RE: Salmon Standard Operational Review - Revised Proposed Changes Feb17

Further SeaChoice comments

Change 19: Auditing of indicators requiring information from Peak Biomass and end of cycle points

I. **"*The Biotic / Macrofaunal indicators in Criterion 2.1 work with the sulphide indicator to evaluate benthic impacts. There is a link between these indicators and some duplication since they are measuring for the same impact. There are valid arguments for using each one as an indicator and in the ASC Bivalve standard for example the conclusion was to use only Sulphide."***

Response: This paragraph suggests a move to sulphide level sampling only for Criterion 2.1, which we assume would result in the elimination of Indicators 2.1.2 (Faunal index score) and 2.1.3 (Macrofaunal taxa). While sulphide levels provide an indication if impact is occurring; the extent and degree of this impact can only be appropriately understood when further biotic/macrofaunal sampling is completed. The Salmon Aquaculture Dialogue (SAD)'s Working Group Report on Benthic Impacts and Farm Siting[1] recognized a one-prong approach to benthic sampling is problematic:

"No single —magic-bullet indicator exists. Rather a suite of indicators should be evaluated in order to correctly interpret the sediment state: if an inappropriate indicator set is chosen then it is quite possible to draw misleading conclusions (Mulsow et al., 2006)"

The expert report also recognized a number of scientific uncertainties still remain with benthic impacts and salmon farming. Additionally, it appears inappropriate to compare the ASC Bivalve standard to that of the Salmon standard, as benthic impacts associated with finfish and bivalves are disparate.

We strongly recommend the standard keeps the intent of the SAD and does not remove Indicators 2.1.2 and 2.1.3.

II. ***"There is a need to clarify that <u>although the audit should coincide with harvest period</u>, it may take place at > 75% peak biomass." And;***
"2) CABs are auditing before peak biomass and raising minor NCRs, then revising these later when the actuals are known. Often <u>audit reports lack detail and evidence</u> of compliance."

Response: We reiterate that we find this statement to be at odds with the SAD and encourages auditors to proceed with certification on inadequate evidence. The requirement to witness harvest has become meaningless in the application of the salmon

[1] Black, K.D., Hansen, P.K. and Holmer, M. (2008) Salmon Aquaculture Dialogue: Working Group Report on Benthic Impacts and Farm Siting. 54 pages.

standard, as it has become routine to audit early enough to complete the certification process before the current production cycle goes to market. This often results in a violation of CAR V2 17.4.5 (Audits should have sufficient evidence). The intent of the Aquaculture Dialogues for requiring the CAB to witness the harvest, was to ensure a full production cycle of data was used for assessing if a farm is in compliance with the criteria.

We agree that "problem" #2 is a significant concern. On review of B.C. audits of soft-bottom farms, it is common practice for a Non-Conformity (Major and Minor) to be raised when benthic sampling has not yet been completed, due to early audits before harvest (i.e. peak biomass). CABs have 'closed' the NCs once the sampling has been conducted. However, there is no mention or evidence provided in the report or surveillance report that demonstrate they have met Criterion 2.1. We disagree, however, that this problem will be overcome by ASC further accommodating the early auditing. To the contrary, accommodating early auditing only increases the potential for non-compliant production to be entered into the MSC Chain of Custody, with no clear sanction or penalty available should this prove to be the case on examination of evidence delivered to the auditor post-harvest. This will rapidly erode confidence in the Standard.

III. ***"2) At the time of the audit <u>the farm shall provide the CAB with estimates of values</u> at that date for indicators that rely on information only available when the farm reaches peak biomass / end of cycle" "***

Response: It is unclear *how* the farm would determine such estimates of values. For example, are they based on previous cycles (see comments to IV. below) or early sampling/analysis. Such estimates, particularly where no evidence from previous cycles exists, would be arbitrary and highly subjective.

IV. ***"6) In the case that biotic values are not available at the time of drafting the final report the CAB shall carry out a risk assessment to evaluate whether the biotic values are likely to meet the ASC standard. This risk assessment shall at least take into account; a) the value of <u>previous biotic analyses</u>; and b) the value of the sulphide analysis. If the CAB finds evidence that the results of the biotic analyses are likely to meet the ASC standard, then certification can be granted."***

Response: The B.C. salmon aquaculture industry is not required to conduct biotic sampling by Fisheries and Oceans Canada. Therefore, historical or previous biotic analyses from immediate previous production cycle(s) are not possible. Prior to 2009, the then regulator (the Province of B.C.) collected this data and required biotic sampling. Consequently, if any historical biotic analyses do exist for B.C. farms, they would be outdated. Further, single point sulfide values cannot be reasonably used for a risk assessment analysis to determine overall impact of a farm on benthic biodiversity. It may be that sulfide values at any particular site merely represent a small, localized impact at a given location that would not be indicative of the true scope of impact identified through detailed biotic analysis. We

recommend that for farms that do not have historical biotic analyses, at minimum, a Major NC should be raised and that certification should not be granted until analysis provides evidence of compliance.

V. "7) The CAB shall review biotic findings at the surveillance audit."

Response: The driving force for accommodating early auditing and deferring biotic analysis compliance is said to be to facilitate the farm's ability to sell the product with the ASC logo. However, in doing so the *ASC is creating the potential for non-conforming product to be sold with the logo*. In the circumstance where a Major NC is warranted due to biotic results, this fact would not be identified until the surveillance audit, by which time the non-conforming product has already been harvested and entered the market with the ASC logo. There is huge potential here for misleading consumers and destroying the value of the certification.

Secondly, if a Major NC for Indicators 2.1.2; 2.1.3 were applied at the surveillance audit, the farm would likely be in its second production cycle (1st year class fish). Therefore, appropriate action(s), such as fallowing and resampling, would not be possible. Delaying the review of biotic findings thus eliminates the potential for prompt remediation of production problems and increases the potential for longer term negative impacts on the environment.

VI. Incorporate criteria for hard-bottom sites under Principle 2.

Recommendation: Hard-bottom farm sites are exempt from Indicators 2.1.1c-f, 2.1.2 and 2.1.3. There is no rationale provided in the Salmon Standard Version 1.0 for the exclusion.

Hansen et al. (2011)[2] found macrofaunal communities of hard-bottom benthic systems to be sensitive to organic sedimentation from farms. The study showed a 75 metre radius absence of organisms such as sponges, Cnidarians and Echinoderms. In their place, opportunistic polychaetes dominated the benthic environment. Eikje (2013)[3] also demonstrated a link to increased organic enrichment from farms and the increase in invasive polychaetes at hard-bottom systems. Both studies observed obvious shifts in fauna structure and diversity.

A vast majority of salmon aquaculture jurisdictions already have regulations and requirements in place for hard-bottom benthic monitoring. Regulations requirements typically rely on visual monitoring, particularly of *Beggiatoa* as an indicator of sulphide levels. However, Hamoutene (2015)[4] noted the absence of *Beggiatoa* does not necessarily equate to a lack of impact. Subsequently, the author warns regulators to be cautious in applying regulations that depend solely on a *Beggiatoa* percent-cover limit, stating:

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[2] Hansen PK, Bannister R, Husa V. 2011. *Utslipp fra matfiskanlegg. Påvirkning på grunne og dype hardbunnslokaliteter.* ("Emissions from fish farms. Impact on shallow and deep hard-bottom locations.") Institute of Marine Research report no. 21-2011.

[3] Eikje EM (2013) Benthic impacts of fish-farm waste on hard bottom habitats, the ecology of opportunistic epifauna polychaetes. Matsers Thesis, University of Bergen, Norway, pp.61.

[4] Hamoutene, D 2015, Sediment sulphides and redoz potential associated with spatial coverage of *Beggiatoa* spp. At finfish aquaculture sites in Newfoundland, Canada, *ICES Journal of Marine Science,* vol. 71(5), pp. 1153-1157.

> "Nonetheless, contrary to assumptions, *Beggiatoa* coverage did not always increase with higher sulphide levels. The absence of *Beggiatoa* (or lack of visibility) can also be the result of oxygen depletion (Brooks *et al.*, 2004) and/or a lack of sulphide flux (Nelson *et al.*, 1986; Kamp *et al.*, 2008) not always indicating an absence of aquaculture impact. Information on *Beggiatoa* coverage should be considered in the light of other evidence gathered through video imaging, such as benthic richness and diversity, as well as the presence of other indicators (polychaetes, flocculent, offgasing, etc.) especially if sulphide and redox values are not available."

Additionally, the monitoring location is critical in accurately determining the extent of impact. As mentioned above, Hensen et al. (2011) found impacts at a 75 metre radius, while Hargrave et al (2008)5 reported that most studies show the local extent of altered benthic structure to be less than 50 meters. For example, previous benthic monitoring for hard-bottom sites in British Columbia (when regulated under the BC Province)6 required: identification and quantification of mega fauna and macrophytyes, changes in sediment colour, presence of organic sediments, presence of uneaten feed pellets and presence of Beggiatoa mats along two transects (one following each of the dominant current directions). As well as, a requirement to place at least 5 survey quadrats (to identify and quantify macrofauna) at each of three stations along each transect (perimeter of containment structure or array, 30 metres from the zero metre stations and on the perimeter of the tenure) and at two reference stations. The data was then subject to a detailed statistical analyses as to determine whether the facility has had any statistically significant effects.

Therefore, given that:

a) nearly a decade has passed since the Salmon Aquaculture Dialogue: Working Group Report on Benthic Impacts and Farm Siting;
b) that hard-bottom benthic monitoring is already present in a number of jurisdictions;
c) hard-bottom farm sites are common on review of ASC audits;
d) there is a trend towards offshore aquaculture (where hard-bottom habitats are more common)[7] ; and
e) despite jurisdictional regulations in place, studies speak to the need to create a robust set of indicators to monitor benthic monitoring (beyond simply observing *Beggiatoa)* and that is monitored within an appropriate zone of compliance;

it is recommended the ASC establish a Technical Working Group (TWG) to determine an appropriate benthic sampling criteria for hard-bottom sites to be incorporated into the ASC salmon standard's Principle 2: Conserve Natural Habitat, Local Biodiversity and Ecosystem Function.

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[5] Hargrave, B., M. Holmer, and C. Newcombe. 2008. Towards a classification of organic enrichment in marine sediments based on biogeochemical indicators. Mar. Poll. Bull. 56: 810-824.

[6] BC Ministry of Environment (FAWCR Section 9(1) and Schedule B Part 1)

[7] Buhl-Mortensen, L, Aglen, A, Breen, M, Buhl-Mortensen, P, Ervik, A, Husa, V, Løkkeborg, S, Røttingen, I & Hagen Stockhausen, H 2013, Impacts of fisheries and aquaculture on sediments and benthic fauna: suggestions for new management approaches, Institute of Marine Research, Bergen.