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.

FINAL WRITTEN SUBMISSIONS ON BEHALF OF THE CONSERVATION COALITION: COASTAL ALLIANCE FOR AQUACULTURE REFORM, DAVID SUZUKI FOUNDATION FRASER RIVERKEEPER SOCIETY, GEORGIA STRAIT ALLIANCE, RAINCOAST CONSERVATION FOUNDATION, WATERSHED WATCH SALMON SOCIETY, AND MR. OTTO LANGER

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Overview

1. The Conservation Coalition is formed of the following six groups and one individual: David Suzuki Foundation, Watershed Watch Salmon Society, Georgia Strait Alliance, Coastal Alliance for Aquaculture Reform, Fraser Riverkeeper Society, Raincoast Conservation Foundation, and Otto Langer. This Coalition was granted standing by the Commission for all topics. Although the Coastal Alliance for Aquaculture Reform (CAAR) is a member of the Conservation Coalition, CAAR's mandate is limited to issues related to salmon aquaculture. Therefore, CAAR, as a coalition, is endorsing only the sections of this submission and appendices directly related to salmon aquaculture.

2. This Coalition approached the technical hearings with the following main themes for development through the evidence:

    a. The conservation of the Fraser River sockeye must come first. Conservation and preservation of the species and its genotypes as reflected in the Conservation Units (hereinafter "CUs") recognized under the Wild Salmon Policy (hereinafter "WSP") is the primary focus. Without the full suite of Fraser sockeye CU's, all groups, including First Nations, Commercial and Recreational fishers, would likewise lose a valuable resource in addition, the members of the public who value the presence of Fraser sockeye in their lives.

    b. There should be open and transparent gathering and sharing of information by all parties and by all scientists who focus upon the Fraser sockeye. Knowledge of the sockeye is key to informed decision making that would potentially impact the survival of the species.

    c. All decisions involving the future sustainability and survivability of the Fraser sockeye must involve all stakeholders and be conducted in a transparent and open setting. The days of decisions being made behind closed doors should be long gone. Thus the people charged with the protection and conservation of the sockeye resource must consult and make decisions that are informed by many interests. However the primacy of the decision making must remain focused upon the best interests of the fish.

    d. This Coalition saw this Commission as an opportunity to inquire into the inner workings of the Canadian Department of Fisheries and Oceans (hereinafter "DFO") the government body charged with stewardship of the Fraser sockeye for all Canadians.

    e. This Coalition recognizes the unique position of First Nations and their relationship to the Fraser sockeye. This Coalition also is of the opinion that the First Nations leaders,

communities and people can teach us much about their relationship to and knowledge about Fraser sockeye.

f. As the hearing progressed it became increasingly clear that science would not be able to answer some fundamental questions about the reasons for the decline of Fraser sockeye. In such a situation, this Coalition questioned witnesses on the precautionary principle and precautionary approach as a methodology that should be applied to decision making. The Precautionary Principle has been expressly accepted into Canadian jurisprudence by the Supreme Court of Canada in *114957 Canada Ltée (Spraytech, Société d'arrosage) v. Hudson (Town)*, 2001 SCC 40, [2001] 2 S.C.R. 241, (at paragraphs 31-32).

3. This Coalition endeavoured to keep these themes foremost throughout the many days of evidentiary hearings. In canvassing the hours of testimony that the Commission has heard over the months of hearings, the Coalition submits that a full comprehensive review of the evidence is not possible due to the limited time and resources that it has. Instead, the focus of these submissions will be on some of the key pieces of evidence that reflect the terms of reference of this Commission. Additionally, this Coalition offers recommendations to the Commissioner for ways in which his mandate may be carried out.

4. We have appreciated the attention and commitment of the Commission and the Commissioner to leading evidence on many of the topics and hearing the issues. We have also appreciated the opportunity that we had to discuss issues of common concern with some of the other participants. We have not had the opportunity to review any suggested recommendations from other participants. We anticipate that once having had that chance, we will be replying to those recommendations and in some cases adopting them.

5. This Coalition submits that the evidence contained in the PPR's that were submitted on many topics should not be afforded much probative value. The authorship of these reports was never identified. Moreover the evidence contained in the reports themselves was not subjected to the same level of scrutiny through cross examination as, for example, were the technical reports. This Coalition found the PPR process to be troubling and has attached as a separate Appendix to this submission, written responses to two of the technical reports on Aquaculture and Gravel Mining. With respect to the latter, this Coalition adopts the critique that Dr. Rosenau made of the PPR on gravel mining in the Fraser River which was marked for identification as "EE" in the evidentiary hearings.

The Wild Salmon Policy

"Simply stated, maintaining salmon diversity provides the greatest opportunity for sustaining salmon production." Dr. Brian Riddell (November 29, p. 6, ll. 38 – 40)

6. Perhaps the document most thoroughly canvassed during the technical hearings was the Wild Salmon Policy (hereinafter the "WSP"). The WSP is central to any discussion of Fraser sockeye since it provides both the rationale and blueprint for the conservation of wild salmon. It took years of drafting and many discussions before the WSP was finally signed by the Minister in June, 2005. The wide-scale consultations undertaken on the WSP, and the fact that virtually all stakeholders have 'bought into' it, enhances the policy's strength and importance.

7. At the heart of the WSP is the recognition that protecting wild salmon requires protecting genetic diversity. To quote Dr. Brian Riddell: "The genetic lineages today are irreplaceable" (November 29, p. 9, ll. 39 – 41) and "[s]imply stated, maintaining salmon diversity provides the greatest opportunity for sustaining salmon production." (November 29, p. 6, ll. 38 – 40) (Exhibit 8, *The Wild Salmon Policy,* p. 11).

8. Implementation of the WSP is not only critical to conserving wild salmon, it is critical to preserving sustainable fisheries. As Dr. Riddell put it: "maximizing production and diversity of salmon are actually consistent objectives...this trade-off that people debate is really about the rate of use, not about total production" (November 29, p. 10, ll. 1 – 8) (November 29, p. 41, ll. 6 – 8).

9. The WSP's focus on maintaining genetic diversity, and thereby fostering maximum adaptability, is an embodiment of a precautionary approach (Bevan, September 26, p. 91, ll. 23 – 30). A precautionary approach is particularly important for Fraser sockeye as a result of: uncertainty in the data; varying significant environmental impacts with unpredictable interactions and outcomes; and the likely and increasing impact of climate change. (Riddell, November 29, p. 12, ll. 4 -12) (Irvine, November 29, p. 53, l. 40 – p. 54, l. 3).

10. Though the principles and objectives of the WSP are sound, in most cases DFO is falling well short of meeting them. For instance, the objectives of the WSP include both maintaining and *restoring* healthy and diverse salmon populations and their habitat (Exhibit 8, *The Wild Salmon Policy*, p. vi). The objective of restoring salmon and their habitat requires more than just preserving the status quo; it requires DFO management to implement proactive conservation measures. (Irvine, November 29, p. 53; lines 12 - 16) We are currently not meeting the goal of maintaining salmon habitat – let alone restoring it (see para. 66, below). Moreover, things are getting worse, not better; and additional government-wide austerity measures and budget cuts are expected (Dansereau, September 22, p. 2, l. 25 – p. 3, l. 11)(Dansereau and Bevan, September 27, p. 10, ll. 11 – 47)(Riddell, June 2; p. 36; ll. 9 – 26).

11. Initially, the WSP was to be implemented within five years, by 2010. (Exhibit 170, *WSP Implementation Strategy*, p. 4) However, to date the DFO has not fully implemented *any* of the individual WSP Strategies (Saunders, December 2, p. 53, ll. 10 – 21). Pat Chamut, former

Regional Director General (hereinafter "RDG") at the DFO and a prime motivator of the WSP's current derivation, is disappointed with the lack of progress of implementation (November 29, p. 72, ll. 11 – 18); he believes that full implementation of the WSP would "absolutely" improve the future sustainability of sockeye (November 29, p. 76, ll. 1 – 4).

12. The glacial pace of implementing the WSP has not served Fraser sockeye very well. Of the 36 Fraser sockeye Conservation Units, 10 have not been assessed due to a lack of data; and of the rest that were preliminarily assessed seven are in the Red Zone; 13 are in the Amber Zone; five are in the Green Zone; and one was not assessed. In other words, only five of the 36 total Fraser sockeye Conservation Units are currently known to be healthy. (Holt, December 2, p. 71, l. 24 – p. 72, l. 28)(Exhibit 1915, *Evaluation of Uncertainty in Fraser Sockeye WSP Status Using Abundance and Trends in Abundance Metrics*).

13. According to former RDG Pat Chamut, 'where a conservation unit is assessed in the Red Zone, the primary almost exclusive consideration in management actions will be biological' (November 29, p. 29, ll. 13 – 20). Despite this, and despite the multiple CUs assessed in the Red Zone, there is very little evidence of management decisions (particularly habitat decisions) being directly informed by the WSP (Young, June 1, p. 80, ll. 29 – 41). As a result, current management is not occurring in a manner consistent with the objectives of the WSP (Young, June 1, pg. 82, ll. 13 – 28).

Solutions

14. In our submission, full implementation of the WSP is the best safeguard for conserving wild salmon generally, and for conserving Fraser River sockeye salmon in particular. Full implementation of the WSP is also the best protection of sustainable salmon fisheries. Despite its central importance, implementation of the WSP has failed to date.

15. Among the initial measures that must be implemented is improved monitoring of both conservation units and their habitat. Monitoring under Strategies 1, 2 and 3 is the primary means to obtain baseline information necessary to inform Strategies 4 and 5 (Young, June 1, p. 90, ll. 33 – 38). Improved monitoring is also a way to control for long-term uncertainty (Riddell, November 30, p. 47, ll. 13 – 23). Indeed, monitoring and the assignment of status relative to benchmarks set out the primary objectives of Strategies 4 and 5, which would be recovery of red zone CUs. Such clear objectives are necessary to support integrated planning, and absent identifying priority CUs, including all Red Zone CUs, these processes would lack the focus and purpose necessary to function.

16. Part of the delay in implementing the WSP, particularly with respect to habitat matters, has been a lack of adequate funding. (Young, June 1, p. 80, ll. 23 – 28) According to former RDG Pat Chamut, "the first and easiest solution is probably about thirty or forty million dollars." (November 29, p. 72, ll. 42 – 44). Others suggest approximately $2.5 million - $3 million annual

funding is required to support implementation the WSP, and ensuring multi-year and additional funding for consistent long-term monitoring is seen as key (Young, June 1, p. 97, ll. 33 – 47)(Riddell, June 1, p. 98, ll. 24 – 37). It may be that the optimal way to ensure longer-term funding for the WSP is to reclassify it from a Policy to a Program or, perhaps, to reclassify its funding as A-based. Regardless, WSP implementation requires an explicit commitment of multi-year funding.

17. Accountability will be fostered should a specific person, or team of persons, be directly tasked with implementation of the WSP. (Chamut, November 29, p. 73, ll. 8 – 21) (Riddell and Young, June 2, p. 7, ll. 1 – 28) (Young, June 1, p. 99, l. 44 – p. 100, l. 24)(Exhibit 96, *The Successful Completion of Scientific Public Policy – Lessons Learned While Developing Canada's WSP*, p. 6). The person or team tasked with WSP implementation should be required to annually report to the public on the progress of implementation.

18. The WSP explicitly recognizes the need for an 'implementation plan' that stipulates what tasks are required for implementation; how they will be performed; and timelines for completing such tasks. (Exhibit 8, *The Wild Salmon Policy*, p. 35) (Exhibit 109, *WSP Implementation Workplan, Results-based Management and Accountability Framework*, p. 19 – 20). Though this is the clear intention in the Policy itself, there has been a shift away from a formal WSP implementation plan, to a more ad-hoc approach, with WSP implementation tasks placed in annual work plans, rather than a centralized 'implementation plan' (Saunders, December 2, p. 37, ll. 14 – 39).

19. One of the approaches taken by the DFO regarding implementation of the WSP is to await the full suite of information on CUs prior to taking action. Although Strategy 4 builds upon the knowledge gained through the 3 prior strategies, it is not necessary to have all of the science known before there could be use of existing knowledge in decision making that affects the Fraser sockeye, particularly in the case of protecting CUs that *may* be in the red zone. This would be consistent with the precautionary approach. In addition to taking a precautionary approach and ensuring protection from manageable risks, such as aquaculture or fishing impacts, restoring CUs in the red and yellow zones requires long-term strategic planning. Long-term strategic plans must identify: the biological target for an individual CU; the causes of decline for that CU; as well as prioritize management actions, and establish timelines for implementing management actions necessary to address impacts (Exhibit 8, *The Wild Salmon Policy*, p. 24). Moreover, DFO must set clear objectives for Strategy 4, focused on completion of long-term strategic plans for CUs assessed in the Red Zone.

20. Given the delay in implementation of the WSP to date, DFO must immediately identify priority CUs based on the work of Sue Grant (Exhibit 1915, *Evaluation of Uncertainty in Fraser Sockeye WSP Status Using Abundance and Trends in Abundance Metrics*). Where data is lacking, CUs should be preliminarily assessed as Red Zone and, accordingly, as a priority CU.

21. There can be no more delay in ensuring management decisions protect Red Zone and priority CUs. DFO must determine how to ensure its management actions meet the objectives of the WSP, including but not limited to: aquaculture permitting, setting precautionary fishing rates, habitat authorizations and assessments under the *Canadian Environmental Assessment Act* ("CEAA"). DFO should consult stakeholders on how to best achieve this.

Recommendations Respecting the Wild Salmon Policy

i.1. Immediately assign a senior DFO manager (who directly reports to the RDG) with the exclusive responsibility of WSP implementation (WSP champion). Performance measures for the position must be integrated with WSP implementation targets. Make the WSP champion's initial task the completion and publication of a WSP implementation plan to be completed by December 2012.

i.2. Assign DFO staff specific implementation tasks with timelines, to be overseen by the WSP champion.

i.3. Assign a substantial portion, or all, of the performance-based pay structure of the Pacific Region RDG to WSP implementation targets and meeting recovery targets of conservation units identified to be in the Red Zone.

i.4. Allocate at least $2.5 million annually over the next three years to support the coordination and administration of WSP implementation.

i.5. By December 2012, assess the amount of resources necessary to complete baseline CU, habitat and ecosystem assessments for Strategies 1, 2 and 3 (likely to be a minimum of $30 million). Allocate the necessary funding to ensure completion of preliminary habitat and ecosystem assessments, with status relative to benchmarks, by December 2013.

i.6. Require annual public reporting on the status of Pacific salmon relative to Strategies 1 – 3, along with progress on the WSP implementation plan.

i.7. By December 2012, assign all CUs to Red, Amber or Green zones, consistent with the CU benchmark methodology. CUs lacking enough information to quantify status should be assigned Red Zone status, and thereby identified as a priority CU.

i.8. By December 2013, a recovery planning process for all Red Zone CUs must be initiated. Regional grouping (e.g., watershed scale) of recovery planning efforts in areas where multiple Red Zone CUs should be undertaken to maximize efficiency and support implementation of integrated planning (Strategy 4).

i.9. By December 2012, host workshops with stakeholders on the application of the WSP to DFO management decisions, including but not limited to: aquaculture permitting, habitat authorizations and CEAA assessments.

i.10. By December 2012 undertake a science-based and multi-stakeholder process to evaluate and apply the goals and intent of the WSP to the DFO Salmon Enhancement Program

i.11. By December 2014, conduct an independent audit of WSP implementation.

DFO Organizational Structure

22. The ability of Fisheries and Oceans Canada to manage Fraser sockeye for the benefits of all Canadians is compromised by the existence of competing mandates, the lack of transparency and independence of science, and a lack of resources directed at core scientific and management functions.

23. Conservation is clearly identified as the primary mandate of DFO. The promotion of industrial activities regulated by DFO, including fish farming and fisheries, undermines the focus and ability of the department to meet this primary mandate. The critical role of scientific research and monitoring activities within DFO in meeting the conservation mandate are compromised by political influence in decisions about what scientific activities to undertake, including the availability of funding, and how their results are communicated to the public.

24. The commercial fishing sector recognizes that the problem often lies with management:

> Morley Oct 28; p. 53; lines 25-40
>
> "…we need to ensure that managers who are tasked with conserving and providing for sustainable fisheries must be forced to undertake the objective, based-in-science analysis of what the real management levers are, where they are, whether they're in habitat management or whether they're in harvest management, what the actual impacts are in the short and the long term across both the existence of the resource and potential benefit to users, and evaluate those in an open, transparent manner and quantify them so that decision-makers are given the appropriate information, rather than the system that we currently have, which is largely based on a consultative process that asks for opinions rather than evaluates real costs and benefits."

25. Too often decisions of DFO are not transparent:

> Young Feb 11; p. 40; lines 3-7
>
> "I think DFO has a responsibility to provide objective scientific information and, more than that, a responsibility to identify how it may affect their conservation objectives or their mandate as clearly as they can."
>
> Young Feb 11; p. 66; lines 23-27

"I don't think we've reached a point through the IHPC where the actual decision-making that occurs essentially by DFO and the Minister, at the end of the day ultimately is open and transparent."

26. Decision making at DFO ultimately resides at the Ministerial level. While such decisions enable government to be responsible through the elective process, Ministerial decisions are often enshrouded in secrecy and apt to be influenced by factors and lobbying interests that too often leave conservation out of the equation

Sprout Mar 4; p. 31; lines 9-12

"…the minister made the decision, ultimately, about what would be the exploitation rate on Cultus, which is regarded as a stock that's at risk."

Sprout Mar 4; p. 81; lines 44-46

"…decision-making rests with the Minister of Fisheries and Oceans. It's a very paternalistic decision-making process."

Schubert May 31; pp. 90-91; lines 38-47, 1-2

"My experience with Cultus is that it's probably inappropriate to have a recovery or response team reporting through the fisheries management structure in DFO sectors. There is always the potential for perception of conflict of interest when that occurs, whether the perception is real or not. And I know when the recovery team was disbanded in early 2005, some team members felt that this action was a direct result of a criticism of a socioeconomic analysis, and the team had become an irritant and needed to be gotten rid of."

Davis May 31; p. 24; lines 42-47

"…a situation where the Minister in the Department is the ultimate arbiter in every decision, that is going to lead to all kinds of problems, so we need to find mechanisms whereby informed bodies of wise people can assist and externalize some of those decisions."

Schubert June 1; p. 4; lines 14-19

LEADEM: "…in the interests of transparency it would have been preferable that that report (Gislason preliminary socioeconomic assessment for Cultus listing) had been shared with members of the Sockeye Recovery Team right from the inception when it was prepared. Do I have your agreement on that?"

MR. SCHUBERT: "Yeah, you do absolutely. Yes."

Schubert June 1; p. 55; lines 28-33

"…there were certainly member of the Team that voiced that view, that we were being disbanded as a team because we had had the audacity to criticize the socioeconomic analysis that was favoured so much by fisheries management."

Schubert June 1; p. 66; lines 40-46

"I think our current status is pretty much an ad hoc team (*internal DFO Cultus recovery team*) that's related to, I guess, the ease with which our activities are ignored by regional headquarters. Formalizing the process as a recovery implementation team would address that, or as a WSP response team if the Department chooses to go that route."

(See also Exhibit 903: Hutchings, Walters and Haedrich, Is scientific inquiry incompatible with government information control?, Exhibit917: Email from Neil Schubert to John Davis re Socio-Economic Analysis for Cultus Sockeye and Exhibit 932: Email thread between Mike Bradford and N Schubert et al re Cultus Socio-Economic Analysis, ending Oct 7 2004)

Recommendations Respecting DFO Organizational Structure

ii.1. Examine the role of science in decision making and ensure its independence through the establishment of an independent body such as the now defunct National Fisheries Research Board of Canada

ii.2. Ensure that decision making occurs in as transparent a fashion as possible by suggesting that Ministers must give full reasons for decisions such as the listing of CUs under SARA

Fisheries Management

27. Like all other management activities, DFO's Fisheries Management must be guided by the WSP. To some, the central purpose of the WSP is to move away from managing fisheries by aggregates, and instead create and manage smaller Conservation Units (Davis, May 31, p. 16, ll. 16 – 39)(Chamut, December 1, p. 97, ll. 7 – 29). Despite the requirements of the WSP, DFO continues to manage fisheries by aggregates, rather than CUs, leading to harvest rates of weak CUs that risk their extirpation.

28. DFO recognizes the problem of having a mixed-stock fishery, and clearly intends to move away from this practice (Farlinger, September 22, p. 64, ll. 2 – 7)(Farlinger, September 22, p. 70, ll. 12 – 19). Despite repeated claims that it has moved away from mixed stock fisheries, DFO continues to permit the vast majority of commercial fisheries to take place in mixed-stock areas

(Exhibit 965, *Wild Salmon Policy Strategy 6 - Performance Review Operations Committee,* p. 23)(Bevan, September 22, p. 73; lines 2 – 5).

29. In order to protect small, unproductive – but genetically irreplaceable – CUs, exploitation rates must be limited to a maximum of 10% (Ex. 1333)(Davis: July 8; pg. 11; lines 6 – 25), at least until recovery planning is completed and science-based recovery exploitation rates, which may be less than 10%, are determined. In order to achieve reduced exploitation rates on struggling CUS while maintaining a robust fishery on stronger CUs, a large proportion of fishing effort must be shifted to more selective areas, particularly terminal, upriver locations (Ex. 1358; pg. 2)(Ex. 1947; pg. 26).

30. Terminal fisheries advance further implementation of the WSP as they avoid exploitation of weak stocks better than the existing situation with mixed stock fisheries (Stewart: Aug. 19; pg. 12; lines 7 – 14). Fisheries that are more selective, including terminal fisheries, also have enhanced marketability, including eco-certification (Farlinger: Sept. 22; Pg. 71; lines 4 – 23); (Ex. 1424; pg. 49).

31. DFO acknowledges that moving fisheries to terminal, upriver locations allows for greater separation of stocks and therefore can, to a large extent, deal with the "mixed stock fishery problem" (Bevan: Sept. 22; pgs. 66 - 67; lines 47 – 8). Many First Nations also see the shift to terminal fisheries as critical (Ex. 292; pg. 7)(Ex. 294; pg. 5)(Crey, Sheppert: July 5; pgs. 80 – 81; lines 20 – 35).

32. Nonetheless, DFO will not require fisheries to move upriver absent commercial fishermen 'buy-in'; for which there is currently none (Bevan: Sept 22; pg. 68; lines 16 – 35). Furthermore, to date DFO has not been very supportive, let alone proactive, regarding terminal fisheries projects (Ex. 1333; pg. 2).

33. Moreover, funding for PICFI, DFO's primary program supporting a few "transformational" and terminal fisheries pilot projects, is almost expired and it is unlikely to be renewed (Farlinger: Sept 22; pg. 9 - 10; lines 46 – 10)(Danserau: Sept. 22; pgs. 4 -5; lines 41 – 30)(Ex. 966; pg. 5). This development is particularly problematic given that overcapacity in the commercial marine fleet and lack of capacity in the terminal areas are the biggest inhibitors in the shift to terminal fisheries (Rosenberger: Jan. 25; p. 36 - 37; lines 21 – 14).

34. The FRSSI process, which DFO claims sets harvest rates in accordance with the WSP, should be abandoned due to its fundamental flaw of setting exploitation rates at an aggregate level in its model rather than CUs; it therefore has neither First Nations' nor Conservation groups' support (Shepert: July 4; pg. 73; lines 2 – 26)(Ex. 412)(Ex. 413; pgs 6 – 8).

Solutions

35. Mixed-stock fisheries also must rely heavily on preseason forecasts, which are highly inaccurate (Exhibit 718, *Technical Report Project 7*, p. 1) A shift to more precautionary, in-season harvest decisions should be instituted which adequately protects stocks at the CU-level. This is supported by a move to more terminal fisheries, as more escapement information becomes available and escapement estimates become increasingly reliable the closer fish are to their spawning grounds.

36. Where fishing occurs in mixed-stock areas, catch mortality of non-target species can be significantly reduced through the use of selective fishing gear. Nonetheless, selective fishing is not a substitute for the necessary shift to more terminal fisheries (Hargreaves, February 21, p. 64, l. 44 – p. 65, l. 24).

37. Accurate catch reporting and monitoring is essential to sound fisheries management, especially where non-target species of concern are caught as by-catch. Whereas all B.C. groundfish fisheries require 100% observer coverage and set-by-set catch recording, requirements are much lower for commercial marine salmon fisheries (Grout, February 24, p. 22, l. 30 – p. 23, l. 11). Increasing observer coverage, dockside validation, and enforcement in commercial marine fisheries would increase compliance and the quality of catch data.

38. As part of the 2010 Marine Stewardship Council ("MSC") certification of B.C. sockeye salmon fisheries, DFO and the commercial fishing industry agreed to 36 conditions of improvement, many of which are tied to implementation of the WSP (Exhibit 343A, *The BC Commercial Sockeye Salmon Fisheries Public Certification Report Vol 2 - Stakeholder Submission Appendices*, p. 228 – 229). A recent audit found that DFO has not met the majority of conditions, and the audit team expressed concern respecting DFO's ability to meet several key conditions (Moody International: *Surveillance Report British Columbia Commercial Sockeye Salmon Fisheries*; pgs. 70, 79, 86, 91)

39. Hatchery production around the Pacific rim is at an all-time high, and competition for finite resources could be affecting growth and survival rates of wild salmon populations (Exhibit 1324, *Shifting Balance, 2011,* p. 36 – 38). Canada should engage salmon producing nations of the North Pacific in multi-lateral discussions aimed at managing production levels and minimizing impacts to wild salmon populations (Exhibit 773, *General Press Release re Ruggerone et al paper*).

Recommendations Respecting Fisheries Management

iii.1. Protect all depleted, threatened or endangered (i.e. red) CUs from overfishing by mandating maximum total exploitation rates at of 10% or less for those CUs, until recovery plans are implemented and exploitation rates are scientifically demonstrated to be consistent with recovery.

iii.2. Ensure that lowered exploitation rates for threatened or endangered (i.e. red) CUs do not unduly restrict fisheries on identifiable CUs with harvestable surpluses by transferring fishing effort to terminal areas and more selective gear types. This action will have the added benefit of reducing reliance on run size forecasts at the 'aggregate level' which has been chronically unreliable .

iii.3. Facilitate the transfer of fishing effort to terminal areas and more selective gear types:

(i) Re-establish a selective fishing policy and program that provides support for the development and/or expansion and management of in-river fisheries using selective gear (e.g. beach seines, fish wheels, fish traps, dip nets), preferential provision of quota to highly selective marine gear types (e.g. tooth tangle nets), as well as management and marketing.

(ii) Recommit funding for a minimum of 5 years to the PICFI process with the explicit priorities of transferring licences from the least selective (e.g., marine) to the most selective (e.g., river tributaries) First Nations fisheries and providing processing capacity for terminal selective First Nations fisheries.

(iii) Ensure that the Fraser Sockeye Chapter of Pacific Salmon Treaty is renegotiated in the next two years to support CU level objectives, thereby ending the entrenchment of aggregate stock management and overfishing of weak CUs.

iii.4. Meet all conditions for Marine Stewardship Council certification of B.C. sockeye and pink salmon fisheries within the required, agreed-upon timelines (Grout, January 24, p. 15, ll. 21 – 43).

iii.5. Mandate a minimum of 50% independent observer coverage (camera or onboard monitors) by 2013 in all salmon fisheries where non-target species are encountered.

iii.6. Canada should commence multilateral discussions with salmon producing nations of the North Pacific aimed at identifying and minimizing hatchery production impacts to wild salmon populations.

Aquaculture

"…there's lots of examples where fish farms have, in fact, created problems because of their location or because of their -- the way in which they've been operated." (Pat Chamut, November 29, p. 30, ll. 17 – 20).

40. This Commission has received substantial evidence regarding the serious risk posed by open net-cage salmon farming to wild salmon. Instead of exercising precaution in the face of this risk, DFO has taken on the mandate to promote this unsustainable practice. The promotion by DFO of open net-cage salmon farming is in direct conflict with its primary mandate: the conservation of wild fish stocks.

41. There are myriad negative impacts resulting from open-net aquaculture that enhance risk to wild salmon populations, and thereby potentially cause or contribute to the decline of Fraser sockeye salmon. For example, open-net fish farms allow excess food and feces to flow directly into the marine environment, enhancing nitrogen and phosphorous levels, and contributing to the growth of harmful algal blooms (Rensel, August 17, p. 34, l. 23 – p. 35, l. 26)(Exhibit 1370, *Harmful Algal Blooms: Causes, Impacts and Detection*, p. 385 – 386). Such harmful algal blooms are known to harm wild fish, including synergistically with additional factors such as disease (Rensel, August 17, p. 35, l. 23 – p. 26, l. 12). Given the above, and given that harmful algal blooms in the Strait of Georgia were identified as among the most likely causes of the 2009 Fraser sockeye decline, DFO must address this issue as a priority (Exhibit 616A, *Memo for the Minister (Info Only) re Factors Affecting the 2009 Fraser Sockeye Return*)(Exhibit 1371, *Briefing Memo for the Minister re Update on Factors Affecting the 2009 FRS Return (For Info),* p. 4). And yet, DFO continues to do little research on harmful algal blooms, and it is not comprehensively assessing the contribution of open-net farming practices to such harmful algal blooms.

42. Open-net fish farms also enhance the risk of disease for wild fish. In this regard, there are approximately 30 fish health events reported annually on fish farms, which indicate the presence of high risk diseases to sockeye salmon (Exhibit 1543, *Technical Report 5A: Summary of Information for Evaluating Impacts on Salmon Farms on Survival of Fraser River Sockeye Salmon*, p. ii, 19 - 20). Moreover, open-net intensive farming can create "close to ideal environments for the spread of infectious disease" by, *inter alia*, its high-density monoculture host populations; creating spatially-concentrated reservoirs of fish host populations; and having numerous possible transmission routes (Exhibit 1482, *Examples of emerging virus diseases in salmonid aquaculture*, p. 86)(Exhibit 1481, *Evidence of Farm-Induced Parasite Infestations on Wild Juvenile Salmon of Coastal BC*, p. 1925)(Exhibit 1484, *Evolutionary Information for Parasites and Pathogens*, p. 59).

43. Viral diseases are a major and continuing problem in salmon aquaculture, and management decisions must comprehensively address the potential for horizontal and vertical transfer of such viral diseases (Exhibit 1483, *Can We Get the Upper Hand on Viral Diseases*, p. 125, p. 130)(Exhibit 1495, *Epidemiological Investigation of Infectious Hematopoietic Necrosis* Virus, p. 49 – 50). This is particularly important in the context of Fraser River sockeye, given that viral disease is among the primary likely causes for their decline (Exhibit 616A, *Memo for the Minister (Info Only) re Factors Affecting the 2009 Fraser Sockeye Return*) (Exhibit 1371, *Briefing Memo for the Minister re Update on Factors Affecting the 2009 FRS Return (For Info*), p. 4).

44. In general, the unnatural density of farmed fish amplifies disease in the natural environment (Richards, September 26, p. 71, ll. 9 – 22). Open-net aquaculture, as opposed to closed-containment, is particularly well-suited to fostering the spread of disease. In this regard, disease particles migrate off farms, and are dispersed widely via water currents (Exhibit 1530, *Discovery Islands Modelling Progress Report*, p. 17 – 18)(Garver, August 25, p. 5, ll. 10 – 19)(Garver, August

25, p. 8, ll. 41 – 47). In contrast, closed-containment aquaculture establishes a barrier between farmed and wild stocks, and limits the dispersion of disease particles and the transference of disease (Exhibit 1540, *Technical Report 5D - Impacts of Salmon Farms on FRSS: Results of the Dill Investigation*, pg. 37).

45. Additionally, there is increasing evidence that lice from farms can be a significant cause of mortality on nearby wild fish populations (Exhibit 1571, *How Sea Lice from Salmon Farms May Cause Wild Salmonid Declines in Europe and NA and Be a Threat to Fishes Elsewhere*, p. 1). Along with direct mortality, sea lice are also known to cause behavioural or sub-lethal effects on wild fish. (Exhibit 1785, *Morbidity-Mortality Effects of Sea Lice on Juvenile Salmon Workshop*, p. 24 – 28)(Exhibit 1476, *Sea Louse Infection of Juvenile Sockeye Salmon in Relation to Marine Salmon Farms on Canada's West Coast*, p. 29). Sea lice are also thought to act as disease vectors, and may be responsible for the transference of diseases between farmed and wild fish (Exhibit 1540, *Technical Report 5D - Impacts of Salmon Farms on FRSS: Results of the Dill Investigation,* p. 29) (Orr, September 6, p. 24, ll. 28 – 35) Suffice to say, sea lice pose a significantly high risk to wild salmon stocks (Price, September 6, p. 24, l. 37 – p. 25, l. 4).

46. As recognized by former RDG Pat Chamut, the siting of fish farms can be problematic (November 29, p. 30, ll. 17 – 20). Most problematic are open-net cages that are sited along key migratory pathways. Largely as a result of its thriving wild fish stocks, B.C. is therefore uniquely ill-suited to the practice of open-net aquaculture.

47. With respect to Fraser River sockeye, numerous farms are situated along their key migratory pathways (Exhibit 1563, *Map of Salmon Farms and Migration Routes*). Moreover, the siting of these farms occurred at a time when migratory routes were less well-known, and siting did not adequately account for various potential interactions with wild salmon (Dansereau and Farlinger, September 26, p. 77, l. 23 – p. 79, l. 8). Even the non-mandatory siting criteria guidelines adopted by DFO are over a decade old. At the very least, these siting criteria must be reassessed using current scientific knowledge, as well as made mandatory rather than mere guidelines.

48. The new *Pacific Aquaculture Regulations* (hereinafter "PARs") do not alter DFO's abject failure to adequately pre-assess impacts from aquaculture projects (Last, Swerdfager, August 30, p. 70, l. 44, p. 71, l. 18). It is also clear that the PARs fail to meet the objectives, or even the requirements, of the WSP. For instance, the WSP states that aquaculture sites undergo environmental assessment pursuant to section 35 of the *Fisheries Act* as well as the *Canadian Environmental Assessment Act* (hereinafter "CEAA") (Exhibit 8, *The Wild Salmon Policy*, p. 31). The CEAA is also a primary tool in ensuring that First Nations impacted by decisions are consulted (Exhibit 966, *Wild Salmon Policy - Draft Implementation Gap Analysis*, p. 3). However,

DFO intends to abandon this practice going forward, and did not envisage a PARs licence triggering *CEAA* (Reid, April 5, p. 89, ll. 6 – 40).

49. Also problematic, models that assess the impacts of fish farms do not consider the potential risk of increased disease (Exhibit 1494, *The Impact of Diseases of Pen-Reared Salmonids on Coastal Marine Environments*, p. 2). In other words, and contrary to a precautionary approach, fish farms are currently licensed absent any comprehensive assessment of their true potential risk of transferring disease to wild fish stocks.

50. The problems associated with aquaculture are substantially exacerbated by DFO's stated mandate to promote the aquaculture industry, and its movement away from simply conserving wild fish. For example, notwithstanding the substantial and often long-standing evidence of risk from aquaculture to wild stocks, DFO has failed to adequately and scientifically assess this risk. Specifically, DFO did not commence extensive fish health field studies in the context of outmigrating Fraser sockeye until 2010 (Johnson, August 22, p. 52, ll. 32 – 47).

51. DFO's promotion of the industry can take various forms, all of which are inappropriate activities for an effective regulator to engage in. For instance, DFO spends ample resources on communications which promotes the aquaculture industry, and masks the true impacts of open net-cages in an attempt to "improve public confidence in aquaculture" (Exhibit 1697, *DFO Aquaculture Communications Overview*, p. 10, p. 16)(Exhibit 661, *Briefing Note for DG of Habitat Management*, p. 1)(Exhibit 60, *Letter from Mr. Paul Sprout to Editor - Globe and Mail*)(Exhibit 1637, *DFO National Aquaculture Communications and Outreach Approach*)(Exhibit 1635, *RE: US Senators and BC Fish Farms*). It is far more appropriate for a regulator to communicate accurately on the serious risks posed by open-net fish farms, rather than 'selling it' and its supposed ecological sustainability to the public, internationally or to the marketplace.

52. DFO also gives preferential treatment to the aquaculture industry over other stakeholders. Often behind closed doors, industry is consulted and its interests' are promoted over conservation (Miller, August 25, p. 15, l. 23 – p. 17, l. 12)(Ex. 1500)(Ex. 1501)(Miller, August 25, p. 12, ll. 22 – 32)(Miller, August 25, p. 13, l. 36 – p. 15, l. 9)(Dansereau, Bevan and Farlinger, September 27, p. 3, l. 42 – p. 5, l. 37)(Exhibit 1836, *CAIA-DFO California trip report*)(Ex. 1734). DFO has gone as far as promoting organic certification of open net-cage salmon products (Stewart, September 8, p. 31, l. 14 – p. 32, l. 32).

53. DFO's promotion mandate and ineffective enforcement results in widespread non-compliance within the aquaculture industry, despite public communications by both DFO and industry to the contrary (Exhibit 1723, *FW: Aquaculture incidents: note Gold River MM comments protected B*). Even with clear harmful impacts from unauthorized aquaculture sites, DFO will meet with industry and only potentially consider regulatory action (Ex. 1718) Additionally, government does not have adequate resources to ensure effective enforcement (Exhibit 1726, *RE: Letter to Mainstream,* p. 3, p.5).

54. Moreover, DFO provides direct and indirect financial subsidies to the aquaculture industry; and continues to do so in the midst of budget cuts to core conservation initiatives, such as monitoring. In this regard, DFO provided the Canadian Aquaculture Industry Alliance with nearly $400,000 in direct funding in 2010, a sum that is expected to be received again this year (Exhibit 1835, *Office of the Commissioner of Lobbying of Canada, lobbying statement for CAIA filed by Ruth Salmon*). DFO also spends much of its limited resources promoting the marketability of aquaculture abroad (Exhibit 1634, *Canadian Fish and Seafood Sustainability Briefings-Proposal*, p. 3, p. 5).

55. Perhaps most egregious, the federal *Aquaculture Innovation and Market Access Program* (or AIMAP) provides nearly $70 million in public money to support the aquaculture industry, often in the form of direct grants to fund studies that have absolutely nothing to do with wild fish health or conservation; but instead address industry marketability such as 'soft-flesh suppression technology' (Stewart and Backman, September 8, p. 21, l. 21 – p. 23, l. 5)(Exhibit 1833, *Aquaculture Innovation and Market Access Program 2009-10*). In times of increasing budget cuts and constraints, and increasing threats to wild salmon, limited public funds must go to ensure conservation of wild fish and their habitat, and not to enhance the profitability of industry (Stewart, September 8, p. 23, ll. 22 – 41).

56. In the face of the substantial risk to wild stocks posed by aquaculture, DFO has the express intention of expanding the aquaculture industry (Exhibit 1640, *Federal BC Aquaculture Regulation and Strategic Action Plan Initiative*, p. 25). Expansion of this industry in the face of such risk is contrary to the goals and objectives of the WSP, DFO's own conservation mandate, as well as the precautionary principle; accordingly, it can only be defined as reckless.

Solutions

57. Given all of the negative risks that open-net aquaculture poses to wild stocks, the only viable long-term solution is to remove salmon net-cage farms from B.C.'s coastal waters. Removal must prioritize farms sited along key sockeye migration routes, and particularly those that are in narrow and confined channels (such as Nodales, Okisollo, Hoskyn and Cardero Channels in the Discovery Islands region).

58. Expansion of the open-net aquaculture industry, both its terms of farm sites and increased production levels, must cease immediately. DFO should not even consider expansion applications until an assessment of the cumulative impacts of current open-net aquaculture, as well as the carrying capacity of the receiving environment, is conducted.

59. The proper role of a regulatory agency managing the risks posed by open-net aquaculture is to adequately protect wild stocks and their habitat from potential impacts. Most certainly, it is not the role of a regulator to promote such risky practices, particularly a regulator which purports to strive for a precautionary and ecosystem-based approach. As a result, DFO must refocus its

mandate to conservation and sustainability, and the mandate to promote the aquaculture industry must be removed.

60. All public funding to the net-cage aquaculture industry must cease until DFO meets its key conservation objectives. AIMAP funds should be redirected to support the development and implementation of closed containment fin-fish farming. Any future public funding for industry must be used for enhancing conservation or sustainability.

61. Oversight and independent audits are critical to ensure best practices in the industry. In this regard, there is strong evidence that farming practices significantly contribute to the spread of disease (Exhibit 1496, *Infectious Haematopoietic Necrosis Epidemic in Farmed Atlantic Salmon,* p. 213). DFO's mandate to promote the aquaculture industry generally, and DFO's focus on 'compliance promotion' over enforcement in particular, must be abandoned to ensure this industry is effectively regulated.

62. Dr. Kristi Miller's critical research must be supported. Moreover, there must be independent oversight, including oversight by this Commission, ensuring the aquaculture industry allows comprehensive testing for the signature virus, which has not yet occurred but has been promised (Miller, August 25, p. 13, l. 30 – p. 15, l. 1)(Miller, August 25, p. 17, l. 36 – p. 18, l. 20).

63. Finally, there is strong evidence that *Infectious Salmon Anemia* (or ISA) can be transmitted vertically, and that the recent outbreak of ISA in Chile was transmitted via imported salmon embryos (Exhibit 1502, *ISA Virus in Chile: Evidence of Vertical Transmission*, p. 1). In accordance with the precautionary principle, importation of salmon eggs into Canada must be banned outright.

Recommendations Respecting Aquaculture

iv.1. Remove all open net-cages from B.C. waters. Begin with removal of open net-cage farms on the Fraser sockeye migration routes presently located in narrow and confined channels, including Nodales, Okisollo, Hoskyn and Cardero Channels in the Discovery Islands region. Prioritize removal of all open net-cage farms on the key sockeye migration routes by not permitting re-stocking after the current grow out is completed.

iv.2. Restore the regulatory primacy of DFO and remove its mandate to promote the aquaculture industry. Shift any promotion or marketing of the industry to another government department.

iv.3. Mandate an immediate halt to any new farm sites, expansion of existing farm sites and/or increased production of the net-cage salmon farming industry in B.C. Halt approvals of replacement sites and direct poorly located farms seeking replacement sites to move to closed containment systems.

iv.4. Eliminate all public funding of the open net-cage aquaculture until the primary conservation measures, including the WSP, are fully implemented and funded. Mandate all future public funding of the aquaculture industry to be solely for conservation purposes. Support the development of a closed containment aquaculture industry through government investment, tax incentives and permitting while transitioning the industry out of net-cages and into closed systems. Re-direct public funds supporting net-cage aquaculture to the development and implementation of closed containment technology. Ensure all aquaculture activities that have the potential to negatively impact Fraser sockeye are immediately removed and transitioned to closed systems.

iv.5. Adopt the precautionary approach to all permitted industrial activities taking place in Fraser Sockeye habitat. Increase compliance monitoring and enforcement activity, and undertake comprehensive peer-reviewed research into the impacts of open-net cage salmon aquaculture on wild fish stocks, focusing primarily on fish health.

iv.6. Immediately halt DFO's and the Canadian General Standard Board's efforts to certify net-cage reared farmed salmon as organic.

iv.7. Extinguish all licences, and recommend the province extinguish all tenures, without compensation, of farm sites that have not been in active use for over 12 months.

iv.8. Ban the importation of salmon eggs into Canada.

Habitat

"[I]t's vitally important that the government demonstrate and continue with the leadership…of setting a very high bar for maintaining habitat and habitat protection, for maintaining the 'no net loss' policy for fish and fish habitat…" Jason Hwang (April 4, p. 53, ll. 14 – 24)

64. Habitat degradation is a significant threat to the long-term health of fish populations generally, and for Fraser River sockeye salmon in particular (Hwang, Reid and LeBlanc, April 5, p. 1, l. 32 – p. 2, l. 14) Increasing uncertainty from factors such as climate change will only exacerbate this situation, and there is an enhanced need for precaution in management decisions respecting habitat (Bevan, September 23, p. 77, ll. 2 – 44).

65. The two overarching policies guiding fish habitat management and protection in Canada - the Wild Salmon Policy and the Policy for the Management of Fish Habitat (or 'no net-loss') - both seek more than simply preserving the status quo. The Wild Salmon Policy seeks to maintain and *restore* salmon and their habitats, (Exhibit 8, *The Wild Salmon Policy*, p. vi.) and 'no net-loss' has the "ambitious but realistic" intention of achieving a 'Net Gain' of fish habitat (Exhibit 260, *Policy for the Management of Fish Habitat*, p. 5)(Irvine, November 29, p. 53; lines 12 - 16).

66. Despite DFO policies having the objective of restoring and obtaining a 'net gain' of fish habitat, all evidence indicates that we are instead accruing a 'slow net loss' of fish habitat (LeBlanc, April 4, p. 13, ll. 42 - 46);(Hwang, April 4, p. 14, ll. 23 – 33);(Hwang, April 4, p. 28, ll. 10 – 17);(Exhibit 715, *The Will to Protect - Preserving B.C.'s Wild Salmon Habitat,* p. 5);(Exhibit 662, *OHEB Key Issues – Draft Memo*);(Exhibit 667, *No Net Loss of Fish Habitat - A Review and Analysis of Habitat Compensation in Canada*);(Hwang, April 5, p. 3; ll. 20 – 37).

67. Just as worrisome, it is impossible to measure the extent to which habitat is being destroyed because DFO is not adequately monitoring habitat loss (LeBlanc, April 4, p. 30, ll. 3 – 20);(LeBlanc, April 5, p. 4, ll. 10 – 16); nor has DFO undertaken recent assessments of the extent to which 'no net loss' is being achieved by permitted projects – i.e. compliance monitoring (LeBlanc, April 4, p. 17, l. 44 – p. 19, l. 29).

68. Furthermore, despite acknowledging that reduced oversight of projects impacting habitat is not sustainable, and that enhanced monitoring is required(Bevan, September 22, p. 33, ll. 2 – 31), in 2004 DFO implemented the *Environmental Protection Modernization Program* (hereinafter "EPMP"), which has resulted in substantially fewer projects being monitored or assessed by DFO staff for their impact on fish habitat (Bevan, September 22, p. 33, ll. 2 – 9) and greatly reduced 'boots on the ground' surveillance by fisheries officers (Nelson, April 7, p. 72, ll. 1 - 24).

69. There is a stark disconnect between EPMP and the goals and objectives of the 'no net-loss' policy and the WSP (Reid, April 4, p. 42, ll. 27 – 34)(Exhibit 101, *Witness summary of Mark Saunders (WSP),* p. 13). In fact, the reductions in habitat monitoring staff and project compliance oversight resulting from EPMP are, in fact, antithetical to the intentions of the WSP (Young, June 2, p. 55, ll. 5 – 28). In this regard, there is wide recognition that the size of a project is not directly correlated with its impact; smaller projects – such as culverts – potentially cause serious harm to fish habitat (Exhibit 260, *Policy for the Management of Fish Habitat,* p. 8)(Exhibit 715, *The Will to Protect - Preserving B.C.'s Wild Salmon Habitat,* p. 6). And yet, the implementation of EPMP has resulted in substantially fewer small projects having any oversight at all. This situation, in turn, has resulted in a widespread re-emergence of unsustainable practices, such as unregulated road-building in remote areas and foreshore development (Dansereau, September 22, p. 31, ll. 27 – 44);(Hwang, April 5, p. 53, ll. 3 – 17).

70. Rather than an effective tool to protect habitat, EPMP and the principles of risk-based management that drive this policy are attempts to be more efficient with limited resources (Hwang, April 4, p. 32, ll. 3 – 10);(Exhibit 662, *OHEB Key Issues – Draft Memo*). In essence, EPMP is an attempt by DFO to do less habitat protection with fewer resources. Since implementing EPMP 7 years ago, DFO has not conducted any assessments of the policy's effectiveness in protecting habitat. Nor has DFO done any recent assessment of the extent to which 'no net loss' of habitat is being achieved. Absent such an assessment, it is impossible for DFO to deliver on its intention to report the status of fish habitats to Canadians (LeBlanc, April 4, p. 39, ll. 25 – 30). DFO has assessed habitat staffs' perception of the effectiveness of EPMP who rate 'habitat'

as the number one loss resulting from EPMP implementation (Exhibit 651, *EPMP Implementation Project Phase 1 Diagnostic***,** p. 8)(Reid, April 5, p. 10, ll. 20 – 29).

71. There are many additional DFO management decisions that undermine both the WSP and 'no net-loss' policy. For example, the WSP is intended, at least partly, to implement ecosystem-based management (through Strategy 4). In order to successfully implement an ecosystem-based approach, it is critical for management decisions and proposed projects potentially impacting salmon or their habitat to formally assess those potential impacts, as well as provide mitigation against them. And yet, individual habitat management decisions are most often made in a manner that does not consider or meet the goals and strategies of the WSP. Far too often, management decisions are conducted in silos so that, for instance, aquaculture licensing decisions and permits do not formally account for proximity to key sockeye migration routes (Morton, Parker and Backman, September 8, p. 6, l. 24 – p. 9, l. 14). Similarly, there is consistent failure to assess cumulative impacts when approving projects (Bevan, September 22, p. 33, l. 44 – p. 34, l. 23)(LeBlanc, April 4, p. 29, ll. 1 – 7).

72. An ecosystem-based approach requires management decisions to pre-assess likely impacts to ecosystem values, both directly and cumulatively. It also necessitates multi-stakeholder participation in planning processes. In this vein, the permitting by DFO of activities that are known to potentially impact salmon or their habitat should not be made in a vacuum, but must be formally assessed through the lens of the WSP and the 'no net-loss' policy.

73. Further, the ecosystem-based approach requires greater scrutiny of ecosystem carrying capacities, as well as assessing the cumulative impacts of prospective development. For their part, DFO sees an ecosystem-based approach as a movement away from individual project review, more limited settings or standards and risk-based assessment (LeBlanc, April 4, p. 32 – 44). Less regulatory oversight of potentially harmful projects does not accord with an ecosystem-based approach.

Solutions

74. There are many things that can be done by DFO that will improve the protection of fish habitat. For instance, a crucial building block in the protection of fish habitat is a determination of the current state of habitat. (See, for instance: LeBlanc, April 4, p. 14, ll. 5 – 9);(Hwang, April 4, p. 15, ll. 1 – 14). In order to obtain 'no net-loss' or a 'net gain' of fish habitat, you must first establish a baseline from which net habitat is either lost or gained (Hwang, April 4, p. 75, ll. 30 – 40);(LeBlanc, April 4, p. 14, ll. 5 – 9);(Hwang, April 5, p. 5, ll. 1 – 36).

75. The need to undertake a baseline assessment of fish habitat is recognized in Action Step 2.1 of the WSP, though six years after implementation, DFO has failed to undertake adequate assessments of current fish habitat. Despite the Department making progress respecting the methodology to assess habitat, very little field work is being undertaken to establish indicators,

and only a small number of assessments have been completed (Hwang, April 4, p. 44, ll. 6 – 9);(Young, June 1, p. 90, ll. 33 – 44). According to Rebecca Reid, a lack of resources is severely limiting the implementation of Strategy 2 (April 5, p. 7, ll. 1 – 12).

76. Given that habitat is currently being degraded, any delay in conducting this baseline assessment could result in less habitat being ultimately protected (Hwang, April 5, p. 7, l. 37 – p. 8, l. 8). Further, the failure to complete such habitat assessments has frustrated implementation of additional aspects of the WSP, largely because subsequent action steps in the Policy must be informed by this information.

77. Also crucial, administration over section 36 of the *Fisheries Act* should be returned to DFO. In this regard, Mr. David Bevan notes that having a single regulatory agency managing an ecosystem reduces complexity (September 26, p. 54, l. 6 – p. 55, l. 18). A single regulatory agency also reduces confusion (Steele, April 7, p. 9, ll. 2 – 9); thus, for instance, DFO has the regulatory tools to set standards for major industries, but does not have regulatory tools to set standards for smaller industries that deposit deleterious substances into fish-frequented waters (LeBlanc, April 4, p. 7, ll. 32 – 38).

78. A single regulatory agency also enhances accountability, and limits the ability of 'buck-passing' or claiming that a matter is not within one Department's responsibility or jurisdiction. A single regulator can also be held accountable for reducing regulatory or research gaps, such as the current gaps in marine matters including: the lack of water quality monitoring in marine areas, including with respect to contaminants (Dansereau, September 22, p. 39, ll. 33 – 38)(Richards, September 22, p. 43, ll. 28 – 39)(Ross, June 14, p. 6, ll. 27 – 36) or researching toxic algal blooms, which is not currently being researched by DFO even though it was specifically identified as one of three major potential causes of the decline of Fraser River sockeye salmon (Richards, September 23, p. 26, l. 7 – p. 28, l. 46);(Exhibit 616A, *Memo for the Minister (Info Only) re Factors Affecting the 2009 Fraser Sockeye Return*).

79. Further, a single agency regulating an area is often more efficient and provides cost-savings. (Nelson, April 7, p. 31, ll. 2 – 7)

80. The Minister of Fisheries and Oceans must direct his staff to refocus on the enforcement of habitat violations (Nelson, April 7, p. 65, ll. 7 – 14);(Steele, April 7, p. 67, ll. 7 – 14). Fishery Officers should solely focus on enforcement, and any 'compliance promotion,' as opposed to enforcement actions, should be conducted by non-enforcement officers, similar to how Environment Canada conducts itself (Bombardier, April 7, p. 42, ll. 10 – 14);(Bombardier, April 7, p. 26, ll. 13 – 20).

81. The presence of enforcement officers in the field is crucial to habitat protection, and the simple presence of uniformed fishery officers is among the best enforcement tools available (Nelson, April 7, p. 65, ll. 3 – 14);(Exhibit 715, *The Will to Protect - Preserving B.C.'s Wild Salmon Habitat,*

p. vii) Among other things, an enhanced presence of enforcement officers can do compliance monitoring, something which DFO is currently failing to adequately perform (Dansereau, September 22, p. 27, ll. 5 – 26).

82. Monitoring habitat is absolutely critical to implementing the WSP. This includes compliance monitoring, effectiveness monitoring as well as fish habitat health monitoring – all of which are important and interdependent (Carter, April 6, p. 20, ll. 9 – 20). Currently, there are insufficient resources for DFO to monitor as robustly as the WSP necessitates (Young, June 1, p. 98, ll. 9 – 13). Accordingly, a short, intense period of catch-up may be required (Riddell, June 1, p. 98, ll. 15 – 20). Moreover, DFO is not currently conducting any monitoring or assessments of CU habitat status under Action Step 2.3, despite both its ability, and its explicit commitment, to do so (Exhibit 181, *Witness Summary of Heather Stalberg (WSP),* p. 3 -4);(Exhibit 141, *Letter from Loyola Hearn to Bill Wareham,* p. 5). DFO should immediately commence monitoring and assessing habitat status of Conservation Units for which partial habitat indicators have been developed. DFO would also benefit from concurrently developing a framework to guide monitoring efforts (Exhibit 181, *Witness Summary of Heather Stalberg (WSP),* p. 4).

83. Similar to the WSP generally, it is essential to have specific persons identified as responsible or 'champions' of implementation of the habitat elements of the WSP. This is particularly important given the evidence that national headquarters does not provide support for Strategy 2 (Exhibit 101, *Witness Summary of Mark Saunders (WSP),* p. 13). Despite the need of a champion, it seems that DFO management is moving away from having explicit personnel tasked with implementation of habitat elements of the WSP (Ex. 181, *Summary of Heather Stalberg (WSP),* p. 1).

84. DFO does not currently have adequate resources dedicated to habitat issues to achieve a credible level of enforcement (Steele, April 8, p. 34, ll. 16 – 19), and this is expected to be exacerbated in the near future (Reid, April 5, p. 58, ll. 22 – 41);(Nelson, April 7, p. 62, ll. 22 – 25). For example, work on Strategy 2 of the WSP is not currently receiving adequate funding, and so funding should be procured or redirected to this immediately and as a priority (Reid, April 5, p. 7, ll. 1 – 15);(Stalberg, December 7, p. 33, ll. 28 – 47). And though there is clearly a need for additional resources for habitat protection, all indications are that there will be further budget cuts which will, in turn, hinder the ability of DFO staff (including enforcement officers) from doing their job effectively (Nelson, April 7, p. 13, ll. 20 – 23).

85. In addition, DFO and Environment must, at an absolute minimum, be required to implement the recommendations of the 2009 Auditor General report (Ex. 35).

Recommendations Respecting Habitat

v.1. For enhanced effectiveness and accountability, the administration of the habitat protection and water quality provisions of the *Fisheries Act* (i.e. sections 35 and 36) must be

administered by a single agency. Return responsibility of administering section 36 of the *Fisheries Act* back to DFO.

v.2. DFO must be adequately funded to effectively protect habitat. This means sufficient funding to allow for the presence of fisheries officers, as well as sufficient resources to conduct the necessary research and audits. DFO should abandon any public funding of industry until it meets its core conservation protection mandate.

v.3. EPMP should be abandoned and the Minister of Fisheries and Oceans should direct staff to recommit to habitat compliance monitoring and enforcement. Further, an independent audit of the effectiveness of EPMP in meeting the goals of the WSP and 'no net loss' should be immediately undertaken.

v.4. DFO management should commit to an honest and objective assessment of the resources required to implement the habitat components of the WSP, as well as to actually achieve 'no net loss'.

v.5. DFO must, as a priority, implement Strategy 2 of the *Wild Salmon Policy*, and it should receive adequate and immediate funding accordingly. In addition, a high-level 'champion' should be tasked with ensuring implementation of Strategy 2.

v.6. Local field staff, in association with a prosecutor, must have independent authority to determine when a *Fisheries Act* violation occurs, as well as when charges should be laid. Proper training and guidelines should be developed in this regard.

Urbanization

86. Healthy riparian areas are critical stream components and necessary for ensuring fish health (Crowe, June 7, p. 89, ll. 36 – 40)(See also: Crowe, June 8, p. 70, ll. 1 – 22). In most cases, fish declines have been linked to cumulative impacts rather than a single cause (Salomi, Jun. 8; p. 70, ll. 44 – 47)(See also: Crowe, p. 73, ll. 1 – 6). To protect salmon under the WSP, healthy riparian habitat is essential (Crowe, June 8, p. 71, ll. 30 – 33).

87. Two of the most pressing threats to riparian habitat are urbanization and development near waterways (Crowe, June 7, p. 92, ll. 14 – 42);(Wilkerson, June 8, p. 66, ll. 38 – 44). "The intensity of impacts ... is perhaps greater in the Lower Fraser, just due to the density of people, the value of the land and the intensity of development of that land for things like urban residential development, agriculture, et cetera." (Salomi, June 7, p. 93, ll. 24 – 29) Additional threats include loss of floodplains, infilling and expansion of agricultural land (Crowe, June 7, p. 94, ll. 38 – 47, p. 95)(See also: Crowe, June 8, p. 93, ll. 28 – 30).

88. In the 2000s, the Province moved towards a "results-based approach, one of providing standards and guidance documents but not one of being actively engaged…", leaving a "vacuum" for the DFO (Salomi, June 7, p. 98, ll. 1 - 47, p. 99, ll. 11 – 30). Unfortunately, this vacuum has contributed to continued confusion between the Province and the DFO as to who has jurisdiction when dealing with areas not covered by the *Water Act* (Crowe, June 8, p. 8, ll. 5 – 47). Protection of riparian zones is one of these areas.

89. Two major gaps in legislation exist. The first is that there is a portion of riparian areas that is not regulated by either The *Water Act* or the *Riparian Areas Regulation* (the "RAR"). The *Water Act* as presently applied by the province is below the mean annual water mark, while the RAR applies above the one-in-five-year flood elevation. As noted in the evidence, there's vertical distance between those two elevations that is not regulated. (Crowe, June 8, p. 9, ll. 9 – 19) The second gap is that the RAR does not apply or is not applied consistently throughout BC (Crowe, June 8, p. 9, ll. 20 – 24).

90. On an operational basis, there is no way to assess environmental impacts on a cumulative basis, taking into account future developments (Baker, June 8, p. 13, l. 42 – p. 14, l. 1). These operating statements contribute to a "tendency to underestimate the potential impact…" of development (Salomi, June 8, p. 16, ll. 16 – 18). Some operating statements, notably the 'Bridge Operating Statement,' make "dangerous interpretations or assumptions" about the amount of riparian habitat disruption necessary for a HADD (Salomi, June 8, p. 15, ll. 46 – 47). Consequently, the use of operation statements is "…continuing to contribute to the ongoing cumulative incremental harm to habitat" (Crowe, June 8, p. 18, ll. 1 – 2).

91. New streamlining tools that remove government employees out of direct engagement and field work have contributed to an increase in reported occurrences of "harm or potential violations of the Fisheries Act." (Crowe, June 8, p. 28, ll. 20 – 24)(See also: Crowe, June 8, p. 22, ll. 13 – 21).

92. There is an inherent conflict of interest between bodies implementing the RAR; local governments concerned with economic development and DFO or Environment Canada who should be focused primarily upon conservation (Crowe, June 8, p. 23, l. 10 – p. 24, l. 15)(See also: Salomi, June 8, p. 56, ll. 4 – 7) Indeed, a number of local governments still feel it's outside their responsibility to deliver RAR (Crowe, June 8, p. 60, ll. 10 – 16)(See also: Wilkerson, p. 44, ll. 13 – 47). This creates a problem whereby authority is being given to local governments who don't want the duty, and highlights the difficulty in ensuring local governments are fulfilling their obligations (Crowe, June 8, p. 84, ll. 3 – 7). Within the RAR, local governments are encouraged to create 'Streamside Protection and Enhancement Areas;' unfortunately, the RAR provides a mere suggestion that local governments use their powers under the *Local Government Act* (Wilkerson, June 8, p. 40, ll. 18 - 29). With a move towards greater reliance upon professionals, a danger exists whereby professionals may simply advocate for their clients and development projects rather than addressing cumulative incremental harms (Crowe, June 8, p. 47, ll. 15 – 20)(See also: Crowe, p. 80, l. 41 – p. 81, l. 15).

93. The Shuswap Lake Integrated Planning Process is an example of a multi-agency participatory process in RAR implementation. It involved cooperation amongst various levels of government and other stakeholders, working in the general spirit and towards the goals of the WSP (Crowe, June 8, p. 92, ll. 38 – 46)(See also: Crowe, June 8, p. 64, ll. 12 – 47)(Crowe, June 8, p. 76, lines 27-38).

94. Within the RAR, it is not always clear in which situation to apply which tool (the Land Development Guidelines, the Streamside Protection Regulation and the RAR's own detailed assessment approach) (Salomi, June 8, p. 55, l. 46 – p. 56, l. 3). Furthermore, the "RAR, itself, isn't enforceable. It was not designed to be…" It depends on the ability and will of local governments to enforce their own bylaws (Wilkerson, June 8, p. 57, ll. 22 – 25). (See also: Crowe, June 8, p. 58, l. 32 – p. 59, l 20). The RAR provides neither a standardized nor a compelling system of ensuring compliance; it also makes sustainable planning difficult by not providing consideration for future developments (Crowe, June 8, p. 59, ll. 17 – 20) (See also: Salomi, June 8, p. 60, ll. 21 – 27). While the RAR recommends follow-up monitoring, property owners are not compelled to ensure this follow-up is completed (Crowe, June 8, p. 81, ll. 29 – 34).

Gravel Mining

95. Gravel reaches are very likely key habitat for genetically important and distinct sockeye salmon (Rosenau: June 16; pgs. 26 – 28; lines 38 – 2). Despite this, and despite multiple reasons for concern, DFO currently permits gravel removal in the Fraser River (Ex. 1094) (Rosenau: June 16; pg. 56; lines 11 -18);(Rosenau: June 16; pg. 14; lines 8 – 15).

96. Potential impacts of gravel mining include: increased turbidity, impact upon or loss of riparian habitat, erosion from gravel pit degrading upstream environment, disturbance of in-stream environment by construction, and blockage of water or fish movements. There is also the potential for impact upon fish habitat through modification of the environment, thus making it less favourable for sockeye (Rosenau: June 16; p. 12 – 13; lines 23 - 33).

97. DFO's permitting of gravel removal highlights the fact that political considerations often trump conservation and science. In this regard, gravel removal in the Fraser is conducted on the dubious basis of flood prevention, even though substantial international experience shows that removals short of a million cubic metres will not substantially affect local water levels; and DFO does not permit extractions of this level, likely because it would "significantly disrupt the aquatic ecosystem" (ex. 1085);(Hwang, Berardinucci: June 16; pg. 102 - 103; lines 27 – 28). Notwithstanding these inconsistencies, DFO permits gravel removal absent sound scientific basis for doing so.

98. Currently, there are gaps in monitoring and DFO cannot ensure effective protection of fish habitat while allowing gravel mining to proceed (Hwang: June 16; pg. 82; lines 32 – 47);(Rosenau: June 16; pg. 36; lines 34 – 41)(Ex. 1085);(Rosenau: June 16; p. 21; lines 20 – 41).

99. Gravel removal also highlights DFO's systemic failure to adequately assess cumulative impacts as mandated by the CEAA. Despite the clear need for an effective cumulative impact assessment, DFO is not ensuring such an assessment occurs (Rosenau: June 16; p. 16-17; lines 39 – 10);(Rosenau, Rosenau: June 16; pg. 17; lines 24 – 33) .

Recommendations Respecting Gravel

vi.1. Gravel mining, and the large scale harmful alteration of fish habitat, must cease in the Fraser River system until a sound scientific assessment is produced showing such removals are necessary for flood-management, and part of a comprehensive environmental management plan for that section of the Fraser River.

Contaminants

"...often sublethal effects of contaminants may not be evident, but when a secondary insult comes along like a virus, like climate change, like a food supply problem or other stress with regard to habitat destruction, that's where the contaminant influence may become a very significant contributing factor...the contaminants would predispose salmon to a secondary insult." Dr. Peter Ross (June 14, p. 41, ll. 33 – 40)

100. Though the amount and complexity of toxins entering the environment has increased, scientific research at DFO on the ecological impacts of such toxins has declined. DFO Pacific Region does not currently have a dedicated fish toxicologist, who has expertise on fish and contaminant interactions (Ross, June 14, p. 6, ll. 16 – 20). This deficiency has continued despite the fact that sockeye are exposed to large amount of contaminants throughout their lifetime including endocrine disrupting contaminants. According to Dr. Peter Ross and others, "there is a *strong possibility* that contaminants have contributed to the decline in Fraser sockeye over the last 20 years." (Exhibit 1381, *Salmon are sensitive: Life history, habitat, and contaminants,* p. 20). Contaminants are also known to have contributed to reduced populations in other *salmonid* species in Canada (Exhibit 1381, p. 6 - 8).

101. The decision by DFO to move away from this research has left large data gaps, and enhanced the uncertainty in which DFO operates (Exhibit 1381, *Salmon are sensitive: Life history, habitat, and contaminants,* p. 20). As a result of its abandonment, DFO is no longer monitoring contaminants such as wastewater, and it is failing to research the connection between ecosystem health and contaminants (Ross, June 14, p. 6, l. 37 – p. 7, l. 10);(Ross, June 14, p. 14, ll. 2 – 13).

102. Like other environmental issues, the danger posed by toxic contaminants cannot be examined in isolation. Contaminants have the potential to work synergistically with each other and with other stressors, and therefore the sub-lethal impacts of toxins may not become evident until fish are already compromised by other stressors, particularly disease (Ross, June 14, p. 41, ll. 33 – 40);(Exhibit 1381, *Salmon are sensitive: Life history, habitat, and contaminants,* p. 9 - 11).

103. Monitoring of contaminants is essential, and DFO currently focuses its monitoring on parameters that are cheapest, rather than those that are most important (Ross, June 14, p. 87, l. 15 – p. 88, l. 13). Current monitoring methods are inadequate and more funding is needed (van Aggelen, June 14, p. 51, ll. 6 - 33).

104. In addition, guidelines respecting contaminants are 'always' determined by examining a single chemical, instead of the 'toxic soup' of the real world (Ross and van Aggelen, June 14, p. 85, ll. 11 - 34);(Ross, August 18, p. 41, ll. 24 – 43). This failure is extremely problematic and should be recognized by DFO as such (Ross, August 18, p. 41, l. 44 – p. 42, l. 14). This chronic failing also supports the need for DFO to obtain expertise in fish toxicology, as well as undertake additional research on the subject.

105. Given that there are currently approximately 90 waste water treatment plants operating in the Fraser River valley, municipal wastewater is of particular concern as a source of contaminants for Fraser River sockeye (Ross, June 14, p. 15, l. 37 – p. 16, l. 9). Plants have varying degrees of treatment, though all contribute contaminants into the Fraser system. The cumulative effect is a cocktail of toxic chemicals which includes pharmaceutical products, PCBs, PBDEs, household cleaners and many others. Toxins in wastewater are likely contributing the long-term declining productivity of Fraser sockeye (Ashley, June 14, p. 62, l. 41 – p. 63, l. 9).

106. According to Dr. Peter Ross, the experience of several other jurisdictions, including Canadian jurisdictions, underscore the potentially important threat that wastewater treatment streams present to the health of fish (Ross, June 14, p. 14, ll. 14 – 23).

Solutions

107. Recommendations from this Commission should focus on limiting contaminants from entering the natural environment, particularly persistent and bioaccumulative contaminants, as well as ensuring adequate monitoring of the worst contaminants.

108. Similar to other subject-matters that go unstudied by DFO, Canada's decision to avoid contaminants research is related to the split jurisdiction of the *Fisheries Act*. In this regard, DFO decided to cease toxic contaminants research on the basis that such matters are governed by section 36 of the *Fisheries Act*, and therefore come within the purview of Environment Canada (Ross, June 14, p. 78, l. 44 – p. 79, l. 11). This situation has hampered the ability of DFO scientists to research topics related to contaminants, including whether

contaminants have contributed to the decline of Fraser sockeye (Ross, June 14, p. 80, ll. 8 – 21);(Ross, June 14, p. 6, ll. 27 – 36). For their part, Environment Canada has not 'picked up the slack' and developed its own contaminants research program (Ross, June 14, p. 82, ll. 40 – 46). Administration of section 36 should therefore be returned to DFO, so as to ensure this gap is addressed, and to limit future confusion.

109. DFO must re-establish expertise in contaminants and fish toxicology. Investment in research is both precautionary, and cost-effective in the long term (Ross and van Aggelen, June 14, p. 51, l. 34 – p. 53, l. 16).

110. Wastewater regulations should be developed or upgraded to include an examination of the vulnerability of the receiving environment (Ross, June 14, p. 15, l. 38 – p. 16, l. 4). These regulations should also address the cumulative impacts of toxic contaminants. Future upgrades to wastewater treatment plants must, at a minimum, be to an advanced level using trickling filter technology or the equivalent, as activated sludge technology does not manage the discharge of emerging chemicals, including endocrine disruptors (Ashley, June 14, p. 70, ll. 18 - 31). In particular, the Iona wastewater treatment plant should be upgraded with better than secondary treatment since by the time it is built (before 2030) technology will have improved (Ashley, June 14, p. 29, ll. 18 - 23).

Recommendations Requesting Contaminants

vii.1. Reinstate the Toxic Chemical Research Program at DFO. Ensure that DFO Pacific Region employ a fish toxicologist, and conducts research respecting the impacts of toxics on fish generally and sockeye salmon in particular.

vii.2. Return responsibility of administering section 36 of the *Fisheries Act* back to DFO.

vii.3. Enhance monitoring for contaminants, including looking at cumulative impacts of multiple contaminants from multiple sources in the natural environment. Ensure wastewater effluent is monitored for presence of contaminants, and not limited to biological measures.

vii.4. Expand risk assessments respecting contaminants to address the multiple chemicals currently present in the natural environment, rather than assessing a single contaminant in isolation. Acknowledge the shortcoming of guidelines that assess individual contaminants in isolation.

Marine Spills

111. For the majority of marine spills environmental impacts are not assessed and clean-up is not undertaken. This failure to assess environmental impacts of spills can result in long term harm to salmon and its habitat.

112. A complex jurisdictional matrix results in potential delays in response time due to confusion over who is the lead responder and jurisdictional squabbling (Di Franco: Aug 17 p. 55 - 56; lines 30 – 19). The current capacity of the various agencies to respond to marine spills - both large and small - is in question.

113. Moreover, the lack of coordination between agencies is problematic. Notwithstanding the fact that DFO has the greatest expertise in marine contaminants, it is not a member of the Regional Environmental Emergencies Team or REET, which is consulted on larger marine spills (Di Franco: Aug. 17; pgs. 58 – 59; lines 43 – 3);(Dr. Ross: Aug 17; p 69 - 70; lines 10 – 15). DFO is consulted less now by REET regarding marine spills (Ross, Di Franco: Aug. 17; pgs. 60 – 61; lines 31 – 9).

114. Most worrying, when REET does provide important advice on ecosystem health to the Coast Guard, that advice is often ignored (Dr. Ross; Aug 17; pg. 61; lines 21 – 33);(Di Franco: Aug 17; pg. 63; lines 42 – 44).

Solutions

115. Canada's response to marine spills can be improved in a number of ways. Firstly, there is a need to increase the capacity of agencies to monitor and address marine impacts from spills (Ross : Aug 18; p 88; lines 37 – 47), as well as ensure cost recovery from polluters (Aug 18; p 23; lines 39 – 47). Also important is to fill large data gaps respecting the impacts of oil spills on salmon (Aug 17; p 92, lines 42 – 46; p. 94, lines 17 – 42; p 95 – lines 9 – 17).

116. Further, changes must be made so that the Coast Guard, which is the primary responder to most spills but which does not have expertise in ecosystem health, is not be permitted to simply ignore advice respecting environmental health (Aug 17; p 70; lines 26 – 42; August 18; p. 33, lines 18 – 43). Moreover, ecosystem health and not cost of clean-up must be the primary determinant respecting remediation (Aug 17; p 64; lines 15 – 20; 34 – 44; p 78; lines 30 – 44).

Recommendations Respecting Marine Spills

viii.1. Establish a formalized structure which ensures environmental impacts of marine spills are adequately considered.

Pulp and Paper Effluent/Mining Effluent

117. The potential ill effects from effluent from pulp and paper mills and metal mines on salmon and salmon habitat are numerous. Occurring in the freshwater and marine environments, these effects include nutrient enrichment and/or endocrine disruption in fish, water

eutrophication, and disturbance of benthic communities (Exhibit 1026, *National Assessment of Pulp and Paper Environmental Effects Monitoring Data: Findings from Cycles 1 through 3*, p. 32 – 34)(See also: Boyd, June 13, p. 20, ll. 21 – 22) (Hagen, June 13, p. 43, ll. 14 – 22).

118. The main federal regulations that deal with effluent being released into fish habitat are the Metal Mining Effluent Regulations (MMER) and the Pulp and Paper Effluent Regulations (PPER), both promulgated under the *Fisheries Act*. In order to assess the adequacy of the PPER in protecting fish and fish habitat, the federal Environmental Effects Monitoring Program (the "EEM Program") was developed. Unfortunately, there are serious shortcomings in the EEM Program, including its failure to take into account cumulative effects of effluent discharge into the freshwater system (Boyd, June 13, p. 61, ll. 1-25) and the marine system, where "it's hard to do effective fish surveys," (Boyd, June 13, p. 22, l. 40) Currently, "[t]he short is that EEM per se doesn't evaluate the sockeye. It's designed to look at resident fish species." (Boyd, June 13, p. 32, ll. 39 – 41)(See also: Boyd and Grace, June 13, p. 62, ll. 17 - 29).

119. Under current effluent monitoring standards, there are serious deficiencies that can harm fish habitat or ultimately, create net habitat loss. Studies have shown that some discharge engenders chronic sublethal effects on fish (Boyd, June 13, p. 84, ll. 2 – 5)(See also: Hagen and Boyd, June 13, p. 86, l. 5 – p. 87, l. 26). For example, bleached pulp mill effluents "have been found to be mutagenic using standard tests." (Exhibit 1041, Health Canada, Environmental and Workplace Health, Effluents from Pulp Mills using Bleaching - PSL1, p. 2 – 3). Current levels of testing do not target endocrine disrupting compounds, nor are these addressed during the environmental assessment (EA) process (Grace, June 13, p. 53, ll. 26 – 47). Furthermore, "As the status quo is considered unacceptable, Environment Canada should consider changes to sublethal toxicity testing within the EEM program." (Exhibit 1033, Metal Mining Environmental Effects Monitoring Review Team Report)

120. In addition, gaps in the PPER, MMER and the EEM Program fail to address effluent from placer mines, which may still have "a very significant impact on the environment" (Hagen, June 13, p. 70, ll. 38 – 42); orphaned mines (Grace, June 13, p. 51, ll. 16 – 28); and mines that were closed before the MMER was promulgated in 2002 (Hagen, June 13, p. 65, ll. 21-26).

121. Now more than ever, with development encroaching on fish habitat, greater numbers of mines and mills in operation, and as there are significant new mine projects planned for the Fraser basin (Hagen, June 13, p. 70, ll. 1-19), research into cumulative impacts, emerging compounds of concern (Hill, June 13, p. 56, ll. 25-28) and sublethal effects on fish are necessary.

122. Ultimately "what's needed is an inventory of the actual discharges of the different contaminants of concern from the different sources and what proportion of the concentration of those substances, those discharges represent in the river." (Hill, June 13, p. 65, l. 45 – p. 66, l. 3).

Logging

123. When it comes to fish and forestry, there are two overarching concerns: riparian standards and fish stream crossing (Delaney, June 17, p. 30, ll. 22 – 24). Referring to the BC Ministry of the Environment's The Strategic Approach: Protocol for Planning and Prioritizing Culverted Sites for Fish Passage Assessment and Remediation, Delaney voices concerns that the fisheries value of some watersheds are being underestimated in the absence or deficiency of stock assessment data (June 17, p. 37, ll. 22 – 30).

124. Under the *Forestry Range and Practices Act* (*FRPA*) and notably in the last three or four years, DFO staff have been "less…engaged in reviewing forestry activities…" and not as proactively involved in research and monitoring (Delaney, June 17, p. 19, ll. 6 – 16). The *FRPA* has necessitated a greater reliance on industry to report and monitor and has resulted in less review or referral tasks for the DFO (Delaney, June 17, p. 19, ll. 31 – 36)(See also: Delaney, June 17, p. 72, ll. 36 – 39). With a diminished role comes less field time and "unless we're actually out there seeing what's going on, good, bad, ugly, that we really don't know." (Delaney, June 17, p. 54, ll. 7 – 10) Severe funding cuts have ended multi-agency proactive research and monitoring programs and have limited the capacity of agencies to examine fish-forestry issues (Tschaplinski, June 17, p. 59, ll. 10 – 13)(See also: Tschaplinski, June 17, p. 67, ll. 32 – 47) (Tschaplinski, June 17, p. 76).

125. Within the Coastal Watershed Assessment Procedure Guidebook (the "CWAP Guidebook") and the Interior Watershed Assessment Procedure Guidebook (the "IWAP Guidebook")(Exhibit 1112) under the Forest Practices Code, earlier versions contained "quantifiable targets" (Tschaplinski, June 17, p. 23, l. 14). Despite later versions having the luxury of being informed by a wider scientific base, they nonetheless contained more ambiguous indicators that were developed "…over broad spatial scales"(Tschaplinski, June 17, p. 23, ll. 13 – 35). The evolution of these guidebooks was indicative of a greater trend in forestry management from a "…more prescriptive basis to a more open one, where professional alliance played a bigger role." (Tschaplinski, June 17, p. 23, ll. 39 – 46) (See also: Delaney, June 17, p. 55, ll. 23 – 32)

126. Mountain pine beetle and salvage harvesting impact salmon-bearing streams and those streams' ability to recover (Tschaplinski, June 17, p. 45, ll. 2 – 21) (See also: Tschaplinski, June 17, p. 15, ll. 1-35). For small fish-bearing streams, buffers of five metres or less generate measurable negative impacts; the Forest Range and Evaluation Program recommends a minimum buffer of 10 meters in order to minimize these ill-effects (Tschaplinski, June 17, p. 45, ll. 24 – 40). Leaving beetle-killed trees standing has been shown to have no adverse effect on riparian habitat (Tschaplinski, June 17, p. 46, ll. 5 – 20), and "even though the trees themselves may be dead, they do carry a number of wildlife habitat and hydrologic function capabilities in the forest." (Miller, June 17, p. 47, ll. 23 – 26) To date, government is "not exactly sure" what effects the geomorphology, topography and the hydrology of those cut

blocks are going have on streams (Tschaplinski, June 17, p. 74, ll. 1 – 14). Despite the unknowns associated with forestry and fish habitat, according to Delaney, "there's very little being done associated with the forest harvesting file." (June 17, p. 81, ll. 23 – 37) Furthermore, the potential for cumulative impacts is greatly increased as individual clear cut areas are not considered as part of a larger system of cleared areas that can adjoin and cover tens of thousands of hectares. (Miller, (June 17, p. 48, ll. 13 – 21).

127. In support of the WSP, it is important to undertake "long-term multi-agency watershed scale basic research projects" that help assess how all ecosystem factors interact with one another – these projects are expensive and difficult to maintain but would be immensely useful for establishing baselines and guiding management decisions (Tschaplinski, June 17, p. 48, l. 40 – p. 49, l. 6).

128. Major gaps in knowledge exist and to close them, more research should be undertaken "focused at cause and effect relationships between alterations to the land base, both by forestry and other things like the beetle infestation on channel form, physical habitat structure, large woody debris dynamics, and fish habitat." (Tschaplinski, June 17, p. 57, ll. 6 – 10, ll. 19 – 24)

Temperature, Flow and Hydroelectricity

129. The relationship between temperature and water flows is critically important to Fraser River sockeye. In this two day panel, the Commission heard evidence first from a panel of experts discussing the science and the impacts of existing hydroelectric projects on sockeye. Second, the Commission heard evidence from representatives of the BC government, DFO and BC Hydro on provincial water and hydroelectricity issues.

130. Groundwater is critical in maintaining water temperatures that support Fraser River sockeye. It helps cool water in summer and warm water in winter, minimizing thermal stress on salmon throughout all stages (Bradford, September 15, p. 68, ll. 29 – 34). The BC Auditor General has concluded that the provincial government is failing to protect groundwater and the viability of ecosystems it supports (Exhibit 1871, An Audit of the Management of Groundwater Resources in British Columbia, p. 9).

131. Protecting water flow is also critical. Significant disruptions to Fraser River flows have occurred over the past century, most notably with the Kemano Project reducing annual discharges in the river by up to 50% (Exhibit 903, Is scientific inquiry incompatible with government information control?, p. 1204). Glacier melt, and other uncertainties posed by climate change amplify these existing challenges faced by Fraser River sockeye (Exhibit 1854, Coupled modelling of glacier and streamflow response to future climate scenarios);(See also: Exhibit 1855, Effects of river temperature and climate warming on stock-specific survival of adult migrating Fraser River sockeye salmon (*Oncorhynchus nerka*)).

132. Provincial shortcomings with respect to water management are significant. In addition to the groundwater inadequacies identified by the Auditor General, B.C.'s Water Act modernization, which is intended to modernize this outdated law to be more responsive, proposes legislation that will rely on guidelines, not regulations, to protect water flows, and only proposing to protect groundwater for problem areas to be defined. (Orr, September 15, p. 59, ll. 1 – 14)(Kriwoken, September 16, p. 64, ll. 11 – 19)The testimony of provincial officials provides little comfort that the current water temperature and scarcity issues in the Fraser watershed will be resolved for sockeye.

Recommendations Respecting Temperature, Flow and Hydroelectricity

ix.1. BC Hydro's Water Use Planning process has proven valuable for planning around hydro projects and would be a good model for balancing ecosystem values with independent power projects (Orr, September 15, p. 66, ll. 23 – 36).

ix.2. Groundwater is a critical component of salmon habitat, and the federal government should take steps to regulate it in the face of provincial inaction. Alternatively, the province should proceed with the Water Act modernization, including mandatory measures to protect water flows.

Causes for the Decline of Fraser Sockeye

"There was widespread agreement with the PSC report that the 2009 and long-term declines in sockeye productivity were likely due to the effects of multiple stressors and factors" Technical Report #6 (Exhibit 1896) at page 104.

133. After many days of hearings involving preeminent scientists and after reviewing all of the technical reports that were generated though this Commission, the conclusion to be reached is that there is no one significant cause that can be shown to have brought about the poor returns for the 2009 run of Fraser Sockeye or that has caused the long term decline.

134. This Coalition agrees with the findings and evidence given by numerous scientific experts who presented to the Commission that there are multiple contributing factors and stressors that have the potential to cause the overall decline in sockeye productivity.

135. While none of the contributing causes can definitively be ruled out, there are certain factors that the scientific community has opined are more likely than others to have caused the decline. This Coalition cautions that while the approach of ranking likely hypotheses may have some utility for the purposes of selecting research priorities, it would be prudent to take into account the potential for cumulative effects of the multiple causes acting together in a fashion that we do not as of yet understand.

136. Thus we submit that the fresh water environment and what may be occurring there ought not to be ignored for the purposes of finding answers.

137. The current thought is that the decline of the Fraser Sockeye can be linked to the marine environment and the early marine survival of the outmigrating smolt. Whether climactic conditions including sea surface temperature, food supply, disease, toxic algal blooms, or some as yet described phenomenon is occurring during that critical phase in the life cycle of the Fraser sockeye, it is likely that something is occurring during that phase to cause or contribute to the decline of the Fraser sockeye.

138. The likely hypotheses suggest that the places to look for the cause (or causes) for the decline would include the Strait of Georgia and Queen Charlotte Sound.

139. We further submit that potential linkages to fish farming should not be ruled out as a potential cause for the decline. Since we are in an era of uncertainty, we submit that in the interim fish farms in the vicinity of the migration pathways for Fraser sockeye be shut down.

140. In this era of uncertainty it is fundamental that the precautionary principle and precautionary approach be adopted during any decision making involving the harvesting of Fraser Sockeye.

141. DFO has shown itself to be ready to use the precautionary approach; for example there was no harvesting of Fraser sockeye during the 2009 return which had been described as disastrous by some of the witnesses.

142. DFO must continue to use this approach in the planning of its fishing plans through the consultations with the participants in the Integrated Harvesting Management Committee and through the annual Integrated Fishery Management Plan.

143. The quest for determining the cause(s) for the 2009 decline and the general trend in the decline of the Fraser sockeye is made more of a conundrum when the sockeye returned in 2010 in such large numbers.

144. It is essential that scientific research be conducted to allow those who are going to be responsible for decision making to have the best available information to guide their determinations. To that end this Coalition recommends that a body be established that would consist of the following:

- DFO research scientists
- Scientists from academic institutions
- Scientists from this Coalition and other participants groups in this inquiry who may make contributions to answering some of the key questions that remain outstanding

- Scientists from groups such as PICES and NOA who may contribute from an international perspective to the debate and to the state of knowledge
- First nations leaders and elders who may contribute traditional knowledge

145. Such a group should focus upon the areas of research and make determinations that would include the following:

- Research priorities
- Publishing and sharing of research
- Data sharing and data retrieval
- Sponsoring conferences and symposia for the free exchange of information and debate

The Future of the Fraser Sockeye and this Commission's work and recommendations

146. It is vital that the work of this Commission and whatever recommendations it may make to the Government of Canada became incorporated into the policy and practices of Canada in a meaningful and timely manner.

147. Too often the reports of past Commissions with their many recommendations as well as the recommendations that have emanated from the office of the Auditor General of Canada have sat on the shelf of DFO's libraries collecting dust. There is a noticeable but disturbing attitude in DFO of excessive dilatoriness. They are indeed the masters of foot dragging as one witness called them. (Stewart, September 7, p. 50, ll. 42-43).

148. This Coalition is reluctant to point fingers but does suggest that it appears that managers who are tasked with the implementation of scientific advice usually are slow to react to suggestions for change and modification. We recognize that it is the Government of Canada that is ultimately responsible for moving ahead on some of the suggestions that are likely to come from this Commission, and that lack of funding is an issue. The tension that we have seen is with government and the civil service wanting to make the right decision in the context of multi-variant stakeholders and the overarching concept of protecting the resource. It is crucial that protection and conservation of the resource come first.

149. In the context of DFO it is thus critical that this Commission's report and recommendations do not become just another link in a useless chain forged by the work of past Commissions.

150. In order to ensure this Commission does not become just another exercise in futility, this Coalition recommends that a multi participant group be established to oversee the progress of the implementation and treatment of this Commission's recommendations. (See Exhibit 1319, *Future of Fisheries Science on Canada's Pacific Coast,* as an example of such a mechanism.)

All of which is respectfully submitted this 17th day of October, 2011.

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T. Leadem, QC
Counsel for the Conservation Coalition

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Appendix A

Summary of Recommendations

Recommendations Respecting the Wild Salmon Policy

i.1. Immediately assign a senior DFO manager (who directly reports to the RDG) with the exclusive responsibility of WSP implementation (WSP champion). Performance measures for the position must be integrated with WSP implementation targets. Make the WSP champion's initial task the completion and publication of a WSP implementation plan to be completed by December 2012.

i.2. Assign DFO staff specific implementation tasks with timelines, to be overseen by the WSP champion.

i.3. Assign a substantial portion, or all, of the performance-based pay structure of the Pacific Region RDG to WSP implementation targets and meeting recovery targets of conservation units identified to be in the Red Zone.

i.4. Allocate at least $2.5 million annually over the next three years to support the coordination and administration of WSP implementation.

i.5. By December 2012, assess the amount of resources necessary to complete baseline CU, habitat and ecosystem assessments for Strategies 1, 2 and 3 (likely to be a minimum of $30 million). Allocate the necessary funding to ensure completion of preliminary habitat and ecosystem assessments, with status relative to benchmarks, by December 2013.

i.6. Require annual public reporting on the status of Pacific salmon relative to Strategies 1 – 3, along with progress on the WSP implementation plan.

i.7. By December 2012, assign all CUs to Red, Amber or Green zones, consistent with the CU benchmark methodology. CUs lacking enough information to quantify status should be assigned Red Zone status, and thereby identified as a priority CU.

i.8. By December 2013, a recovery planning process for all Red Zone CUs must be initiated. Regional grouping (e.g., watershed scale) of recovery planning efforts in areas where multiple Red Zone CUs should be undertaken to maximize efficiency and support implementation of integrated planning (Strategy 4).

i.9. By December 2012, host workshops with stakeholders on the application of the WSP to DFO management decisions, including but not limited to: aquaculture permitting, habitat authorizations and CEAA assessments.

i.10. By December 2012 undertake a science-based and multi-stakeholder process to evaluate and apply the goals and intent of the WSP to the DFO Salmon Enhancement Program

i.11. By December 2014, conduct an independent audit of WSP implementation.

Recommendations Respecting DFO Organizational Structure

ii.1. Examine the role of science in decision making and ensure its independence through the establishment of an independent body such as the now defunct National Fisheries Research Board of Canada

ii.2. Ensure that decision making occurs in as transparent a fashion as possible by suggesting that Ministers must give full reasons for decisions such as the listing of CUs under SARA

Recommendations Respecting Fisheries Management

iii.1. Protect all depleted, threatened or endangered (i.e. red) CUs from overfishing by mandating maximum total exploitation rates at of 10% or less for those CUs, until recovery plans are implemented and exploitation rates are scientifically demonstrated to be consistent with recovery.

iii.2. Ensure that lowered exploitation rates for threatened or endangered (i.e. red) CUs do not unduly restrict fisheries on identifiable CUs with harvestable surpluses by transferring fishing effort to terminal areas and more selective gear types. This action will have the added benefit of reducing reliance on run size forecasts at the 'aggregate level' which has been chronically unreliable .

iii.3. Facilitate the transfer of fishing effort to terminal areas and more selective gear types:

(iv) Re-establish a selective fishing policy and program that provides support for the development and/or expansion and management of in-river fisheries using selective gear (e.g. beach seines, fish wheels, fish traps, dip nets), preferential provision of quota to highly selective marine gear types (e.g. tooth tangle nets), as well as management and marketing.

(v) Recommit funding for a minimum of 5 years to the PICFI process with the explicit priorities of transferring licences from the least selective (e.g., marine) to the most selective (e.g., river tributaries) First Nations fisheries and providing processing capacity for terminal selective First Nations fisheries.

(vi) Ensure that the Fraser Sockeye Chapter of Pacific Salmon Treaty is renegotiated in the next two years to support CU level objectives, thereby ending the entrenchment of aggregate stock management and overfishing of weak CUs.

iii.4. Meet all conditions for Marine Stewardship Council certification of B.C. sockeye and pink salmon fisheries within the required, agreed-upon timelines (Grout, January 24, p. 15, ll. 21 – 43).

iii.5. Mandate a minimum of 50% independent observer coverage (camera or onboard monitors) by 2013 in all salmon fisheries where non-target species are encountered.

iii.6. Canada should commence multilateral discussions with salmon producing nations of the North Pacific aimed at identifying and minimizing hatchery production impacts to wild salmon populations.

Recommendations Respecting Aquaculture

iv.1. Remove all open net-cages from B.C. waters. Begin with removal of open net-cage farms on the Fraser sockeye migration routes presently located in narrow and confined channels, including Nodales, Okisollo, Hoskyn and Cardero Channels in the Discovery Islands region. Prioritize removal of all open net-cage farms on the key sockeye migration routes by not permitting re-stocking after the current grow out is completed.

iv.2. Restore the regulatory primacy of DFO and remove its mandate to promote the aquaculture industry. Shift any promotion or marketing of the industry to another government department.

iv.3. Mandate an immediate halt to any new farm sites, expansion of existing farm sites and/or increased production of the net-cage salmon farming industry in B.C. Halt approvals of replacement sites and direct poorly located farms seeking replacement sites to move to closed containment systems.

iv.4. Eliminate all public funding of the open net-cage aquaculture until the primary conservation measures, including the WSP, are fully implemented and funded. Mandate all future public funding of the aquaculture industry to be solely for conservation purposes. Support the development of a closed containment aquaculture industry through government investment, tax incentives and permitting while transitioning the industry out of net-cages and into closed systems. Re-direct public funds supporting net-cage aquaculture to the development and implementation of closed containment technology. Ensure all aquaculture activities that have the potential to negatively impact Fraser sockeye are immediately removed and transitioned to closed systems.

iv.5. Adopt the precautionary approach to all permitted industrial activities taking place in Fraser Sockeye habitat. Increase compliance monitoring and enforcement activity, and undertake comprehensive peer-reviewed research into the impacts of open-net cage salmon aquaculture on wild fish stocks, focusing primarily on fish health.

iv.6. Immediately halt DFO's and the Canadian General Standard Board's efforts to certify net-cage reared farmed salmon as organic.

iv.7. Extinguish all licences, and recommend the province extinguish all tenures, without compensation, of farm sites that have not been in active use for over 12 months.

iv.8. Ban the importation of salmon eggs into Canada.

Recommendations Respecting Habitat

v.1. For enhanced effectiveness and accountability, the administration of the habitat protection and water quality provisions of the *Fisheries Act* (i.e. sections 35 and 36) must be administered by a single agency. Return responsibility of administering section 36 of the *Fisheries Act* back to DFO.

v.2. DFO must be adequately funded to effectively protect habitat. This means sufficient funding to allow for the presence of fisheries officers, as well as sufficient resources to conduct the necessary research and audits. DFO should abandon any public funding of industry until it meets its core conservation protection mandate.

v.3. EPMP should be abandoned and the Minister of Fisheries and Oceans should direct staff to recommit to habitat compliance monitoring and enforcement. Further, an independent audit of the effectiveness of EPMP in meeting the goals of the WSP and 'no net loss' should be immediately undertaken.

v.4. DFO management should commit to an honest and objective assessment of the resources required to implement the habitat components of the WSP, as well as to actually achieve 'no net loss'.

v.5. DFO must, as a priority, implement Strategy 2 of the *Wild Salmon Policy*, and it should receive adequate and immediate funding accordingly. In addition, a high-level 'champion' should be tasked with ensuring implementation of Strategy 2.

v.6. Local field staff, in association with a prosecutor, must have independent authority to determine when a *Fisheries Act* violation occurs, as well as when charges should be laid. Proper training and guidelines should be developed in this regard.

Recommendations Respecting Gravel

vi.1. Gravel mining, and the large scale harmful alteration of fish habitat, must cease in the Fraser River system until a sound scientific assessment is produced showing such removals are necessary for flood-management, and part of a comprehensive environmental management plan for that section of the Fraser River,

Recommendations Respecting Contaminants

vii.1. Reinstate the Toxic Chemical Research Program at DFO. Ensure that DFO Pacific Region employ a fish toxicologist, and conducts research respecting the impacts of toxics on fish generally and sockeye salmon in particular.

vii.2. Return responsibility of administering section 36 of the *Fisheries Act* back to DFO.

vii.3. Enhance monitoring for contaminants, including looking at cumulative impacts of multiple contaminants from multiple sources in the natural environment. Ensure wastewater effluent is monitored for presence of contaminants, and not limited to biological measures.

vii.4. Expand risk assessments respecting contaminants to address the multiple chemicals currently present in the natural environment, rather than assessing a single contaminant in isolation. Acknowledge the shortcoming of guidelines that assess individual contaminants in isolation.

Recommendations Respecting Marine Spills

viii.1. Establish a formalized structure which ensures environmental impacts of marine spills are adequately considered.

Recommendations Respecting Temperature, Flow and Hydroelectricity

ix.1. BC Hydro's Water Use Planning process has proven valuable for planning around hydro projects and would be a good model for balancing ecosystem values with independent power projects (Orr, September 15, p. 66, ll. 23 – 36).

ix.2. Groundwater is a critical component of salmon habitat, and the federal government should take steps to regulate it in the face of provincial inaction. Alternatively, the province should proceed with the Water Act modernization, including mandatory measures to protect water flows.

Appendix B

Critique of *Policy and Practice Report: Aquaculture Regulation in British Columbia*

Critique By: Will Soltau and Catherine Stewart, Living Oceans Society (July 28, 2011)

The document, "Policy and Practice Report: Aquaculture Regulation in British Columbia" was prepared for the Cohen Commission of Inquiry into the Cause for the Decline of Fraser River Sockeye and is intended to provide an overview of the policies and practices of DFO, other federal departments and the Province of B.C. with respect to finfish aquaculture and salmon farming in the marine environment in particular. The name of the author is not on the document. The accuracy of the report is contingent on the accuracy of documents disclosed to or otherwise made available to the Commission. Questions remain about the accuracy of this document considering that some documents are still being disclosed and uploaded to the Ringtail database at this time and that many of the supporting documents referenced in the report, particularly the ones that informed the author about DFO's intention towards future regulatory policies under the new federal jurisdictional responsibilities and the new *Pacific Aquaculture Regulations,* are marked as 'Draft'.

The discussion of the current make-up of the industry in B.C. is cursory with no mention of small operators or methods of production. The only reference is in paragraph 15 to; "In 2011, four main companies engage in finfish aquaculture on the B.C. coast, holding 130 tenure licenses, not all of which are in active operation at any one time." The map included in Appendix C that is meant to show the location of salmon farming operations is clearly outdated and wrong. The report refers to the map in paragraph 16; "As of 2010, fish farms were located around Vancouver Island and the south-central coast, as shown in the map at Appendix C." For example, the map in Appendix C shows only 2 farms on the Central Coast in Kitasoo territory. There are now six farms on the Central Coast.

The author states the purpose of the report is to describe the regulation of finfish aquaculture in B.C. with particular attention to DFO's role and responsibilities in order to provide the hearings with a contextual background. It does not purport to engage in any scientific or political debate around the issues nor does it aim to endorse or criticize and policy or approach of a regulatory authority. Overall, the contextual history of the aquaculture industry in B.C. and the development of **policies** to regulate that growth as described in the report appear to be accurate and well documented. In what appears to be an effort to avoid endorsement or criticism on the part of the author, when it comes to describing the actual **practices** employed to implement the policies and whether those practices were effective or not, the document falls short. Yet, the author chooses at times to limit his report to certain examples and ignore others thereby injecting some personal bias.

Here are some examples;

- **Para 87**: "The mandate of AMD and its RACOs includes activities related to 'Introduction & Transfers (I&T) of aquatic organisms, Access to Wild Resources for aquaculture purposes, site access/application requirements'‖ and 'the research DFO undertakes that is not funded through the PSA [Program for

Sustainable Aquaculture], but is done to provide the department with sound science-based advice to better manage aquaculture and related issues.'". There is no reference made to when these policies were enacted or what research the Department actually undertook to provide that sound management or regulatory science. DFO clearly ignored its mandate with regards to activities related to Access to Wild Aquatic Resources for Aquaculture Purposes (AWAR). (CAN044479 [2004], CAN016847 [2007], CAN202148 [2008], CAN112987, CAN129722, CAN157369, CAN157370, CAN 214276, CAN138583, CAN124626 [2009]). Only after this became a potential for embarrassment in the media did DFO make changes to the Introductions and Transfers permit to include reference to by-catch as an interim measure until the new PARs were drafted (CAN044477 [2010]).

- **Para 92**: "Pacific Region has approximately 54 staff… In comparison Maritimes RACO has three staff." The author does not comment on the level of DFO staffing dedicated to aquaculture in the Pacific Region structure before 2009 thus making it appear that there was higher DFO presence during that time. The higher level of staffing (54 staff) came about after regulatory authority was transferred to DFO as a result of the *Morton Decision*.

- **Para 120**: "Prior to the *Morton* Decision, DFO participated regionally in the referral process for aquaculture applications and had responsibility for reviewing projects for possible harmful alteration, disruption or destruction ('HADD') of fish habitat contrary to s. 35 of the *Fisheries Act*. DFO would issue s. 35 authorizations where it deemed it appropriate to do so." This is true except that DFO policy to issue HADD Authorizations did not come into effect until 2004 and only applied to applications for new licenses or expansion amendments. All other sites were grandfathered in (CAN 427439).

- **Para 183**: "ASWP initiated in 1991." The author does not state that the program was largely abandoned sometime between 2003 and 2008. A search of Ringtail reveals the following ASWP was operated by DFO but funded by the province (MAL) (BCP000030). Stream surveys were carried out in 2001 (First Nations ASWP, CAN000076), with a promise to the Standing Committee on Fisheries Recommendation 12 (CAN075857, pages 11 and 12) to continue monitoring efforts. The only other record of stream surveys was a Power Point presentation in 2003 by Andy Thomson (CAN057459). It shows some juvenile catch/sightings in 2002 and 2003. There was no later documentation. In an email from 2008, DFO's Graham Gillespie asks if it is time to resurrect the AWSP after media on the July 1 escape at Frederick Arm (CAN161665). Environmental Assessment screening reports in 2008 mostly all cite an active ASWP (one example CAN351421, page 9) and a few claim that, "although the Program has recently been expanded, only a small proportion of BC streams will actually be surveyed." A 2009 EA screening report for Doyle Island also claims the program was expanded (CAN065342, page 13). CAN251621 is a list of Q's & A's from HEB to Science Branch. On page 6 there is a note saying a question should be posed to DFO-FAM to determine if the AWSP is still true that the program has recently been expanded. The 2010 EA screening report for Doyle Island states the program is no longer operational. Personal communication from Byron Andres (DFO Senior Biologist, Aquaculture Management) is that the program has been resurrected with the transition to federal jurisdiction, but could not confirm whether stream surveys will begin again.

- **Para 205**: *Aquaculture Regulatory Research*. "In the early 2000s, DFO developed the State-of-Knowledge Initiative to carry out a scientific review of potential environmental impacts arising from aquaculture. From 2003-2006 DFO published a total of five State-of-Knowledge reports. These reports focus on the following three main themes: effects of wastes, chemicals used by industry, and interactions between farmed fish and wild species. In 2008, Treasury Board provided $22 million for a regulatory science element (under SAP), funding the Program for Aquaculture Regulatory Research ('PARR') and DFO's Centre of Expertise for Integrated Aquaculture Science ('CIAS')." A detailed breakdown of what funding was available for regulatory research from the $75 million Program for Sustainable Aquaculture (PSA) can be found in paragraph 251 which details DFO's response to the Auditor General of Canada's Report of 2000. The author did not analyse whether DFO actually translated these commitments into practice but, in 2004 Ms. Liisa Peramaki gave a presentation on behalf of the DFO Environmental Science Branch to the National Habitat Management Working Group on Aquaculture on the environmental effects of marine finfish aquaculture. The follow up discussion focused in part on the need for aquaculture-related science as well as the "difficulty for Environmental Science to access Aquaculture Collaborative Research and Development Program (ACRDP) funds, the lack of support for some important science projects and the difficulty on obtaining client-directed science advice." (CAN014300, page 9). This document shows that some in DFO Environmental Science still felt there was not enough capacity to do the required regulatory science within the PSA alone.

  In some references the author highlights certain passages and omits others from the documents he cites. For example;

- **Para 22-26**: "The SAR report contained 49 recommendations related to farm siting, escaped farmed salmon, farm and wild fish health, waste discharges, interactions with coastal mammals and other species, First Nations issues, managing risk and uncertainty, alternative salmon farming technology, dispute avoidance and resolution, and implementation." The author claims that the SAR process and report were a "key turning point", he does not note that the phrase "sea lice" did not appear anywhere in the 49 SAR Recommendations and only 3 times in the Summary Report. The word "parasite" appeared 7 times in the 49 SAR Recommendations and only 29 times in the Summary Report.

- **Para 143**: The PPR states that DFO will not make decisions on application for new marine salmon sites or for amendments to existing licenses that have a potential to result in substantial change in the environmental footprint. Exhibit 1595 demonstrates DFO advocating for an exception to be made to this policy for Mainstream Canada's Plover Point 'replacement' farm application. DFO notes it will have a 'lower environmental footprint at equivalent levels of production' and on that basis, suggests it be exempt from the department's stated public policy. "At equivalent production" suggests equal production capacity. The existing site, Cormorant, is licensed to produce 800 mt of smolts. The 'replacement' site, Plover Point, is seeking approval to product 3,300 mt of adult fish.

- **Para 146**: The author suggests Nuisance seal permits/licences (NSLs), previously issued under the Marine Mammal Regulations, will be 'incorporated and replaced' in the PARs. The author does not

mention that NSLs were only issued for lethal control of harbour seals and California sea lions and permission for lethal control of the Steller Sea Lions was removed in 2004 due to their listing and protection under the Canadian Species At Risk Act (SARA) as a species of "special concern". The new PARs stipulate licences will only be issued for harbour seals and California sea lions. DFO's website however, (http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/mar_mamm-eng.htm) notes that "Under special circumstances, additional licences can be obtained to lethally control other species. These instances are reviewed on a case by case basis by DFO biologists and the outcomes are carefully monitored." According to data posted on line by DFO, Mainstream Canada has shot two Steller sea lions in the first quarter of 2011. There is no mention in the PARs of 'special circumstances' and permits to shoot species at risk.

- **Para 147**: The author states that the federal licence incorporates and replaces previously-issued federal permissions including HADD Authorizations. HADD Authorizations were previously very specific with conditions attached for mitigation, monitoring and compensation. It is not made clear how those specific conditions can be replaced by a set of generic licence conditions.

  Some passages are misleading and other references are clearly contradictory.

  For example:

- **Para 18**: The source for the report's reference to the number of salmon farming industry jobs in BC comes from MAL/MoE. MAL relied on a report commissioned by the BC Salmon Farmers Association (BCSFA) that was never made publicly available in its entirety. Other reports are available and show lower employment numbers. For example, the Special Committee on Sustainable Aquaculture (SCSA) commissioned an independent economic analysis from MMK Consulting in 2007 (http://www.leg.bc.ca/CMT/38thparl/session-3/aquaculture/reports/Rpt-AQUACULTURE-38-3-2007-MAY-16.htm#economicImpacts) which estimated 2,945 jobs in salmon farming in BC; 1,500 direct, 1,032 indirect and 413 induced. Another example is DFO's own 2011 report, *Aquaculture Canada Facts and Figures* (http://www.dfo-mpo.gc.ca/aquaculture/ref/stats/aqua-ff-fc-2009-eng.htm). Part 3 states; 2007 Employment (FTE) for **all aquaculture** (**not just for salmon farming**) in BC is broken down as direct = 2,220, indirect = 2,330, induced = 1,410 for a total of 5,960. The BCSFA figures should not be considered as long as the raw data and methodology are unavailable for independent verification.

- **Para 127**: The author writes: "Towards this end, it (DFO) says it will conduct environmental reviews of new aquaculture applications and of applications for substantial amendments to existing licences." But the PARs do not address the need for environmental assessments (EAs), and DFO has verbally stated the department *will not* conduct an EA of any aquaculture operations prior to issuing a licence under the PARs. Further, para 134 of the PPR notes that "there is no longer a Canadian Environmental Assessment Act (CEAA) trigger associated with HADD authorizations". The PPR claims DFO says it *will* conduct EAs yet all further evidence in the PPR itself, in exhibits and in testimony confirms the department *will not* conduct EAs.

- **Para 159**: The PPR notes DFO has prepared drafts of the "Fish Pathogen and Pest Treatment Regulations". In fact, DFO circulated a discussion document outlining the intent to draft these regulations, did not circulate the regulations to stakeholders on record as interested parties, and testified at Cohen (Swerdfager) that the draft regulation no longer existed – it had been pulled prior to Gazetting. No Section 36 (FA) controls are specified in the PARs and no regulation exists to cover the absence of regulations related to deposition of deleterious substances by net-cage salmon farms in BC.

- **Para 178**: The author states "With respect to bloodwater from the processing of cultured fish from aquaculture facilities, licence conditions specify that it must be retained, sterilized and disposed of at a land-based facility". The wording of this could lead the reader to conclude the bloodwater "*from the processing of*" farmed fish at a processing facility must be retained. Bloodwater arising from bleeding on farms or in transport vessels must be retained and disposed of under the PARs. That is correct. However, bloodwater arising from the actual *processing* of the fish at a processing plant is not required to be retained, sterilized, treated or disposed of on land. Processing plants are 'encouraged' to treat bloodwater but it is not a requirement and may be dumped into receiving waters untreated -- and potentially laden with pathogens. The author admits to no discussion about the regulation of processing plants. This would have been appropriate, considering that plants along the migration routes of Fraser River sockeye could be disease vectors and it is not clear if this issue is being discussed in any other Reports to the Commission.

- **Para 185**: The author correctly cites the PAR requirements that farms "take immediate corrective action to control, mitigate, remedy and confine an escape or suspected escape" and "undertake a number of prescribed activities to recapture escaped Atlantic salmon". What this fails to convey is that efforts to 'remedy' an escape through recapture of fish are constrained by the regulations mandating only 'Z'-licensed vessels may be used to recapture fish, that these boats are few in number and often based a significant distance from the farm site. In many cases it takes hours, sometimes days, for a licensed recapture boat to reach the location of an escape. These protracted delays allow the fish to be widely dispersed, seriously limiting the success rate of any 'remedy' based on recapture. Recovery rates in BC are very low.

- **Para 187**: The author chose to quote from the draft *'Approach to the Use of Lights';* "DFO 'does not intend to implement management measures for use of lights in aquaculture at this time' noting that the use of lights is 'a wide-spread practice,' 'there is little information on the attraction or aversion of marine biota to illumination of net pens,' and 'there is no direct science to advise that lights are a concern and require management measures.'" This paragraph is somewhat misleading since the *'Draft Approach to the Use of Lights'* also states; "From September to May, electric lights are submerged in the centre of aquaculture net pens and constantly illuminated during the evenings and nights." And, "While there is much evidence to indicate that marine organisms are attracted or avoid light at night, there is little information on the attraction or aversion of marine biota to illumination of net pens."

- **Para 240**: The PPR states the BAMP objectives include "...improve public confidence and collect data....etc" This statement is incorrect. It suggests BAMP's objectives include improving public confidence in aquaculture operations. The correct BAMP objective, per BAMP agreed documents, states "Maintain and/or improve public confidence that appropriate scientific methods are being used to provide an independent evidence base which can inform policy and management decisions."

  Beginning at paragraph 213 the report strays from a description of regulatory policies and practices and begins to document industry standards (SAD, ASC, ISO and the Aboriginal Aquaculture Association Standards Program) and what the author calls, 'Evolving Practices'. **The author only addresses a limited number of certification schemes.** Under 'Evolving Practices' the author summarizes DFO's (CSAS) role in assessing closed containment technology and other initiatives currently underway (MHC/CAAR). **There is no discussion of IMTA even though there is a pilot finfish aquaculture project growing sablefish in B.C.**

  The author then goes on to list a number of interested groups and associations and then gives a 'cursory look at' joint ventures (F4D, BAMP and CAAR/MHC cc pilot).

  Beginning at paragraph 242 the author begins to describe a number of previous Audits, Reports and Investigations in a chronological order.