jackson, *Perspective on the Technical Challenges Associated with Closed System Aquaculture for Grow-out of Salmon in BC*, 2011, p. 1, 4;
Exhibit 1841, *Fisheries and Oceans Canada, Feasibility Study of Closed-Containment Option for British Columbia Aquaculture Industry, Sept 2010* , p. vii, 11;
Noakes, Transcript August 29, 2011, p. 78 ll. 41 – p. 79 ll. 1

130. The Conservation Coalition suggests cutting funding to the aquaculture industry and redirecting funds to closed containment alone. The BCSFA says that the funding of research to improve the sustainability of the aquaculture industry is consistent with DFO's conservation mandate, and should be continued. The BCSFA proposes ongoing research to assess risk and develop mitigation and management approaches to impacts should continue to receive funding; assessment and trial of closed containment technologies should be funded as budgets allow this.

Conservation Coalition Submissions, iv.4;
Canada Submissions para. 670

131. Regarding organic certification, Ms. Stewart of the Coastal Alliance for Aquaculture Reform gave her perspective that seeking this certification should be discontinued. There has been no other evidence brought forward to support this recommendation. The BCSFA notes that the DFO played an "essential role" in the process of assisting the commercial salmon fishing industry obtain Marine Stewardship Counsel certification and says that there is no reason why the DFO should not also play a role in assisting in the certification of the aquaculture industry.

Conservation Coalition Submissions, para. iv.6;
Grout, Transcript, Janurary 21, 2011, p. 71 ll. 29-33]

132. The BCSFA submits that fallowing a farm for 12 months or more should not result in a loss of licences and tenures. Fallowing periods are highly dependent on environmental variables and the industry should not be forced to operate a farm in the possible contravention of the conditions of licence, thus risking prosecution under the *Fisheries Act* (Canada) for the sole purpose of maintaining its licence.

Conservation Coalition Submissions, para. iv.7.

133. The BCSFA says that egg importations pose low to extremely low risks of importing exotic diseases. Imports should continue to be permitted, provided that they come from regions that ISA-free and that follow a rigorous disinfection and quarantine process.

Conservation Coalition Submissions, para. iv.8;
Above, para. 127

134. The Conservation Coalition submits that the "potential linkages to fish farming should not be ruled out as a potential cause for the decline" and suggests removing salmon farms from the Fraser River sockeye salmon migration route. The BCSFA says that the Conservation Coalition is misapplying the precautionary approach and fails to acknowledge adaptive management actions regularly taken by government and industry, the strong support by fish health experts who testified that FHMPs and biosecurity effectively minimize the risks, and the Project 5 analyses which determined that those measures are effective. This recommendation is not supported by the evidence.

135. The Conservation Coalition also seeks to introduce new evidence in its Appendix B critiquing the Policy and Practice Report #20 on Aquaculture Regulation. Instead of citing exhibits, the Conservation Coalition provides Ringtail document identification numbers and hyperlinks, in some cases states facts and opinions that are clearly not in evidence, such as regarding the treatment of bloodwater, or offers opinion and facts with no support whatsoever. Although the BCSFA only did a brief search of several of these cited documents in the Commission's exhibits, it is apparent that most, if not all of these documents referred to are not

in evidence, otherwise an exhibit number would undoubtedly have been provided. In one instance a personal communication from Byron Andres, DFO Senior Biologist is cited with no reference to a exhibit number or Ringtail number. The comments are also highly prejudicial, for example, the Conservation Coalition refers to the lethal control of predators by Marine Harvest and alleges the company did not have a proper licence when it killed two predators. The Commissioner's ruling of October 11, 2011 permitted participants to make written submissions on PPRs during final submissions, but did not permit the participants to introduce new evidence in these critiques. The BCSFA says that the Conservation Coalition's attempt to introduce new evidence in this Appendix is highly prejudicial to other participants, and should be disregarded entirely.

Conservation Coalition, p. 44-49;
Commissioner Cohen, Ruling on Disposition of Documents Marked for Identification, October 11, 2011, paras. 42-43

10. Area D Salmon Gillnet Association & Area B Harvest Committee (Seiners) ("SGAHC")

136. Dr. Miller's research remains preliminary and is not as conclusive as the SGAHC presents it to be, nor has Dr. Miller linked the MRS to "viral activity associated with leukemia." This appears to be a common misunderstanding that Dr. Miller attempted to clarify in her testimony. As noted in the submissions of the Province, the MRS is not plasmacytoid leukemia.

SGAHC Submissions, p. 61

137. The SGAHC refers to "Exhibit 1986, *Exhibit 1986, Marmorek et al, Cohen Commission Technical Report 6 - FRSS: Data Synthesis and Cumulative Impacts, Apr 2011*" in its arguments regarding the "plausible concern" of pathogen transfer from salmon farms. The BCSFA notes that this comment in fact appears in Exhibit 1575, Marmorek et al, *Addendum, Technical Report 6: Implications of Technical Reports on Salmon Farms and Hatchery Diseases for Technical Report 6 (Data Synthesis & Cumulative Impacts)*, Jul 29 2011 ("**Exhibit 1575, Marmorek et al, *Addendum, Technical Report 6***"). Exhibit 1986, *[Formerly For ID ZZ] - Lewis re Kent's Infectious Diseases and Potential Impacts on Survival of FRSS, Aug 10 2011 - [cf Exh 1449]* ("**Exhibit 1986, *Lewis re Kent's Infectious Diseases* 2011**") is a report prepared by Dr. Ron Lewis for the Commission explaining how the "high risk" pathogens identified by Dr. Kent are managed on salmon farms and explaining why salmon farms pose little risk to wild salmon from a disease transfer perspective.

SGAHC Submissions, p. 63;
Exhibit 1575, Marmorek et al, Addendum, *Technical Report 6, 2011*, p. 13;
Exhibit 1986, *Lewis re Kent's Infectious Diseases,* 2011

138. The SGAHC's criticisms of Dr. Noakes have little merit. *The* BCSFA observes that Dr. Dill is not an expert in statistics, did not analyse or even look at the available data, and his opinions on the low statistical power carry no weight. Dr. Noakes' explanation regarding the very strong statistical power that the contrast between the 2009 and 2010 Fraser River sockeye salmon returns provides, as explained above, must be preferred. Dr. Noakes furthermore approached the issue from an objective and scientific perspective whereas Dr. Dill testified he approached the project with the belief he would find evidence implicating salmon farms in the decline. Dr. Noakes' report should be given substantially more weight than that of Dr. Dill. The BCSFA will not repeat the criticisms of Dr. Connors' approach already summarized above and in the BCSFA's Submissions. As explained by Dr. Noakes, the high contrast in the 2009 and 2010 returns is a "unique" situation in a short time series which proves a "very powerful" statistical analysis:

> 22 We have in **2009 the lowest returns on record**
> 23 or very near the lowest returns on record. And in

2010, although we may not know the exact number, they're certainly one of the highest on record. So we have **a unique situation here. Even though it's a short one, you have a bit more power in terms of an ability to look at the relationship simply because we're looking at the extremes**, at both the high and the low. So **if we're going to see some sort of a signal associated with aquaculture or something else, then you should be able to see it when you're looking at those extremes** because, as I say, most of the time when you're limited with a short-term time series, you're dealing with things right around the mean and you don't have a lot of ability to try and see those signals. **But if there was something that caused the huge decline in 2009, it should jump out at you.**

And the same thing would happen in 2010 in terms of a large return. **Even though we don't know exactly what the number is, we know it was very large. So again, what changed to give us that kind of high contrast that we see in the two returns from those two years?** It's a unique situation. As I say, most of the time when you only have three or four years of data, the data points are typically closer to the mean and you don't have that kind of high contrast to actually look and see what the signal might be. So it's **very powerful and it's very unique** and it gives us **a lot more information simply because we've got that huge range.**

Q And do you also agree that the juxtapositioning is important as to 2007 and 2008, the outgoing years, and in terms of whether anything drastically different was happening in each of those two years, one to the other?

DR. NOAKES: Yeah, the unique part of **it is not only it's the highest and lowest but they're back-to-back** so it's not as if they were 20 years apart and you can argue that, well, things changed in 20 years. **We're dealing with something that happened over a two-year period. So if you're looking for something, the smoking gun, then you should be able to see something in terms of what caused the dramatic decline in 2009 returns and what changed in order for the 2010 returns to go so high**. And as I say, it's multi-factorial. I'm sure there's lots of issues that govern the survival. But if you're looking at particular ones, you should be able to see something in that signal. What changed in, say, aquaculture or salmon farms that

28 would cause that kind of dramatic change?

SGAHC Submissions, p. 63-64;
Noakes, Transcript August 26, 2011, p. 43 ll. 22 – p. 44 ll. 28;
BCSFA Submissions, paras. 135-136, 154
Above, para. 3

139. As the BCSFA said in its submissions, the precautionary approach is already applied to aquaculture. "Actions" occur all the time and are not limited to dramatic or draconian actions that are not justified by the evidence, are not recommended by credible scientific experts, and do not take into consideration the socio-economic factors as required by both Exhibit 51, *A Framework For The Application Of Precaution In Science - Based Decision - Making About Risk* ("**Exhibit 51, *A Framework For The Application Of Precaution***") and Exhibit 8, the Wild Salmon Policy.

SGAHC Submissions, p. 64-65;
BCSFA Submissions, Part II.A.4

140. The SGAHC suggests there are "a number of representatives from the aquaculture industry" on the CAHS board of directors. This is not untrue. That number is two – out of ten. The others include NGOs who are "hesitant" about aquaculture and are working on closed containment. Furthermore, as noted above, the BCSFA contracted CAHS to collect industry information and perform audits to bridge the regulatory transition from the Province to Canada pursuant to the Morton decision. DFO began auditing in 2011 and the contract with CAHS has been discontinued.

SGAHC Submissions, p. 65;
Saksida, Transcript September 6, 2011, p. 79 ll. 38 – p. 80 ll. 2;
Above, paras. 59, 83

141. The SGAHC asks that detailed fish health databases be provided to the public. However, as demonstrated by Ms. Morton's misinterpretation of those databases due to her lack of expertise, the BCSFA says that this level of information would in fact serve to confuse people who are not veterinarians, or who possess the necessary expertise to interpret them. The BCSFA says that the DFO's release of data to the public in a transparent and timely manner is a well-measured approach.

SGAHC Submissions, p. 66;
BCSFA Submissions, paras. 88-89

142. The suggestion that the aquaculture industry has not cooperated with Dr. Miller's research efforts is baseless and wrong. The cited passage from Dr. Miller's testimony itself shows that the director of the BCSFA contacted Dr. Miller about testing industry fish, and that someone within DFO told industry that they should not be testing their fish at that point. It does not appear that the government itself

asked the aquaculture industry to submit samples until recently, at which point the industry complied.

SGAHC Submissions, p. 66-67

143. Although climate change did not abruptly start in 1996, neither did salmon farming. As explained above and in the BCSFA's submissions, there is evidence of a regime shift in the marine environment in 1989/1990 or 1992. The suggestion that the declines are not caused by climate change is contrary to the weight of evidence before the Commissioner.

SGAHC Submissions, p. 71;
BCSFA Submissions, paras. 9-15
Above at para. 14

144. As stated above, the BCSFA disagrees with the recommendation that salmon farms be removed from migration routes, and notes that siting decisions already recognize the risks of pathogen transfer and require mitigative measures to reduce those risks. These measures have proven to be effective, as evidenced by Drs. Korman and Noakes in their analysis of fish health data.

SGAHC Submissions, p. 76;
Above, para. 87

16. First Nations Coalition

145. The First Nations Coalition concludes that not enough is known about the most of the likely drivers of the Fraser River sockeye salmon declines, or about the possible contributors. It lists the aquaculture industry as a possible contributor, noting a lack of scientific certainty, and expressly preferring Dr. Dill's report to that of Dr. Noakes because it does not believe that strong conclusions can be drawn. The BCSFA says that the FNC has misunderstood Dr. Noakes' approach which is statistically powerful and not limited by a lack of data as the FNC believes.

146. On the issue of sea lice, Dr. Dill is quoted as an authority on the ways in which sea lice can act as vectors for disease, which Dr. Orr relied upon in his testimony. As explained by Dr. Jones, Dr. Dill actually misunderstood the literature he quoted on this point. Although sea lice can act as mechanical vectors, all experts apart from Dr. Orr agree that transmission of pathogens through the water would be more effective and that sea lice do not amplify the risk of disease.

FNC Submissions, para. 294;
BCSFA Submissions, paras. 165-171;
Above, para. 116

147. The FNC quotes around Dr. Kent's testimony that farmed fish are healthier than wild fish notwithstanding their higher densities. As noted above at para. 23, Dr. Kent said it is only an assumption that farm fish are under more stress due to densities, and that "actually, if you look, **wild fish have a higher prevalence and abundance of pathogens than farm fish**" whereas farm salmon are vaccinated, and monitored to remove sick fish from the pens, and that these factors favour farm fish having "less disease". The BCSFA says that these comments put the subsequent discussion about the potential for disease amplification in the necessary context, which is that such events are decreasing in frequency due to management actions and are monitored and addressed quickly.

FNC Submissions, paras. 308-309;
Above para. 23

148. The BCSFA emphasizes that the comments by Dr. Kent are hypothetical – indicated by the words "may", and "potential" – and that the analysis by Dr. Noakes of fish health in salmon farms shows that these hypothetical scenarios are in fact unlikely. Dr. Noakes concluded "the incidence of diseases in farmed salmon that would be classified as high risk to sockeye salmon is very low and do not pose a significant risk."

FNC Submissions, paras. 310;
Exhibit 1536, Noakes Report 5C, 2011, supra, p. ii

149. The FNC says that the other Project 5 experts "relied" on Dr. Korman's report. While this may be true of Dr. Connors and Dr. Dill, Dr. Noakes testified that he did not rely on Dr. Korman's calculations and in fact repeated all of the analysis to "get a feel for the data" himself, noting that his calculations were in agreement with Dr. Korman's. Dr. Noakes also "pre-whitened" the data to avoid naively estimating correlation, noting that there is no common underlying driving force that affects both farmed salmon production, which is affected by the aquaculture licence, and Fraser River sockeye production, which is affected by environmental factors. Dr. Noakes took the further step of doing a farm-by-farm analysis of fish health events meaning his analysis was not limited by the low power identified by Dr. Korman. It does not appear that Dr. Korman or Dr. Connors performed these further steps, and Dr. Dill did not himself do any analysis of the data and was entirely reliant on both Dr. Korman and Dr. Connors. It is therefore incorrect to say Dr. Noakes relied on anything but the data. His report's agreement with that of Dr. Korman merely serves as a reassurance that both were done correctly.

FNC Submissions, paras. 311;
Noakes Transcript, August 25, 2011, p. 103 ll. 16-23;
Exhibit 1536, Noakes Report 5C, 2011, supra, p. 2-3, 105

150. The FNC says that due to the short time series of data, it is statistically difficult to detect a relationship between aquaculture and sockeye salmon survival, if one exists and that what can be drawn from the analyses is limited. They submit that "no conclusion can be reached" regarding the impact of salmon farms on Fraser River sockeye salmon. The BCSFA disagrees. As explained above, the high contrast in the 2009 and 2010 returns permits a "very powerful" statistical analysis.

FNC Submissions, para. 313, 322;
Above, para. 3, 138;
BCSFA Submissions, paras. 135-136

151. In addition to not including, or not estimating, the 2010 Fraser River sockeye return data for the purpose of his analysis, Dr. Connors also engaged in an analysis of climate-fisheries interactions, which was outside his area of expertise but disregarded advice given to him by Dr. Noakes who is a qualified expert in that field. He included pink salmon and sea surface temperatures despite repeated warnings this would result in spurious correlations. He failed to do diagnostic tests on the farm production data to determine whether it was a good proxy for pathogens on salmon farms for his long terms analysis and justified an inappropriate use of this data on the grounds it was the only data he had. Dr. Connors furthermore aggregated the farm data and did not consider where disease occurred relative to migration routes. Taken together, the BCSFA says that these errors show significant problems in Exhibit 1545, *(formerly UU) - Connors, Cohen Commission Technical Report 5B, Examination of Relationships btw Salmon Aquaculture and Sockeye Salmon Population Dynamics*, Jun 2011 ("**Exhibit 1545, *Connors Report 5B*, 2011**"). As argued in the BCSFA's

submissions, the reports of both Dr. Connors and by extension Dr. Dill, are speculative, not useful, and unreliable.

FNC Submissions, para. 314-15;
BCSFA Submissions, paras. 172-184

152. The BCSFA says that Exhibit 1540, *Dill Report 5D*, 2011 is biased, speculative, and should be accorded little weight. The potential pathways for disease transmission identified by Dr. Dill depend on a subjective and selective interpretation of available literature, and a superficial dismissal or outright disregard for contrary information. Dr. Farrell strongly criticised Dr. Dill's report for these problems in the peer review comments yet it does not Dr. Dill made any changes to address this weakness. Dr. Dill failed to consider the actual occurrence of diseases on salmon farms, although he said that he would have preferred to have done so had the data not been aggregated – he did not realize the data was provided on a farm-by-farm basis and relied entirely on Dr. Connors' aggregated data. He also failed to note that farmed salmon are vaccinated against both IHN and *Aeromonas salmonicida*, and that BKD is not easily transmitted and it an incidental disease in Atlantic salmon. Dr. Dill's suggestion that it is not possible to say salmon farms are not implicated could only be reached by preferring speculative literature over available evidence, and that sufficient evidence does exist to show that salmon farms have not been a factor in the Fraser River sockeye salmon decline.

FNC Submissions, para. 316-19;
BCSFA Submissions, paras. 137-138, 154, 156-171, 241-245

153. The BCSFA suggests that the FNC's concerns regarding Dr. Noakes' analysis is misplaced. As explained above, the Project 5 researchers had access to a robust and impressive data set that, despite its short time series, covered a period of time in which the high contrast of Fraser River sockeye salmon returns gave the statistical analysis very high power. Dr. Dill for example had sufficient information to conclude that apart from disease, the individual or cumulative impacts of all other salmon farming variables including sea lice, benthic and pelagic, and escapes were not sufficient to cause long term declines or the low returns in 2009. Even without data on diseases in wild salmon, which Dr. Noakes expressly recognized, there was sufficient data from salmon farms to determine whether the actual fish health events would have posed a risk to wild salmon based on their proximity to migration routes. Dr. Noakes concluded that based on the "very low" incidence of high risk disease events and location, they "do not pose a significant risk" and that disease from salmon farms has not contributed to the decline of Fraser River sockeye salmon.

FNC Submissions, para. 321;
Exhibit 1540, *Dill Report 5D*, 2011, supra, p. 2;
Exhibit 1536, Noakes Report 5C, 2011, supra, p. 26, ii

154. The FNC refers to Dr. Dill's report as evidence that closed containment is "technologically and economically feasible as an alternative top open net pens." Not only do most experts agree that closed containment or coordinated fallowing is unnecessary, the evidence shows that closed containment is presently non-viable. The aquaculture industry continues to research closed containment and is conducting pilot projects, but it is not presently feasible at a commercial scale.

FNC Submissions, para. 339-340;
BCSFA Submissions, para. 115, 149;
Above paras. 129 - 130

BCSFA Reply to FNC Recommendations

155. The FNC provides a compiled list of the recommendations made in its arguments in its Executive Summary. For ease of reference the BCSFA replies to those paragraphs rather than recommendations interspersed in the FNC's longer argument.

156. The FNC recommends a research program to be funded by the industry to monitor interactions between farmed and wild fish. The BCSFA says the aquaculture industry will continue to monitor the health of its own fish and report these data to its regulator and the CFIA. Where appropriate the industry will participate in research to discover if pathogens of wild salmon of interest to regulators can be detected in farm stocks during their residency in salt water. However, costs related to such monitoring if over and above required sampling must be paid by the interested party, not the industry – industry will not undertake and pay the costs associated with a program of wild fish sampling as this is a responsibility of the DFO itself. As explained by Mr. Bevan and Ms. Dansereau, the aquaculture industry already pays for the monitoring of benthic effects, fish health, and all aquaculture activities, absorbs the costs of fallowing farms, and licence fees may be used to cover costs in the future; it would be unfair to imposes costs on the aquaculture fishery not borne by the capture fishery.

FNC Executive Summary, para. 76;
Bevan, Transcript September 22, 2011, p. 84 ll. 36 – p. 86 ll. 8;
Dansereau, Transcript, September 23, 2011, p. 1 ll. 23 – p. 2 ll. 6

157. The BCSFA submits that such a program as the one proposed by the FNC is unnecessary as monitoring and reporting of disease pathogens present on fish is already captured in the management and regulation of salmon farming including the requirement to cull or harvest fish in extreme cases. It would also be necessary to determine the prevalence of pathogens in wild fish prior to undertaking such a qualitative analysis.

FNC Executive Summary, para. 77

158. While the BCSFA supports consultation with First Nations groups, the aquaculture industry should not be required to pay for consultations. Consultation is a duty of government, not private entities, and can be a very lengthy process. There would be no incentive on either side of the table, whether First Nations or government, to take reasonable positions or compromise on any point if a third party who has no control over the process is funding the consultation. The FNC does not refer to any precedent where a proponent has been required to pay for consultations. The BCSFA submits that the Commission of Inquiry into the Decline of Sockeye Salmon in the Fraser River does not have a mandate to set

precedent on unresolved areas of Aboriginal law or make recommendations that are not relevant to the future sustainability of the fishery.

FNC Executive Summary, para. 81

159. The BCSFA notes that the partners listed in FNC Executive Summary paragraph 82(c), proposing a working group to develop and implement a consultation protocol and accommodation options, are government bodies with the inclusion of the industry. The BCSFA says that the aquaculture industry, because it does not have a fiduciary duty to consult and accommodate First Nations but rather engages in direct talks and often partners with them, should not be included in this working group.

FNC Executive Summary, para. 82(c)

160. The BCSFA says that the aquaculture industry is already based on a user pay model, as noted above, and that no additional costs should be borne by the industry for these proposed activities.

FNC Executive Summary, para. 83

161. The BCSFA makes no comment on the government's duty to consult First Nations with respect to aquaculture licences. However, in considering recommendations relating to the length of aquaculture licences, the Commission should consider the lack of certainty due to short-term licences may hamper investment in the aquaculture industry, thereby limiting its resources to conduct research and development to further improve environmental performance and sustainable practices. Security of tenure and security of operating licences are fundamental issues if businesses are going to employ capital in any economic activity; capital investments look elsewhere than BC if there is no security or stability. The industry requires licenses of 3 year duration at a minimum, preferably 6 years to cover at least two production cycles. One approach would be to grant licences on an indeterminate time scale with specified infractions that would result in the loss of the licence. Aquaculture is an ongoing operation for which all the available evidence points to no evidence of harm, let alone irreversible harm, to wild salmon or the environment, and that the transfer of licences to DFO pursuant to the *Morton* decision did not result in a change of aquaculture operations or their environmental footprint.

FNC Executive Summary, para. 87

20. Musgamagw Tsawataineuk Tribal Council ("MTTC")

162. The BCSFA disagrees with the characterization that a high level of uncertainty or risk was demonstrated. As noted above, the Project 5 researchers generally concluded that there was no significant relationship between farmed salmon and wild salmon. Dr. Connors himself admitted that had he included the 2010 return there would have been significant positive leverage on his report, meaning the negative association he drew is even less reliable.

MTTC Submissions, para. 10;
Above, paras. 173, 3

163. Pursuant to the *Morton* decision, aquaculture is considered a fishery in BC. DFO promotes and regulates the capture fishery as well, and there is no reason for differential treatment. As explained by Mr. Sprout, the capture fishery is proven to kill wild salmon. The aquaculture fishery on the other hand is considered to be a minimal risk and to be unlikely to affect salmon populations.

MTTC Submissions, para. 11;
Exhibit 1588, *BC Aquaculture Regulatory Program Licensing Approach*, Jun 17 2011, p. 6;
BCSFA Submissions, para. 97;
Exhibit 1536, Noakes Report 5C, 2011, p. 33;
Above, para. 79

164. As reviewed at length in the BCSFA's submissions, the majority of experts agree that it is unnecessary to relocate salmon farms. FHMPs and biosecurity are robust systems used to minimize risks to wild salmon. There is no evidence of harm to Fraser River sockeye salmon, and there is evidence that salmon farms pose at most minimal risks, meaning draconian actions are not justified.

MTTC Submissions, para. 12;
BCSFA Submissions, para. 103-124;
Exhibit 1536, *Noakes Report 5C, 2011*, *supra*, p. 33

165. The BCSFA says that Integrated Area Management Plans should be developed for salmon aquaculture, but that ongoing license renewal or length of license duration should not be dependent on these plans. Instead, renewal of licenses should be dependent on conforming to the plan when developed.

MTTC Submissions, para. 14

166. As explained in the BCSFA's submissions, the precautionary approach and adaptive management are use on an ongoing basis. All available evidence points to superior farm management, professional and effective fish health management which has resulted in the statistically significant decline in high risk fish health events, and no evidence of harm, let alone irreversible harm, to wild salmon. Dr.

Noakes and Dr. Connors agreed that the 2010 returns would have a positive effect on the latter's analysis, meaning there is no evidence to support Dr. Dill's conclusion of a possible effect. Without commenting on the government's duty to consult First Nations, the BCSFA says that as explained above long-term licences of at least 3 to 6 years are required to secure and retain capital investment in aquaculture in BC and to research and develop new practices and technologies to continue to improve the sustainability of aquaculture.

MTTC Submissions, para. 15;
Above, para. 3, 161

21. Heiltsuk Tribal Council ("HTC")

167. Generally, the HTC's submissions suggest that absent absolute scientific certainty, no activities should be permitted that pose a risk to Fraser River sockeye salmon. This is a misunderstanding of the precautionary principle as interpreted by Canadian courts and as applied by the DFO, and in the scientific process which is generally unable to give absolute certainty. The Canadian government applies Exhibit 51, *A Framework For The Application Of Precaution*, to make decisions in the face of scientific uncertainty. The BCSFA suggests that the HTC's arguments based on the need for scientific certainty are flawed.

168. The HTC suggests that DFO has not taken a precautionary approach to regulating salmon farming. The BCSFA disagrees. As shown in the BCSFA's submissions, this is not supportable as the DFO, the Province, and the aquaculture industry all take a precautionary approach. The BCSFA supports the continued application of the precautionary approach to fisheries management, including that of the aquaculture fishery.

HTC Submissions, paras. 17-18;
BCSFA Submissions, part II.

169. The BCSFA submits that the weight of evidence shows that salmon farming has not had a detrimental impact on Fraser River sockeye salmon returns, and that the remaining controversy over whether salmon farms have negative impacts on wild salmon stocks is largely a function of "'belief-oriented science'" meaning that some individuals use their strongly held views as the starting point for their research. As explained above, international literature is not useful in determining risks of aquaculture in BC, yet it is continuously cited to show an ongoing debate. As Dr. Noakes suggested, some publications attacking the industry are "neither objective nor scientific and they generally lack credibility." The BCSFA observes Ms. Morton's papers generally fall under that category. For example, Dr. Farrell notes that Ms. Morton published a paper on shedding of sea lice in 2005, but ignored that data when she co-authored with Dr. Krkosek in 2007 to (erroneously) predict the extinction of pink salmon due to sea lice.

HTC Submissions, paras. 37;
Exhibit 1536, Noakes Report 5C, 2011, p. i, 11, 17-18, 32, 99

170. Dr. Miller and Dr. Garver are unable to give any certainty about any of their research on the MRS or parvovirus at this point. It must be expected that scientific knowledge will continue to evolve after the end of the Commission, and that DFO will continue to research and make decisions pursuant to the precautionary approach and adaptive management and in the interest of all Canadians. As a virus has yet to be identified and transmission has yet to be shown, the BCSFA again says that attempting to draw links between this novel research and aquaculture is purely speculative and not at all probative.

HTC Submissions, paras. 38-39

171. The HTC points to the fact that Dr. Dill did not give an "unqualified" answer on whether there were significant benthic and pelagic effects on sockeye salmon. Dr. Dill's report concluded that "None of the other possibilities considered (lice, benthic and pelagic impacts, escapes, etc.) are likely to be sufficient, alone or in concert, to cause either the long-term population declines or the especially low returns in 2009." This is a strong conclusion; science rarely gives "certain" or "unqualified" answers.

HTC Submissions, paras. 40

172. The HTC relies on Dr. Dill, Mr. Price, and Dr. Orr to establish a high risk of sea lice to wild stocks. As noted above, Dr. Orr relied on Dr. Dill's summary of literature suggesting sea lice can act as a disease vector, and Dr. Jones explained how Dr. Dill had in fact misinterpreted those studies. Mr. Price's research paper, Exhibit 1476, *Price et al, Sea Louse Infection of Juvenile Sockeye Salmon in Relation to Marine Salmon Farms on Canada's West Coast, Feb 2011* was also extensively criticised by a number of sea lice experts including Dr. Johnson, Dr. Saksida, and Dr. Jones, and in Dr. Noakes' report for making highly speculative conclusions as to correlations between sea lice and salmon farms despite numerous problems with their sampling methods, assumptions, salinities, and inconsistencies between reported areas of effect from salmon farms in Exhibit 1481, Price et al, *Evidence of Farm-Induced Parasite Infestations on Wild Juvenile Salmon of Coastal BC*, a 2010 paper which were then counted as being of no effect in the 2011 paper. Furthermore, as noted above, Dr. Dill lacks the necessary statistical expertise to recognize that the 2009 and 2010 returns provided the necessary contrast to determine effects, making the need for experimental manipulation unnecessary. Together, the BCSFA says that these problems make the HTC's argument on sea lice or the need for experimental manipulation untenable.

HTC Submissions, paras. 41;
Above, paras. 116, 138;
Exhibit 1476, *Price et al, Sea Louse Infection of Juvenile Sockeye Salmon in Relation to Marine Salmon Farms on Canada's West Coast, Feb 2011*;
Exhibit 1481, Price et al, *Evidence of Farm-Induced Parasite Infestations on Wild Juvenile Salmon of Coastal BC*, 2010
Johnson, Transcript August 22, 2011, p. 104 ll. 15 – p. 106 ll. 45,
August 23, 2011, p. 7 ll. 19 – p. 13 ll. 4;
Saksida & Jones, September 6, 2011, p. 0 ll. 46 – p. 13 ll. 25;
Exhibit 1536, Noakes Report 5C, 2011, *supra*, p. 18-19

173. The HTC refers to the "potential" of salmon farms to contribute to pathogens in Fraser River sockeye salmon without acknowledging the farm-by-farm analysis of Dr. Noakes who was able to conclude that based on the reported fish health events the risks posed to wild stocks from the high risk diseases is "minimal at best", or

even the analysis by Dr. Connors who found no statistically significant relationship between salmon farms and wild salmon. The "totality" of evidence shows salmon farms pose a "minimal" risk to Fraser River sockeye salmon.

HTC Submissions, paras. 42;
Exhibit 1536, Noakes Report 5C, 2011, p. 33;
Exhibit 1545, Connors Report 5B, 2011, p. i

174. The BCSFA notes that Ms. Stewart and Ms. Morton gave perspectives on fallowing, not expert opinion. Dr. Orr cited an Irish paper on sea trout as the basis for his opinion on fallowing, which the BCSFA says is inapplicable to BC because of the innumerable differences in the species of sea lice, ocean conditions, and between Atlantic sea trout and Pacific sockeye salmon. Furthermore, as Dr. Saksida noted, Ms. Morton's own published research shows fallowing does not have any population level effects on salmon, which the BCSFA says is further evidence salmon farms pose minimal risks to wild salmon either through sea lice or disease effects. Two papers by Dr. Beamish, Exhibit 1790, Beamish et al, *Exceptional marine survival of pink salmon suggests that farmed Atlantic salmon and Pacific salmon can coexist successfully* and Exhibit 1984, *[Formerly for ID WW] - Beamish, Assessing the Impact of Salmon Farming on Pacific Salmon at the Population Level in BC, Jul 2011*, also suggest that fallowing does not play a significant role in salmon populations, as does Exhibit 1555, *Marty et al, Relationship of Farm Salmon, Sea Lice and Wild Salmon Populations, 2010*. The DFO also has control over fishing, which kills millions of salmon each year, and hatcheries which poses unknown disease risks to wild salmon. The HTC fails to acknowledge this direct mortality or the need for further research on diseases in hatcheries notwithstanding its recommended support of the HTC's own conservation hatchery and further hatcheries and enhancement activities.

HTC Submissions, paras. 42, 50-54;
BCSFA Submissions, paras. 146-147, 110, 120-124;
Exhibit 1790, *Beamish et al, Exceptional marine survival of pink salmon suggests that farmed Atlantic salmon and Pacific salmon can coexist successfully;*
Exhibit 1984, *[Formerly for ID WW] - Beamish, Assessing the Impact of Salmon Farming on Pacific Salmon at the Population Level in BC*, Jul 2011,
Exhibit 1555, *Marty et al, Relationship of Farm Salmon, Sea Lice and Wild Salmon Populations, 2010;*
Exhibit 1454, Stephen Report 1A, 2011

BCSFA Reply to HTC Recommendations

175. The HTC recommends that a moratorium be imposed on new salmon farming licences until "scientific certainty on whether pathogen transfers unreasonably negatively affect wild salmon, and if so, continue the moratorium until it is shown that these effects can be controlled". The BCSFA says that this recommendation conflates the scientific process and management decisions – science cannot make a value judgment of what constitutes an "unreasonable" risk. Second, pursuant to the precautionary approach, DFO makes management decisions notwithstanding the lack of scientific certainty while balancing socio-economic considerations. It is unreasonable to suggest that any activity should be halted until there is "scientific certainty", particularly where that activity has been shown to be a low risk to Fraser River sockeye salmon. The HTC is not recommending the closure of hatcheries which constitute an unknown risk, nor an end to logging, land use or other human activities found to be unlikely causes of the decline.

HTC Submissions, paras. 19, 1st bullet;
BCSFA Submissions, paras. 44-51, 91-102
Exhibit 1575, Marmorek et al, Addendum, Technical Report 6: Implications of Technical Reports on Salmon Farms and Hatchery Diseases for Technical Report 6 (Data Synthesis & Cumulative Impacts), Jul 29 2011, p. 21-22

176. The BCSFA notes that fallowing and studying area effects is already used as a condition of licence under the aquaculture licences and as agreed upon between the aquaculture companies and environmental groups such as Marine Harvest and CAAR, and as supported by DFO. Presumably the HTC is recommending coordinated fallowing as suggested by two peer reviewers of Exhibit 1545, *(formerly UU) - Connors, Cohen Commission Technical Report 5B, Examination of Relationships btw Salmon Aquaculture and Sockeye Salmon Population Dynamics*, Jun 2011 ("**Exhibit 1545, *Connors Report 5B*, 2011**"). As Tom Carruthers, one of the reviewers said, this recommendation does not consider economic costs. The BCSFA also argues that the experiment would be unable to differentiate any potential effects of such experimentation from the innumerable environmental factors which would also have an effect. Furthermore, as explained by experts such as Dr. Marty and Dr. Saksida in Exhibit 1555, Marty et al., *Relationship of Farm Salmon*, 2010, it is not necessary to remove salmon farms from migratory routes through closed containment or coordinated fallowing.

HTC Submissions, para. 19, 2nd bullet;
Exhibit 1594, *Finfish Aquaculture Licence 2010 Under the Pacific Aquaculture Regulations*, s. 2, Appendix I;
Stewart, Transcript September 8, 2011, p. 10 ll. 13-23;
Richards, Transcript September 22, 2011, p. 79 ll. 42 – p. 80 ll. 3;

Exhibit 1545, *Connors Report 5B, 2011*, *supra* p. 89
BCSFA Submissions, para. 110, 120-124

177. As described above, the aquaculture industry is continuing to study closed containment. This recommendation is unnecessary.

HTC Submissions, paras. 19, 3rd bullet;
Above, paras. 129 - 130

All of which is respectfully submitted

This 3rd of November, 2011,

K. Alan Blair
B.C. Salmon Farmers' Association

B.C. SALMON FARMERS ASSOCIATION

REPLY SUBMISSIONS
NOVEMBER 3, 2011

LIST OF AUTHORITIES

1. *Kwicksutaineuk/Ah-kwa-mish Tribes v. Canada (Minister of Fisheries & Oceans)*, 2003 CarswellNat 4077, 2003 FCA 484, 313 N.R. 394, 246 F.T.R. 319 (note)

2. *Kwicksutaineuk / Ah-kwa-mish Tribes v. Canada (Minister of Fisheries & Oceans)*, 2003 CarswellNat 177, 2003 FCT 30, 227 F.T.R. 96, 120 A.C.W.S. (3d) 197

3. *Ecology Action Centre Society v. Canada (Attorney General)*, 2004 CarswellNat 2658, 2004 FC 1087, 9 C.E.L.R. (3d) 161, 262 F.T.R. 160