Salmon Aquaculture Dialogue – Comments on Draft Standards, October 2010
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Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Henry C. Clifford
*Organization/Company: AquaBounty Technologies
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 3	3.3	No Standard ("None") has been proposed for the indicator 3.3 (Use of transgenic salmon by the farm). The rationale offered is that TG fish are not permitted under this standard because of **concerns about their unknown impact on wild populations**. This is an arbitrary, irrational, non-scientific opinion. The same rationale should be applied to transgenic salmon as was applied to non-native species, which is "that culture of non-native species is permitted only when they pose an acceptable level of risk to biodiversity." To arbitrarily apply one rationale to non-native species, and then to deny that same rationale to another indicator (TG salmon) is discriminatory, indefensible, and capricious. If under certain specific conditions (see Proposed Solution) an acceptable risk to biodiversity can be	Land based, contained, freshwater culture of sterile (> 99%), single sex (100%) transgenic salmon in government approved, fixed structure facilities which are physically isolated from natural bodies of water

		established, then a permissive standard should be applied for TG salmon.	
General comments			The "solution" proposed above for the Standards for transgenic salmon is essentially identical to the conditions of use which will be imposed by the U.S. FDA on AquaBounty's transgenic salmon. The fish must be sterile, female, and only reared in contained, land-based FRESHWATER (no marine systems) culture systems that must be PRE-APPROVED by the U.S. FDA prior to receiving the fish or eggs. They are extremely restrictive limitations designed to eliminate adverse environmental impacts. So as to not overwhelm this comment space with technical information, suffice it to say that AquaBounty can demonstrate that 100% of our TG salmon (available to aquaculturists) are single sex (female), and that > 99% of our fish are sterile via triploidy. In the official, GLP study submitted to the FDA in order to validate our methods, 7000 eggs from 20 different crosses were rendered triploid using a commercial industrial-scale pressure shocker, and then each egg was individually assayed using flow cytometry. Final results were 99.85% triploidy, with 14 out of the 20 crosses resulting in 100.0% triploidy. Statements that high triploid efficiencies cannot be achieved using commercial equipment are invalid and false. And each batch of our eggs must be QC assayed for triploidy before shipment.

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*__Name:__ Carlos Odebret B.
*__Organization/Company:__ Asociación de la Industria del Salmon de Chile A.G.
*__E-mail address:__ ______________________

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COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1: **COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS.**	1.1.5. Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months	Este punto se debe aplicar a aquellas sustancias que se encuentran prohibidas en el mercado de destino.	Explicitar en el indicador que la exigencia es para productos prohibidos en los mercados de destino.
Principle 2: **CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION**	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos sólo para centros ubicados en profundidades hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.2.2. Maximum percentage of weekly samples from 2.2.1 that fall under 1.85 mg/liter DO	Se sugiere explicitar la metodología que será válida para la medición de DO.	Se debe explicitar que las mediciones serán: 1. Monitoreo discreto en la columna de agua. 2. Máximo de 3 niveles. 3. Medición dentro de la concesión. 4. La profundidad de medición es hasta la profundidad de las redes. 5. Se propone incorporar una frecuencia de medición de 3 veces semanales.

	2.3.1. Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I subsection 2)	De acuerdo a los antecedentes obtenidos desde proveedores de alimento, es muy difícil encontrar el porcentaje de finos en los centros de cultivos. Estándar muy difícil de alcanzar.	Solicitamos que el rango sea de < a 1,5%, que aún es muy bajo y pocos centros lo alcanzarán.
	2.4.1. Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have	El estándar no considera la metodología y definición de especies protegidas y puede ser distinto para los diferentes países, inclusos en distintas áreas de un mismo país. Además, pueden existir otras actividades que afecten a estas especies.	Proponemos eliminar este indicador
	2.5.1. Number of days where acoustic deterrent devices were used	El uso de aparatos acústicos es utilizado por la industria como alternativa para evitar o minimizar la interacción con los mamíferos. Esto permite no ejercer acciones letales en contra de los mamíferos marinos y disminuyes los riesgos de escapes en los centros.	Se sugiere eliminar este indicador.
	2.5.2. Prior to the achievement of 2.5.1, evidence that if acoustic deterrent devices are in use, the farm is developing and implementing a plan to phase out their use		
	2.5.3. Number of marine mammals and birds killed through the use of lethal action	Dado a que existen en Chile mamíferos considerados como plagas, y no corresponden a especies endémicas, es necesario generar una excepción para estos casos.	Se solicita incorporar una excepción para aquellas especies que constituyen plagas.
	2.6.1. Presence or absence of selected sensitive or sentinel species	Proponemos eliminar dado a que las especies centinelas pueden ser distintas para cada lugar, incluso dentro de un mismo país.	Eliminar
Principle 3: **PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS**	3.1.2. An assessment of key regional cumulative impacts of the farm and its neighbours, Iincluding an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.	El análisis regional de los impactos acumulativos excede al alcance de un solo centro de cultivo. Por lo que es complicado que dicha evaluación la realice una sola instalación.	1. Cambiar concepto de silvestres a endémicas. 2. Eliminar indicador.

<table>
<tr><td></td><td>3.1.3. A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks.

Farms located in areas of wild almonds must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.</td><td>Cambiar concepto de silvestres a endémicas. Además, excede al alcance de un solo centro de cultivo.</td><td>1. Cambiar concepto de silvestres a endémicas.
2. Eliminar indicador.</td></tr>
<tr><td></td><td>3.1.4. Maximum average sea lice levels on all farms in the area-based management scheme.</td><td>Dado a que las especies de parásitos son distintas entre los países, es necesario hacer esta diferenciación.</td><td>Se solicita que el indicador sea definido en función de la especie del parásito.</td></tr>
<tr><td></td><td>3.1.5. Timing of wild salmonid out migration and juvenile periods is well established and monitored.</td><td rowspan="5">Estos indicadores requieren una aclaración respecto de las especies silvestres de las endémicas, ya que son estas últimas las que se quiere proteger.</td><td rowspan="5">Cambiar concepto de silvestres a endémicas.</td></tr>
<tr><td></td><td>3.1.6 Measure lice levels on wild juveniles during out migration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)</td></tr>
<tr><td></td><td>3.1.7. Maximum average sea lice levels on all farms in the area-based management plan during juvenile out migration (or equivalent for coastal salmonids).</td></tr>
<tr><td></td><td>3.1.8. In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.</td></tr>
<tr><td></td><td>3.1.9. Period of demonstrated compliance with standards in 3.1 prior to initial certification.</td></tr>
</table>

	3.4.1. Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes	Solicitamos revisar el valor del estándar, dado a que se debe considerar aspectos como el robo y operaciones no cubiertos con el estándar.	Sugerimos un valor de 2%.
	3.4.2. Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	Se hace necesario definir un periodo para contabilizar este número de escapes. Se hace necesario definir y explicitar cuales serán los eventos excepcionales que se consideraran por el estándar.	Explicitar que el estándar es en el ciclo de producción actual y cual serán los eventos excepcionales que se considerarán. Se sugiere incorporar los robos, dentro de estas últimas.
Principle 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER	4.2.1. Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1)	Los estándares planteados son muy exigentes dada la relación de precios hoy existentes para los ingredientes vegetales y provenientes de recursos pesqueros en el mercado.	Se sugiere revisar el estándar
	4.2.2. Fish oil Forage Fish Dependency Ratio (FFDRo) for grow-out (calculated using formulas in Appendix IV, subsection 1)	Los estándares planteados son muy exigentes dada la relación de precios hoy existentes para los ingredientes vegetales y provenientes de recursos pesqueros en el mercado.	Dado lo anterior, se solicita modificar el estándar a 5.
	4.3.1. Commitment to source feed containing >90% fishmeal or fish oil originating from fisheries certified under an ISEAL member's accredited sustainability certification scheme. This must be done as the product becomes available and within 5 years of the publication of the SAD standards.	Dada las actuales condiciones de certificaciones de las pesquerías, se debe evaluar otras alternativas. Acá se debe tener presente que un alto porcentaje los países de origen de las materias primas utilizadas para la fabricación de alimento.	Ampliar a otras certificaciones,
	4.3.3. Prior to achieving 4.3.1, demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO Code of Conduct for Responsible Fisheries.		

	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un periodo transitorio para su implementación.
	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
	4.6.3. Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que se consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **benthos.**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **sedimento.**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.

	5.5.1. Percentage of cages or pens that are single-year class (generación)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **a peces** de la misma generación.
	5.5.5. Re-occurrence of a specific disease over more than one generation	Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.	Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 2: CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos sólo para centros ubicados en profundidades hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.1.3. Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1	Se debe considerar la condición oligotrófica de los lagos par la evaluación de este indicador.	Se sugiere, para estos casos, que el estándar sea de ≥ a 1 especie.
	2.2.1S. NETPEN: For any “open” system (e.g. net pen), evidence that carrying capacity of the freshwater body has been established by a reliable entity. Analysis must take into account the natural ecological condition of the lake or water body (e.g., oligotrophic) and have been conducted within a recent (2 years) timeframe.	Es poco factible hacer evaluación de capacidad de carga por parte de un centro para un cuerpo de agua completo, considerando que existen varios actores involucrados.	Se propone eliminar
	2.2.2S. NETPEN: Evidence that total biomass present in freshwater body (e.g., a lake) falls within the established carrying capacity.		

	2.3.4. FLOW: Evidence of use of sediment traps	Se solicita aclarar si las trampas que aquí se solicitan son para el muestreo de sedimento o para la captación de sólidos presentes en el ril.	Explicitar el indicador
Principle 4: **USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER**	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un periodo transitorio para su implementación.
	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que serán consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **benthos.**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **sedimento.**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.
	5.5.1. Percentage of cages or pens that are single-year class (generación)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **a peces** de la misma generación.

<table>
<tr><td></td><td>5.5.5. Re-occurrence of a specific disease over more than one generation</td><td>Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.</td><td>Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.</td></tr>
<tr><td><u>General comments for Grow out and Smolt production</u></td><td colspan="3">1. El estándar debe considerar que, en caso de contradicciones en las normativas nacionales e internacionales, <u>primarán las nacionales.</u>

2. El Estándar debe considerar la verificación de los indicadores a través de información objetiva y documentos legales de la empresa y evitar vacíos en la aplicación de criterios y subjetividades.

3. No queda claro con la información disponible cuales son aquellos puntos que son de cumplimiento obligatorio y si se ha pensado en la ponderación de cada uno de los indicadores de acuerdo a su impacto.

4. Aclarar para aquellos indicadores del criterio 4, que los peces que se pretende resguardar son los endémicos y no silvestres.

5. Existen indicadores de carácter social (en especial lo relacionado con pueblos originarios) que corresponden a políticas públicas de los países, las cuales superan el alcance de un centro en particular y la empresa.

6. En materia laboral, se sugiere que el estándar quede sujeto a las normas laborales de cada país y a las internacionales reconocidas por ellos.

7. La industria salmonera chilena, considera que existen indicadores y estándares muy difíciles de cumplir y poca claridad en algunos de ellos, dada que las metodologías están en discusión no validadas. Por ello, se estima que pocos centros alcanzarán la certificación y el efecto será mínimo. Se sugiere revisar indicadores y estándares de a cuerdo a lo expuesto.

8. Se hace necesario definir la ponderación de cada indicador en la evaluación final. Se sugiere que cada uno ellos tenga un nivel de criticidad, de acuerdo al impacto.

9. Se sugiere eliminar aquellos indicadores que son por “áreas” ya que exceden el alcance de una instalación en particular.

10.</td></tr>
</table>

Comments on the draft criteria for farmed salmon on behalf of the Atlantic Salmon Trust

September 2010

The Atlantic Salmon Trust welcomes the opportunity to comment on the final draft criteria produced by the Salmon Aquaculture Dialogue.

General comments

We believe that the setting of a Standard for sustainable salmon farming offers the opportunity to achieve industry buy-in to continually improved performance. We have noted with some dismay that governments have tended to regard economic sustainability as a greater priority than environmental sustainability – the Standard offers an opportunity to bring better balance to this.

However, it is **essential** that the bar is set high enough to offer a challenge to operators, even those who appear to be leading the field in aiming for sustainable practice; otherwise, it will not succeed in its avowed aim of driving up standards. In particular, we are keen to see the Standard use all opportunities to make closed containment of farmed salmon an attractive option. From the Scottish perspective, the draft Standard's proposal that smolts raised in open net pens in wild salmonid systems are ineligible for certification is a very welcome first move in this direction. However, there may well be further scope for including further incentives to move to closed systems within the Criteria relating to benthic impact.

It is also crucial that the drive to improved standards is an ongoing process, rather than a static one. Our comments are based on the premise that the intention is to review the Standard regularly on a 2 – 3 year basis, so that improvements in salmon husbandry, and lessons learned from increased monitoring, can be incorporated in succeeding versions. We recommend that the Standard makes more specific reference to the inbuilt ethos of continuous improvement.

We also believe that area management can only proceed successfully on the basis of 5- or 10-year plans, since it is very difficult to turn situations around quickly in the natural environment. A Standard which is unrealistic risks losing the benefits which a pragmatic and achievable, though demanding, Standard could undoubtedly bring.

We also make a general observation that there are certain points within the Criteria where the term 'research' is used rather loosely, and a better term would be 'monitoring'. Research provides the tools to monitor and assess.

We note that it is suggested that areas of wild salmonids are defined as areas that are within a certain distance of a wild salmonid migration route (or for coastal trout, an equivalent), and that the appropriate distance is still under discussion. Since it is our understanding that the Standard is designed (a) to apply in all countries where salmon is farmed commercially and (b) to offer protection to populations of native salmonids, then we would support the definition offered, although it is based on experience with Pacific salmon populations.

PRINCIPLE 5

We shall restrict our comments on Principle 5 to the following:

We support the criteria suggested for Principle 5, and the only detailed comment we would offer is on 5.5.3, where we would suggest that 100% of fish should be transported to slaughter facilities in a closed wellboat or a wellboat with discharge treatment and disinfection, where such transport involves moving fish between one Management Area and another, or across Management Areas.

We support the solution offered in the rationale for 5.5.2 – namely that the Scottish system of sampling within a dispersal area is adopted.

PRINCIPLE 3

We note that the primary aim of Principle 3, in combination with Principle 5, is to ensure salmon farms do not harm the health of wild fish populations, and are fully supportive of this aim. However, although the Criteria cover impacts of sea lice in some detail, other aspects of impacts on the health of wild salmonids – for example, via the amplification of pathogens – seem to be underplayed. We fully realise that baseline data on incidence of disease (particularly incidence of disease in non-pathogenic form) among wild populations is patchy, and possibly lacking in consistency. Monitoring of the health status of wild salmonids is expensive, which accounts for the lack of consistent baseline data. The Standard does not appear to fully address the question of how far salmon farm operators should be asked to fund such monitoring.

We would suggest that monitoring should focus on the best available sentinel species – in the case of the UK, Ireland, this would be sea trout, and in the case of Norway, sea trout and Arctic char, since they remain in contact with the inshore marine environment for a longer period than salmon.

Criterion 3.1 Introduced or amplified parasites and pathogens

3.1.1 Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport.

Comment: It is crucial that there is a tighter definition of 'effective'. The draft criteria invite comment on the best way to delineate a management area; we believe that it must consist of the biological area within which viable stages of sea lice larvae originating from within salmon farm cages can be transported and dispersed.

It would appear (from Appendix II) that the schemes envisaged relate to area-based management schemes involving only salmon farm operators, similar to the 'farm management agreements' in Scotland. The experience in Scotland is that Area Management Groups, which involve both salmon farm operators and representatives of wild fish interests, do not tend to operate in tandem with Farm Management Agreements. In practice, this has been an 'either/or' situation. It is important that, as well as participating in an intra-industry area based scheme, farms seeking accreditation should participate in AMAs on the multi-stakeholder model.

Similarly, 'open communication' must prevail not only among salmon farm operators, but on a wider, multi-stakeholder basis?

The key to successful area-based management is that, for a particular area of coastal waters, salmon must be farmed on a single-generation basis, with an inbuilt requirement for synchronised lice treatment, and synchronised fallowing. The optimum fallow period will vary from one area to another; there is no 'magic number'. A sensible requirement can only be that the entire management area is fallowed at a minimum for sufficient time to break the sea lice cycle.

3.1.2 An assessment of key regional cumulative impacts of the farm and its neighbours, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.

Comment: How would one define "appropriate" infection pressure on wild populations? We are unclear as to what this means, since sea lice are widely dispersed in the natural marine environment. A better measure would be to look at sea trout as an indicator – measurements could include: percentage of fish which return prematurely to fresh water and a profile of lice burdens on such fish – both in terms of number and developmental stage; condition & growth rate of fish. The crux of the problem for wild salmonids is the situation where juvenile fish encounter large numbers of larval lice as soon as they enter the sea. The significant measurement is thus the level of juvenile lice present in areas adjacent to where juvenile fish enter the sea. This can then be linked to numbers of adult female lice on the farm. These measurements should be the basis for the liaison with NGOs mentioned in 3.1.3

3.1.3 A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.
Comment: Such a commitment must be demonstrated by having historical evidence of such collaboration, over a period of at least one production-cycle, and the data should be publicly available, in the interests of transparency and successful multi-stakeholder co-operation.

We fully support the concept of co-operation, but suggest that this should relate to a requirement for monitoring, as opposed to research. Research could establish the parameters of what should be monitored. Since monitoring is likely to be less costly than research, salmon farming companies may be more willing to sign up to this.

We note that in the rationale for these criteria, the observation is made that: "The SAD expects that researchers will need to become more consistent in their methodology for testing for sea lice in the wild." This also implies transparency in regard to data-sharing.

We would suggest that, once such monitoring is established, it should be used to set targets in terms of lice pressure caused by farms, and that operators should have to hit these targets according to a mutually-accepted pattern, such as in three years out of five, or six years out of ten. This would allow operators to learn from experience, and to aim for an improving trend.

3.1.4 Maximum average sea lice levels on all farms in the area-based management scheme.

Comment: We support this, in the context of our comments on 3.1.7

3.1.5 Timing of wild salmonid outmigration and juvenile periods is well established and monitored.

Comment: For such criteria, evidence of such monitoring should be a precondition for entering the accreditation process, not a criterion for certification. (this appears to be covered in 3.1.9)

3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)

Comment : We do not agree with the suggestion that lice levels on wild juveniles should be measured during outmigration, for the following reasons: (a) it will be exceptionally difficult to catch a sufficient number of wild fish at this stage, particularly in the case of salmon (b) there is no scientific basis for interpreting such numbers. We prefer the suggestion which we made above: the use of an indicator species such as sea trout, and monitoring according to a set protocol, for example sampling of prematurely-returning fish.

3.1.7 Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids). Suggested levels: Maximum 0.5 mature sea lice per fish or 3 total sea lice.

Comment: The target must clearly be zero for the spring months and trigger levels sufficient to ensure that progress is made towards achieving this target at least 3 years out of every 5. The absolute maximum trigger level should be 0.5 but levels of closer to 0.2 should, where possible, be agreed locally. We suggest that the standard should allow for the target being met during three years out of five, in order to be achievable. It is essential that there is a link between the critical period for wild salmonids and the rest of the year – during the latter

period, levels of 1 or 2 adult female lice per farmed fish may be quite acceptable, in certain areas.

We are convinced that there is a requirement for clear targets in the relevant local geographic zone, and that these targets will vary from one zone to another, even within a single national jurisdiction. It is important to find a formula which is applicable to experience in areas of Atlantic salmon and Pacific salmon, since the size of migrating smolts differs so greatly. The only way to do this is to incorporate a local/regional dimension.

In order to cater for the need to look at optimised trigger levels locally, we suggest that the following wording could be added to any trigger level cited: "or a locally/regionally -agreed maximum, which ever is the lower." Although not all such locally/regionally-agreed trigger levels will have the force of law, it is our perception that they are usually incorporated in some sort of Code of Practice or national Pest Control Strategy.

3.1.8 In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.

Comment: we are not convinced that there should be a separate figure for trout, since Atlantic salmon and sea trout will tend to occur in the same rivers and inshore marine environments. We believe that the trigger level should be based on the requirements of sea trout, or other locally-relevant indicator species, since these levels will also offer maximum protection to wild salmon.

3.1.9 Period of demonstrated compliance with standards in 3.1 prior to initial certification.

Comment: We suggest AT LEAST one full production-cycle, since lice impacts will not be evident until second year of production. Possibly much can be learned from the compliance-demonstration period required for organic certification.

We note that the rationale for criteria up to 3.1.9 includes the following: "The impact assessment intends to ensure a credible third party has analyzed the key cumulative impacts of the farm and its neighbours." We suggest that in this, and the following, paragraph the words 'and impartial' are added to 'credible' . We agree with the components of the EIA as described in Appendix III.

The SC is considering how to set global maximum sea lice levels that are meaningful in different regions and jurisdictions. The following concepts are guiding the deliberation.

§ There is a trade-off between pressing for very low sea lice levels and the danger of over-treatment and development of resistance

We believe that the approach to trigger levels outlined in our comment on 3.1.7 should help address this dilemma.

§ Juvenile outmigration is a particularly sensitive moment for wild salmon populations, and sea lice levels during that period should reflect a precautionary low level

Our comment on 3.1.7 addresses this point, and the next.

§ Coastal trout are susceptible to sea lice because they potentially remain in contact with sea lice from farms throughout the year (***we would suggest amending this to read ".. potentially remain in contact with sea lice from farms for an extended period")***

§ The transmission of sea lice from farmed fish to wild populations, and visa versa, is still poorly understood

The emphasis which the criteria place on monitoring and data-sharing should address this issue.

§ Maximum farm level limits should be an average of sea lice levels on all farms in the area-based plan, since that is the infection pressure that wild populations will experience

We suggest that management areas are delineated to take into account the area over which viable stages of lice larvae originating within farm cages can be dispersed.

Given these concepts, the SC is considering the following, as detailed in the indicators above:

§ A global sea lice level for all farms seeking certification that may be as low as 0.5 motile female sea lice per fish

This does not tally with the suggestion made under 3.1.7? Is the intention here to refer to 0.5 adult (as opposed to motile) female lice per fish?

§ A sea lice level during juvenile outmigration that is 0.5 motile female sea lice or lower

See our comments on 3.1.7

§ A feedback loop from testing of sea lice on wild juveniles to ensure the farm level limits are appropriate

See our comments on use of appropriate indicator species, and protocols for monitoring impacts on these

§ A year-round sea lice level for areas of coastal trout that is yet to be determined

See comment on 3.1.7

We support the suggestion of prohibiting the certification of farms sited in areas that pose the greatest risk to wild salmonids, such as areas where juveniles are most vulnerable, or areas in proximity to stocks of special concern (on national at risk lists or the IUCN Red List of Threatened Species).

EU Directives, such as the Fish Health Directive, Natura 2000, the Dangerous Substances Directive, various Directives relating to health of shellfish etc, will also contain useful guidance as to at-risk sites.

3.1.9 The SC seeks input on the idea of a demonstration period to ensure that a farm is performing and fully implementing area-based management, wild juvenile monitoring and other aspects of 3.1 prior to certification. As is the case with all standards in this document, the standards in 3.1 require demonstrated compliance with the performance measures on an annual basis. The SC is considering for what length of time prior to certification the farm would need to comply with these standards. One option would be an entire production cycle.

We support this option.

Criterion 3.2 Introduction of non-native species

We feel that, in the European context, any provision for farming on non-native species will encounter huge problems in term of Natura 2000. This criterion needs to make reference to a requirement for any non-native species to be sterile.

Although the rationale for this criterion makes reference to the FAO guideline that permits the culture of non-native species only when they pose an acceptable level of risk to biodiversity, we feel that here is NO 'acceptable' level of risk in this context.

We support the Standard's stance on the use of cleaner fish for sea lice control. We also believe that there is scope within a Standard focused on sustainable practice to ensure that cleaner fish are not harvested from unmonitored or unsustainably-exploited native species of wrasse for use in salmon cages, particularly in view of the fact that it is now possible to farm disease free wrasse for this purpose.

Criterion 3.3 Introduction of transgenic species

We support the ban on use of transgenic fish under this standard because of concerns about their unknown impact on wild populations.

Criterion 3.4 Escapes

We are concerned that the suggested criteria in regard to permissible levels of escapes focus on prevention of large-scale escape incidents. Science has now shown very clearly the potential risk from wild / farmed interbreeding – and it is clear that regular small-scale escapes within the same salmonid system may present a larger risk that intermittent large-scale escapes. We therefore object to the arbitrary level of '200 or more fish' cited in 3.4.2. We are also aware that recommendations from the on going, EU funded, Prevent Escape Project may provide a more quantitative approach to measuring losses both in terms of direct escapes and low grade losses over time due to grading, fish transfer, smolt stocking etc.

It is now up to the regulators and wild fish interests to carry out an objective assessment of wild salmon stocks to quantify where and when these impacts have occurred. The stock-specific genetic markers from the SALSEA Merge project will greatly facilitate such a survey. This will help inform revisions of this part of the Standard.

We also believe that the definition of escape incidents 'out of the farm's control' leaves loopholes for bad practice. Examination of the causes to which escapes from Scottish fish farms over the past seven years are attributed shows that, with the exception of freak weather events,

everything else SHOULD be 'within the farm's control', with careful attention to siting, predator management, staff training, correct specification, maintenance and deployment of equipment, etc.

It is important that the Standard does not lose sight of the need to keep escapes at a low level for purposes of lice and disease control, in addition to risks of genetic introgression.

The SC is considering adding an additional standard to further address the issue interbreeding and welcomes input on whether such a standard is needed or what it might look like.

We would make the observation that relatively little work has been done in the field on the extent to which genetic introgression has taken place. It is important that there is sufficiently strong impetus for ongoing monitoring of this, so that the Standard's provisions on escape prevention could be tightened up during successive reviews, if necessary.

SMOLT PRODUCTION FACILITIES

We wholeheartedly support the proposal that the Standard allow only closed or semi-closed smolt systems to be certified in areas of wild salmonids. Our opposition to certification of fish raised in smolt pens within salmonid systems is based on:

- Risk of dilution of the native gene-pool by hybridisation with escaped fish; recent work has shown that precocious parr play a very large role in successful spawnings. This means that there is a high risk that farm escapees could hybridise with native fish without ever having left fresh water. [1]
- The risk that availability of uneaten feed from the pens will disrupt the migratory behaviour of native anadromous fish
- The risk of spread of disease and freshwater parasites

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[1] Comparison, using minisatellite DNA profiling, of secondary male contribution in the fertilisation of wild and ranched Atlantic salmon (*Salmo salar*) ova. C. E. Thompson, W. R. Poole, M. A. Matthews, and A. Ferguson. Can. J. Fish. Aquat. Sci. 55(9): 2011–2018 (1998) | doi:10.1139/cjfas-55-9-2011 | © 1998 NRC Canada

We have considered whether it would be reasonable to include a 'phase-in' period for farms which use smolts reared on open net pens in salmonid systems. However, since certification will be offered on a farm-specific basis, and since over 50% of smolts raised in Scotland are currently raised within closed/semi-closed systems[2], we do not believe that it is too onerous to ban all net-pen-raised smolts from the start.

Contact person: Fiona Cameron
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[2] Scottish Fish Farms Annual Production Survey statistics 2008 (most recent available): the Scottish Government

	No of sites	Capacity (000s cubic metres)	Type of system	No of smolts produced (ooos)
Cages	53	385	Cages	17,065
Tanks & raceways	77	64	All others	19,385

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Myron Roth
*Organization/Company: BC MINISTRY OF AGRICULTURE AND LANDS
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	This standard will prohibit the use of chemotherapeutants since each country has different legal standards with respect to drugs, pesticides and vaccines that are licensed for use, label directions, maximum residue limits, and withdrawal times. In many instances where the same drugs are licensed in different counties - different use standards apply.	Focus on regional requirements; Focus on residues than use *per se*. For, example if a drug is licensed in the exporting country but not the importing country, a zero residue tolerance could be applied where exported to a country with no set maximum residue limit.
	2.1.1	In BC, sulphide of less than 1,500 µM beyond 30m is drastically different than the present standard of not statistically greater than 6,000 µM at 30m or beyond. Even without widely accepted carbon flux to sulphide measure equivalence, a large number of sites would probably not be unable to meet the proposed standard. Present 'base line' level of no more than 1,300 µM pre-stock is probably statistically insignificant at some sights to the 1,500 µM WWF standard.	Consider setting regional specific standards that are relevant to base line data.
Principle 2	2.1.2	This would represent a new/additional standard for BC. From a regulatory perspective, BC doesn't support this type of monitoring as a regulatory tool as the data is complex and difficult to assess. Further, it takes a long time to process and make regulatory decisions. This presents an unnecessary duplication of effort for BC (and possible other regions), where better proxy measures have been established for the evaluation of environmental impact to sediments.	Remove or revise the standard.

	2.1.3	See comments for 2.1.2	
	2.2.1	Is there a scientific justification for routine DO monitoring? While DO is directly related to performance, DO levels tend fluctuate quite widely in direct response to environmental conditions. More importantly, a farm's contribution to DO fluctuation in the water column is negligible compared to environment's influence. Thus, DO may crash temporarily (e.g. algal bloom) but can recover just as quickly. Thus, while DO monitoring is useful information on a day to day basis, it says little about trends with respect to environmental degradation (hence the trend to sediment monitoring – which is a much more value indicator of environmental degradation). Thus, a transient drop in DO could mathematically drop the weekly DO average and have nothing to do with the farm.	Remove this standard.
	2.2.2	Seem comment for 2.2.1	
	2.3.1	New standard/requirement for BC.	This should be regulated through labeling requirements/ manufacturing specifications rather being measured directly by the farmer. See 4.1/4.2 General Comment regarding feeds & raw material standards.
	2.4.1	To be practically effective, "critical, sensitive or protected habitats" needs to be defined. Similar standards are in place in BC so it would be unreasonable to expect farmers to accommodate two standards, given the cost of environmental assessment studies if they are marginally different.	Revise standard to make allowance for recognition of equivalent habitat assessment work.
	2.5.3	There may be justification to cull a marine mammals (e.g. seal) for humanitarian/animal welfare reasons (i.e., animal is trapped/hurt/damage in gear).	Revise the standard.
	2.6.1	To be practically effective, "sensitive or sentinel species" needs to be defined. We concur with the sentiment that population declines of wild species may occur for reasons unrelated to nearby farms. Thus, species selection is not only critical but also needs to be support by significant baseline monitoring data.	The standard needs to be regionally relevant. The wording of the indicator should be revised to reflect this.
	3.1.1	This indicator would be more correctly identified as a "best management practice" than a "standard". "...area-based" needs to be defined. To be effective, resistance monitoring protocols should be standardized. Advocating the use of coordinating treatments and rotating different treatments is not consistent with 1.1.5 which effectively restricts the use of treatments.	Revise the standard.

Principle 3	3.1.2	See comments for 3.1.1. How are “neighbors” defined? At what distance to farms cease to be “neighbors”. What criteria are used to assess cumulative impacts – these criteria need to be identified and regionally relevant.	Revise the standard.
	3.1.3	Need to define “demonstrated commitment”. How is this evaluated? Too much emphasis on sea lice. If there is a focus to collaborative research efforts it should be determined by the collaborating group and regionally relevant.	Revise the standard.
	3.1.4	Setting a single sea lice action level for all salmon farming regions in the world is not based on science. While actions levels are a proven management tool, which we fully support, they should be regionally relevant and based on background lice levels. For example will the action level apply to a specific species of lice or all lice? Will they apply to all species of salmon? For example, in many instance it would not be considered prudent use of a chemotherapeutants to treat Pacific salmon species that may become (temporarily) infected with lice, unless there was a clinical need to do so. Further, should the same action levels be used for different species of lice, namely *Caligus sp*. and *Lepeophtheirus salmonis* infecting Atlantic salmon?	Revise the standard so that it is regional-specific and based on a base-line reference rather than an absolute value. Resistance management should be a prime consideration when considering sea lice action levels.
	3.1.5	In BC this would be part of the environmental risk assessment for new sites.	Older sites may need a phased approached. The standard will have to take into consideration a potentially large number of streams/sources for out-migrating smolts. More definition is required. Suggest that perhaps an indicator stream(s) approach is used to be more practical.
	3.1.6	What is the goal with sea lice enumeration and reporting– collaborative participation by all the groups noted or monitoring sentinel wild salmon stocks? Such programs are very costly and difficult to run and should be standardized, to the extent possible, to maximize the information obtained. This therefore should be a responsibility of the relevant regulatory body and as such is largely out the control of the salmon farmer. From a “farm-level” certification perspective, this will be very difficult to audit when considering the above.	Revise the indicator and standard.
	3.1.7	See comment for 3.1.4	
	3.1.8	See comment for 3.1.4	
	3.1.9	See comment for 3.1.4	
	3.2.1	As written, this indicator will prohibit the	Revise the indicator to make allowances for

		development of new species which might be considered for culture in closed containment facilities.	development of new non-indigenous species in closed containment.
	3.3	The definition of transgenic needs to be clarified. Insertion of genes alone is too vague. The definition has to clarify, more specifically, that the inserted genes are incorporated into the host genome. It is possible to insert genes into muscles and have them expressed without any incorporation into the host genome. Such situations should not be classified under the transgenic fish definition.	Revise definition of transgenic.
	3.4.1	Unrealistic, if the standard is to be practical. This is because one incident of escapes will decertify a farm, regardless of the cause, which could include atypical storm damage, natural causes (such as a large predator damaging the net), or a malicious criminal act. In other words, actions that are out of the farmer's control.	Revise the standard.
	3.4.2	See comment for 3.4.1	
	3.4.3	What value is such a standard if standards are different from region to region or, worse might be absence in a particular region?	Revise the standard.
	4.1/4.2 General Comment	From a farm-level site certification perspective, the indicators and standards for feeds and raw materials are not practical. This is largely because farmers cannot be expected to have access to raw materials/formulation records from their feed suppliers	Develop a separate set of Feed Standards and then require farms to source feeds from certified sources and create some synergies between the two standards. This would provide a much more practical way of tracking feed materials and use of wild fish and fish oil for feed.
Principle 4	4.2.1	This will be difficult for farmer to calculate without access to raw materials records from feed suppliers.	As noted in 4.1.1 – these standards (if adopted) should be "as demonstrated by the feed producer". Where a salmon farmer produces their own feed they might apply. See 4.1/4.2 General Comment.
	4.2.2	See comment for 4.1/4.2 General Comment	
	4.2.3	See comment for 4.1/4.2 General Comment	
	4.3.1	See comment for 4.1/4.2 General Comment	
	4.3.2	See comment for 4.1/4.2 General Comment	
	4.3.3	See comment for 4.1/4.2 General Comment	
	4.3.4	See comment for 4.1/4.2 General Comment	
	4.7.1	Not practical given the current number of copper treated nets in use. Exceptions need to be made for regionally approved cleaning practices according to government guidelines that allow cleaning *in situ* in relation to performance-based for copper leachate in sediments.	Suggest a phased approached that balances the need for animal welfare and environmental impact.
	4.7.2	See comment for 4.7.1	
	4.7.3	Is there a scientific rationale for this level of copper	Suggest developing a standard relative to base-line data

		in the sediment? Due to the current and past use of copper antifoulants on nets (and many marine vessels), background levels of copper in sediments may exceed this level disqualifying many farms from the onset. This would defeat the purpose of the standards to move the industry forward.	that is regionally specific.
	4.7.4	Need to defined qualified third party.	Revise indicator.
	4.7.5	Legislative scope is too narrow.	The legal framework for approval of antifouling biocides needs to reference the country where the nets are located, i.e., Canada, Chile, Norway, Faeroes, etc.
	5.1.2	Definitions used many not be appropriate for all regions. In BC, veterinarians, licensed in the province of BC, are the only recognized fish health "professionals".	Suggest revising wording of "fish health professional" to "Fish Health Biologist"
Principle 5	5.1.3	This may not be practical since the successful use of a vaccine depends on: 1) the availability of licensed product in region of concern (not always available for all diseases of concern); 2) the efficacy of the vaccine may be subject to interpretation. For example, in some cases vaccines are licensed where efficacy testing, due to a lack of a laboratory challenge model, may not be proven. Thus, who's decision should it be to use such a vaccine? Further, what happens in cases where vaccines are available for disease where eradication orders are in effect? Such determinations should be made by the attending veterinarian or, in the case of notifiable diseases, on a case by case basis by the competent regional animal health authority and may be subject to change depending on circumstances.	Revise the indicator and standard.
	5.1.6	Is this statistically relevant? In the case of a disease outbreak resulting in a large die off, a sub-sample of fish which all test positive for the causative agent will provide a statistically relevant diagnosis. It would be waste of resources to require that every fish is tested. Further, in many instances analysis of dead fish is difficult to interpret due to post mortem artifacts, especially where histology is the key diagnostic tool for a given disease, or the fish may simply be too decomposed to work with. While we agree that understanding the cause of mortality is critical and that routine disease diagnosis should form part of a comprehensive fish health management plan (as per 5.1.1), the analysis should be statistically and clinically relevant and appropriate.	Revise the standard so that it is statistically relevant.

	5.1.7	This indicator/standard needs further clarification. Cycle time needs to be defined. In some instances, mortality may result for known but unpredictable reasons; for example and algal bloom, storm damage, or endemic disease such as IHN that are commonly found in wild fish populations but can result in highly unpredictable clinical outbreaks, and can be highly pathogenic. Dose mortality includes cull? This need to be clarified, especially where few fish die due to a disease but a large number of fish are culled to manage the disease.	Revise the indicator and standard.
	5.2.1	If the amounts of therapeutants used are known, as are the production numbers which would be part of a standard management plan, "grams per ton of fish produced" is redundant. How is proof of proper dosing defined? Is this based on efficacy, pharmacology data, residue analysis of flesh and/or residue analysis of feed? While it is possible for the attending veterinarian to cross their figures and instructions for medicating fish – it does not provide proof. It would not be economically feasible to carry out residue analysis for all therapeutant treatments administered to the fish.	Suggest revising this standard – or removing it all together.
	5.2.2.	This standard, from a global perspective, will be very difficult to develop if all possible therapeutants are taken into consideration. It is suggested that the cost to develop the reference data would not justify the benefit.	Use a phased and/or targeted approach. Develop standards for newly developed chemicals; however, doing so would require working with regional regulatory agencies who are responsible for the discharge of aquaculture chemicals, including therapeutants. Any standards applied would have to be consistent with regionally applied regulatory requirements.
	5.3.1	How is "banned" defined? In most cases, compounds are either licensed, permitted, approved or registered for use. In effect, they are 'banned' where use is not otherwise permitted. With a couple of notable exceptions, few compounds are technically "banned". How is "primary" salmon producing countries defined? Under this wording a "secondary" country could use a "banned" antibiotic or chemical, assuming both existed.	Suggest the wording is changed to reflect the following: "...those only therapeutic treatments that include antibiotics or chemicals that are approved or otherwise authorized for use by the appropriate regulatory authority...."
	5.3.2	No consistent with current legislation in BC and other regions where some medications, in particular those used in hatcheries, are approved for over the counter use.	Focus on label directions.

	5.3.4	This indicator is not consistent with other tenants of chemotherapy promoted in the standards. For example, sea lice treatments administered prior to (or during) smolt migration as a prophylactic measure are an accepted practice, since there is often not clinical justification for treating the fish. In BC, diseases such as BKD or mouthrot, are often very effectively managed prophylactically. Thus, under special and/or certain circumstances treatments may be more effective where they are used prophylactically under the direction of a veterinarian. This indicator therefore does not seem consistent with 5.3.2.	Revise the indicator and standard.
	5.4.2	Please define "bio-assay" as the text implies resistance monitoring, but this is not clear. Further, resistance monitoring of a population after a treatment has been applied can be difficult to interpret. This indicator seems inconsistent with 5.4.1 where resistance testing is part of coordinated monitoring efforts.	Revise the indicator and standard.
	5.4.4	Please reference the WHO list of "antibiotics critically important for human medicine". The WHO has an "essential medicines" list, so this needs clarification for further discussion and analysis as it's not clear which antibiotics this would apply to.	Revise the indicator and standard.
	5.5.1	This indicator needs an exception for broodstock sites, which by their very nature are multi-year class sites. How will this apply to marine-based solid, or soft wall, containment systems.	Revise indicator and standard.
	5.5.2	See comments for 5.5.1	
	5.5.3	Not practical as this severally limits options to harvest fish into totes for transport to processing plants. Need to define what constitutes a wellboat.	Revise indicator and standard.
	5.5.5	Not practical where common, endemic diseases are present. In BC there are many diseases that are managed by veterinarians through fish health management plans. Sea lice for example could be considered a re-occurring disease over more than one generation.	Revise or remove indicator and standard.
	6.7.2	How is social compliance defined?	Revise the indicator.
Principle 6	6.11.1	Very vague standard – needs more definition if it is to be audited on a practical basis.	Revise indicator and standard.
General comments	Pg. 7, Purpose and Scope.	This section notes that the standards are meant to be "performance based" yet many of the standards are very vague. That is, the standard is based on	Ensure the standards are auditable and provide a level of consistency between regions.

		participation in a practice or scheme. The issues here is that such a standard will be very difficult to audit if the goal is to reach a common set of practices. ; 2) the second type of standard does not take into consideration regionally relevant difference and regionally relevant baseline data.	
	Pg. 7, Purpose and Scope.	This section notes that the standards are meant to be "performance based" – yet many of the standards a based on a single, global metric. The issues here is this type of standard does not take into consideration regionally relevant differences and baseline data.	Specific standards should be regionally relevant and take into consideration base line environmental data.
	Pg 8, Issue Areas of Salmon Aquaculture to Which the Standards Apply	This section notes Animal Welfare does not fall under the mandate of the SAD. By its very definition, aquaculture involves the culture and care of aquatic animals. The practice therefore explicitly implies that animal welfare is a primary consideration for the salmon farmer and veterinarian. Further, the issue of fish health management and environmental impact from disease, pathogens and animal health products has been central to the aquaculture debate for many years. Thus, it behooves the standards to not take animal welfare and associated animal health practices, and in particular clinical care practices, central to this issue into consideration and use this opportunity to address such an important issue.	Include animal welfare as a term of reference for the standards.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 2	2.2.1S	Carry capacity standards should conform to a common standard, or allow for equivalence where national environmental assessment criteria are in place.	Revise indicator and standard.
	2.5.1S	See comment for 2.5.3	
Principle 3	3.1.1S	This would require the immediate withdrawal of net pens in should a producer wish certification. This may not be practical in some regions or within the	Suggest a phased approached where performance standards are clearly defined with respect to environmental impact (waste deposition in

		spirit of the standards if a) they are performance based; and b) the intent is to encourage continuous improvement while permitting the industry to remain economically viable. Where pens containing smolts are situated in areas with native salmonids and they meet environmental assessment standards. Also there is ambiquity in the indicator as the standards apply to the genus *Salmo* and *Oncorhynchus* (as noted on pg 8), but the intent of 3.1.1S appears to be with salmon smolts, i.e. genus *Salmo*. This should be clarified.	sediments/escapes etc.). Also the text of the indicator should read "salmon smolt" to be consistent with the preamble for the section.
	3.1.2S	See comment for 3.1.1S	

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: G.Mace
*Organization/Company: Biomar Ltd
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	2.3.1	What is deemed to be point of entry to farm? Salmon cage at sea<	Clarification
Principle 3			
Principle 4	4.1.1.	OK	
	4.2.1/2. 4.2.1 4.2.2. .	Calculation of FFDR should include fish meal/oil produced from salmon trimmings and then subsequently used in aquaculture production Value 1.31 precludes Label Rouge production based from whole fish meal and oil (min 45%FM) Value 2.85 only achieved consequent to c.70% FO replacement with plant oil, when FO from whole fish. Prevents Label Rouge and most differentiated products formulated to deliver elevated EPA/DHA levels	To be included in FFDs Extended 5year implementation period to enable switch to MSC or equivalent FO as becomes available, and as is being proposed for certification of fisheries under 4.3.1.

		General observation is that SAD requirements re 4.3 significantly different in stance to that taken for Tilapia or Pangasius. Salmon require Min Fish Source scores AND Iffo RS No logic for difference positions and could lead to artificial market distortion in any Ecobrand market as Salmon standards harder to achieve.	
Principle 5			
Principle 6			
Principle 7			
General comments			

CANADIAN AQUACULTURE
INDUSTRY ALLIANCE

WWF's Salmon Aquaculture Dialogue

October 2010

The following comments are from Ruth Salmon, Executive Director, Canadian Aquaculture Industry Alliance (CAIA).

Email address:

CAIA is a national industry association, that represents the Canadian aquaculture operators, feed companies and suppliers, as well as provincial finfish and shellfish aquaculture associations. CAIA is dedicated to facilitating an environment in which the Canadian aquaculture industry can achieve its full potential and, towards this aim, supports all initiatives that strengthen the international competitiveness of the Canadian Aquaculture industry. CAIA actively supports the development of industry standards.

Comments:

1. As a member of the WWF Salmon Dialogue steering committee, CAIA has provided its full support to the process, including the unfolding Aquaculture Stewardship Council (ASC) development process. Thanks to Mary Ellen Walling for representing CAIA on the Steering Committee and providing unified Canadian industry comments into the process.

2. CAIA has been actively supporting our salmon and feed producing member companies and affiliated salmon industry associations, many of whom have submitted detailed comments on the draft standards. As such CAIA fully supports the comments made by its members.

03 October 2010

CERMAQ'S COMMENTS TO THE DRAFT STANDARD FOR RESPONSIBLE SALMON AQUACULTURE (SALMON AQUACULTURE DIALOGUE)

Cermaq's vision is to be one of the global leaders in the aquaculture industry, with main focus on sustainable farming of, and production of feed to salmon and trout. We are committed to creating value for our shareholders through sustainable aquaculture. To achieve this objective, we remain focused on our customers and suppliers and on maintaining the quality of our product. We also recognize that the key to achieving improved revenues through sustainable aquaculture is to demonstrate our respect for each other, the consumer, and the communities and environment in which we operate.

As such, we are well placed to evaluate the draft standards for responsible salmon aquaculture, as presented by the Salmon Aquaculture Dialogue Steering Committee and dated August 3, 2010. Our comments are in two sections: general comments; and specific proposals for adjustments to the indicators, standards and appendices.

General Comments:

It is our opinion that the draft standards do not represent an appropriate definition of sustainable salmon farming, and our comments will address the most important areas where we see a need for improvement.

First, we believe that sustainable salmon farming can make an important contribution to the provision of healthy food for our growing population. Therefore, sustainability is the basis for salmon farming in general and not only a niche sector of the industry. Because of this, we believe that a standard should aim to shift the industry in general and be achievable for the majority. The standard should not be limited to niche or value added production to selective consumer groups.

Second, there are several interests that have to be balanced in order to arrive at a standard that achieves the goal of transforming the industry;

- Salmon farming takes place in diverse geographical locations and under variable social and environmental conditions. As such, the standard must be flexible to account for this variability. However, the current draft does not provide such flexibility when, for example, the same limit is set for different species of sea lice in different regions where the impacts of sea lice varies a lot. The standard must be based on compound industry knowledge and latest scientific findings.

- It is stated that the standards will apply at farm level. Therefore, they must avoid adding unnecessary costs and bureaucratic workload if not directly needed to ensure responsible practices. Indicators must be based on a "need to have" and not "nice to have" basis.

- The level of activity required under the standards must be proportional to the outcomes. For example, the proposed requirement for research and monitoring from single sites is very difficult to audit and the value of monitoring is limited if there is no well established methods. Some examples of indicators that are out of proportion are 3.1.2, 3.1.5, 4.7.4 and 7.1.4.

- The standards should be dynamic, with some flexibility in auditing to provide for the variable biological nature of salmon farming. Cermaq believes the impact of the standard would be stronger if continuous improvement strategies were incorporated, instead of the ‘absolute’ approach that is proposed.

Lastly, we note many areas requiring clarification before the standard will be ready for implementation:

- We are concerned that almost 1/3 of the indicators are still "flagged", meaning that there is no consensus on a particular issue. It is uncertain how these issues are going to be resolved. To be able to provide complete comments we need to understand how the indicators will be audited, and the auditing comments and auditing guidelines are included only for a few indicators.

- Cermaq doubts that the presented draft would be possible to audit, due to complexity and lack of clarity. Before implementing, test audits should be performed on commercial salmon farming sites, to ensure that a third party certification can manage a reasonable process and that the auditing guidelines give the right support and clarification.

- We require clarification of the processes for pre-qualification periods, effect of non-compliance on one or more indicator, period of validation of the certification, and period before re-certification. These important elements are key to our assessment on how the standard would be usable and whether it can achieve support and participation from the farming operations.

- Many of the indicators can not be applied on a site level, but must be applied on a company level. This is especially so for larger companies with many sites in multiple locations where, for example, R&D work may be coordinated centrally. The indicator or the auditing guidelines should specify this in detail.

We hope that our comments are helpful to the process, and that the outcome of this process will be a standard which has a real effect of further improving salmon farming globally by being realistic for salmon farming operators and useful for all stakeholders.

Specific Proposals:

Our specific comments to the individual indicators are presented below. In addition, please note:

- The term veterinarian throughout the draft standard. In foot note 35 this is explained to also cover fish health biologist and similar. This foot note should apply to all use of the term veterinarian in the document.

- Principles, criteria, indicators and standards for smolt production are not developed sufficiently to be commented on, and our feed back on this is preliminary in line with the preliminary status of the draft.

Where our comments imply need for changes in the text we have suggested alternative text with justification.

Criteria	Indicator	Comments	Proposal
Principle 1: Comply with all applicable international and national laws and local regulations			
1.1	1.1.1 – 1.1.4	It will be difficult in practice for producers to provide 'documents demonstrating compliance' with laws. To be audited at company level.	Change these indicators towards: 'evidence of non-compliance with laws'. Change the standard to: 'None'.
1.1	1.1.5	Demonstration of compliance with the 'importing laws of countries' would appear to be beyond the application scope of these standards, which is stated on p.7 'minimize or eliminate the key negative environmental and social impact of salmon farming'. Import laws in a country do not address environmental impact in the country of production.	Remove this indicator.
Principle 2: Conserve natural habitat, local biodiversity and ecosystem function			
2.1	2.1.1		
2.1	2.1.2	As there might be several ways to address this goal, the standard should not add costs to the certification process by requiring a specific analyses method.	The indicator should have the following added text: Where existing, national standards with the same intention and level of protection of benthic biodiversity should be accepted as fulfilment of the standard.
2.2	2.2.1 and 2.2.2	Water quality in the site of operation is more of a fish welfare concern rather than an environmental concern, given the extremely small footprint that salmon farms have in context of a) the marine environment; and b) regulatory controls governing the siting of fish farms. It is stated on p.8 that "The SC has decided, however, not to comprehensively address farmed fish welfare in the standards document".	Remove indicator 2.2.2 and 2.2.1
2.3	2.3.1	As focus is on point of entry to the farm, there is no need to focus on sampling methods for feed going into the pens in Appendix 1	Update appendix 1 accordingly
2.4	2.4.1	Same comments as on 2.6.1: Both of these indicators relate to biodiversity impacts. However, the idea of identifying the presence or abundance of sentinel species proximate to salmon farms as an indicator of environmental change is not presently practicable. Further studies should be commissioned to develop this idea before it is considered further as part of the standard. Meantime, indicators 2.4.1 and 2.6.1 can be combined and wording for the indicator can be based upon GRI indicator EN12 and EN14.	Change 2.4.1 to: "Evidence of biodiversity risk assessment, including proximity to critical, sensitive or protected habitats and species". Add indicator 2.4.2 to: "Evidence of strategies, current actions and future plans for managing identified impacts on biodiversity". The standard in both cases should be "Yes".

Criteria	Indicator	Comments	Proposal
2.5	2.5.1	The industry need to have a mix of tools to use in a balanced way to avoid predators attacking the farms. A limited use of ADD could be a part of this.	Indicator should read: Predator controls should be implemented and recorded so as to prevent unnecessary wildlife destruction by the use of preventive measures or scaring devices. Evidence of risk assessments prior to implementation Change standard to "Yes"
2.5	2.5.2	Based on comment to 2.5.1.	The indicator should read: The farm must show evidence that anti predator methods are regularly assessed and found effective.
2.5	2.5.3	Restriction on killing marine mammals and birds can only apply outside periods where hunting is allowed by national regulation. In situation of emergency, i.e. if predators are breaking through the predator net/pen or are inside the pen, lethal action should be allowed.	Change indicator to: 'Evidence of effective and non-destructive measures for the control of predators such as marine mammals and birds'. Change standard to: 'Yes'.
2.6	2.6.1 and 2.4.1	Both of these indicators relate to biodiversity impacts. However, the idea of identifying the presence or abundance of sentinel species proximate to salmon farms as an indicator of environmental change is not presently practicable. Further studies should be commissioned to develop this idea before it is considered further as part of the standard. Meantime, indicators 2.4.1 and 2.6.1 can be combined and wording for the indicator can be based upon GRI indicator EN12 and EN14.	Remove indicator 2.6.1, and thus also criterion 2.6. Change indicator 2.4.1 and add indicator 2.4.2.
Principle 3: Protect the health and genetic integrity of wild populations			
3.1	3.1.1	Se comments to appendix II	
3.1	3.1.2	Indicator 3.1.2 needs to be worked on. As the text is substantial scientific research is needed which is out of proportion of what should be required of singe sites in an area based management scheme. An assessment should be based on available data.	Change 3.1.2 to: Indicator: An assessment of key regional cumulative impacts of the farm and its neighbours on the wild populations in the region. Standard: Yes Delete appendix III

Criteria	Indicator	Comments	Proposal
3.1	3.1.3	Second part is unnecessarily narrowing the scope of cooperation. Sea lice monitoring might be the highest priority, but the standard should not conclude on this for defined regions. Must be audited at company level.	Change 3.1.3 to: A demonstrated commitment to collaborate with NGOs academic and governments on areas of mutually agreed research to measure possible impacts on wild stocks.
3.1	3.1.4, 3.1.7 & 3.1.8	Any standard for maximum average sea lice levels must be adjusted to account for differences in the species of lice present (L.salmonis and C.rogercresseyi) and also the differences between salmon lice in the Pacific and Atlantic Ocean. This is incorporated in the national regulations and trigger levels for treatment. As the sea lice treatment is strictly regulated, we should avoid setting a standard that might have as a consequence that sites complying with national regulations are non-compliant with the standard.	Delete indicators 3.1.4, 3.1.7 and 3.1.8. Replace with: Demonstrate compliance regulations on sea lice levels and treatment against sea lice. Standard: Yes
3.1	3.1.5	Monitoring of wild salmon outmigration would add cost unproportional to the outcome.	The indicator should read: Document assessment of timing of wild salmonid outmigration in the adjacent area. Standard: yes
3.1	3.1.6	This might be one of the areas for cooperation with NGOs, researcher and government in areas where this is relevant, re indicator 3.1.3. It is not relevant for all areas	Delete indicator
3.1.	3.1.9	The question of pre-qualification period applies for many indicators, this indicator is not special.	Delete indicator
3.2	3.2.1	In line with the general view that one should be causes on transferring species, the farming of salmonides should be limited to areas where the species are already widely used for commercial production. The second part of the indicator does not add any real content to assessing how the present farming operates sustainably, and should be deleted.	The indicator should read: If a non-indigenous species is being farmed, evidence and documentation that the species is already widely used in commercial production locally by the standard release date.
3.4	3.4.1	The counting of fish is a severe stress factor and should be avoided as much as possible. Fish are normally counted at the time of vaccination and when harvested. The proposed level of 0.1% has limited value based on the accuracy levels of counting methods and machines.	Explanation of fish loss during a production cycle (pre-smolt vaccination to harvest) from mortalities or other causes. Change standard to: “Yes”

Criteria	Indicator	Comments	Proposal
3.4	3.4.2	The last sentence in footnote 16 adds confusion and should be deleted.	Footnote 16: Should read: The farmer must demonstrate that there was no reasonable way to predict the events that caused the episode.
3.4	3.4.3	Reference should also be made to established local codes of good practice.	Change indicator to: "Evidence of compliance with national regulations and/or established local codes of good practice aimed at reducing the risk of escapes"
Principle 4: Use resources in an environmentally efficient and responsible manner			
4.2	4.2.1 and 4.2.2	We maintain that FFDR is not an appropriate indicator on the use of wild fish for feed, because it is not stable with the yield of fat from 'forage fish' and it neglects differences in nutritional composition between forage fish and farmed salmon. Therefore, in the case of salmon farming, a performance measure based on FFDR is, in our opinion, wrong and could in fact encourage formulation behaviour that leads to over-exploitation of high-fat forage fish, with resulting adverse impacts on biodiversity. For details, see scientific documentation: Crampton et al (2010) Demonstration of salmon farming as a net producer of fish protein and oil. Aquaculture Nutrition See also presentation on Intrafish (subscription needed to open the site) http://www.intrafish.no/norsk/nyheter/article273829.ece	Remove indicators 4.2.1 and 4.2.2
4.2	4.2.3	The wording under 'standard' should be adjusted for stock generations	Change standard to: '80% for fish generations stocked prior to Jan 2014 and >100% for stockings after Jan 2014'
4.2	-	Further to comments on 4.2.1 and 4.2.2, the standard is missing an indicator that measures efficiency in the utilisation of sustainably sourced marine oils, in addition to 4.2.3 that measures efficiency in the utilisation of sustainably sourced marine protein	Add an indicator: 'Fish Oil Index (FOI) for grow out' The calculation for FOI should be added to Appendix IV: FOI = Oil in salmon (grams) / (fish oil in feed + (fishmeal in feed * fish oil in fishmeal)) * eFCR The standard should be as for FPI: '80% for fish generations stocked prior to Jan 2014 and >100% for stockings after Jan 2014'

Criteria	Indicator	Comments	Proposal
4.3	4.3.1 – 4.3.3	Indicator 4.3.2 (relating to a FishSource score) would appear to be an unnecessary layer of complexity when it is already required (4.3.3) that the source of marine raw materials is assured through an ISEAL accredited or ISO 65 compliant certification scheme (such as IFFO-RS) that is itself based upon the FAO code of conduct for responsible fisheries.	Remove 4.3.2
4.3	4.3.4	This indicator must be based on declaration from the producers of fish oil and fish meal. These producers must again build on certificates and declarations as sorting by species can not be expected don for trimmings.	
4.7	4.7.1	Copper is not been concentrated in the value chain and has little toxic effect in seawater. This is why Norway has delisted copper from the priority list of substances harming the environment. The foundation of this indicator seems not to be based on sound science.	Delete indicator
4.7	4.7.5	This is regulated by national law, based on thorough documentation. It is not justified that such a restriction is needed to address environmental issues of salmon farming. Such justification can only be done if specific biocides are listed as prohibited. This indicator is easily judged as a technical barrier to trade.	Delete indicator
Principle 5: Manage disease and parasites in an environmentally responsible manner			
5.1	5.1.1-5.1.2	Visit from veterinarian and fish health professionals would be a part of the fish health management plan.	Remove indicator 5.1.2 as this should be covered under 5.1.1
5.1	5.1.6	Post mortem analyses of all dead fish would be costly and the value is not justified. A robust classification system addresses the same need.	Percentage of dead fish that are recorded and classified according to mortality causes.
5.1	5.1.7	Indicator 5.1.7 is outside the scope of normal farming, and only extreme causes (e.g. algae bloom) would lead to mortality rates at this level. It is not justified that this is needed to define sustainable aquaculture.	Delete indicator 5.1.7.
5.2	5.2.1	"grams per tonne of fish produced" – the calculation for this must be clearly defined in an appendix We propose a formula at the end of this document	Append formula given at the end of this document.
5.2	5.2.2	This is covered by 5.2.1.	Remove indicator 5.2.2.

Criteria	Indicator	Comments	Proposal
5.3	5.3.1	This is regulated by national law, based on thorough documentation. It is not justified that such a restriction is needed to address environmental issues of salmon farming. Such justification can only be done if specific biocides are listed as prohibited due to their local environmental effect. This indicator can easily be judged as a technical barrier to trade.	Delete indicator.
5.3	5.5.3	The issues is key for all food production, butt his is related to food safety and is thus outside the scope of the standard.	Delete indicator
5.4	5.4.1	Duplicates 3.1.1. and on of them should be deleted	Delete duplication
5.4	5.4.4	We agree with the comments from the SC	
5.5	5.5.3	Closed well boat is a costly measure where the benefits should justify the extra cost involved. In many situation, e.g. when fish are documented free of disease or for transport within a defined area this measure is not necessary	The indicator should read: Fish transported in closed well boats where health risks have been identified. Standard: 100 %
5.5	5.5.5	Diseases may reoccur in many situations as they spread horizontally and by vectors. The suggested requirement is not a justification of sustainable operations.	Delete indicator.
Principle 6: Develop and operate farms in a socially responsible manner			
6.10		This indicator is not in line with Norwegian regulation where overtime may be compulsory.	
Principle 7: Be a good neighbor and conscientious citizen			
7.1	7.1.1.		Footnote 69 should read Regular and meaningful: meetings should be at least bi-annually with elected representatives of affected communities. The agenda for the meting should in part be set by community representatives.
7.1	7.1.4	The scope must be the health effects on a community from fish farming sites, i.e. health effects that are not covered by any of the environmental indicators. This is neither explained nor justified.	Delete indicator

Criteria	Indicator	Comments	Proposal
7.1	7.1.5		Auditing guidelines should state that this requirement is fulfilled by established procedures by authorities to assess eventual adverse impacts.
7.2	7.2.2	This does not apply in all regions and should have the same scope as 7.2.1. (where applicable)	Add (where applicable) to the indicator
7.2	7.2.3	This does not apply in all regions and should have the same scope as 7.2.1. (where applicable)	Add (where applicable) to the indicator
	Smolt	The indicators appear to be relevant. Without the proposed standards it is impossible to give further feedback.	

APPENDICES

Appendix	Subsection	Comment to SAD	Proposal
I	2	The term ‘Fines’ should be very clearly defined	Fines (or dust) are defined as particles that separate from feed when sieved through a 1mm sieve. Broken feed pellets are not included in fines. Breakage is typically defined as particles that are <70% of the declared feed size specification.
II	-	The text needs to account for cases where a salmon farm is sited in an area under full control of one holding company and therefore is not part of a collaborative area-based scheme. Any definitions on areas should be based on what is defined in national regulations and where areas are not defined the available oceanographic data should be used to define areas. Text on well boats should be updated re our comment to indicator 5.5.3. There should not be limitation on transport of stocked pens within the defined area. On monitoring schemes only the two first bullet points should be kept, the others deleted as they are out of proportion.	Update the text according to our comments.
III		Re comments to indicator 3.1.2	Annex III should be deleted

IV	1		Our proposal is to remove the flawed forage fish dependency ratio calculations from the standard. If the calculations are, for some reason, to be retained then we propose that the default fish oil yield given in the formula on p.70 should actually be 7.2 rather than 5.0. This is because fishmeal also contains about 10% fish oil, so 10% of 22.2 should be added to the yield factor under FFDRo (5+2.2 = 7.2). Note 80 on p.71 should read "The protein content of fishmeal…" The formula for FPI given on p.71 is the inverse of the nutrient ratio formula specified by Crampton et al (2010) 'Demonstration of salmon farming as a net producer of fish protein and oil' in the Journal of Aquaculture Nutrition. We recommend that the nutrient ratio formulas specified by Crampton et al (2010) are adopted by the SAD standard. When discussing the efficiency of resource use, it is intuitively better to have a ratio where lower = 'better'. .

Ref: Indicator 5.2.1:
We proposed this formula for measuring antibiotic use:

$$\text{Antibiotic use ratio (g/t produced LWE)} = \frac{\text{Total amount of antibiotics used in the period (g)}}{\text{Fish production in the period (tonnes LWE)}}$$

Where: Fish production in the period (tonnes LWE) = Closing stock + sales - Opening stock

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Demonstration of salmon farming as a net producer of fish protein and oil

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Abstract

To date aquaculture's reliance on dietary marine sources has been calculated on a fish weight-to-weight basis without considering the absolute amounts of nutrients but this approach neglects the often considerable differences in the nutritional value of fish. We propose simple nutrient-to-nutrient-based dependency measures that take into account these nutritional differences. In the first study reported here, individually tagged Atlantic salmon (*Salmo salar*) were reared in seawater supplied tanks with feed collection facilities. In the second, commercial net pens were used to grow over 200 000 fish. For both studies, a low marine ingredient feed containing approximately 165 g kg^{-1} fishmeal was compared to a control feed (approx 300 g kg^{-1} fishmeal) whilst fish oil inclusion was less markedly reduced. The low marine feeds supported similar growth and feed efficiency compared to the control feeds. With the low marine ingredient feeds, the weight of salmon protein and lipid produced through growth exceeded the weight of marine protein and lipid consumed by the fish meaning that salmon farming can be a net producer of fish protein and oil. The amount of n-3 long-chain polyunsaturated fatty acids deposited was sufficient to meet current recommendations from human health organizations.

KEY WORDS: dependency ratios, fishmeal, marine oil, marine protein, salmon, sustainability

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Introduction

Global consumption of seafood is increasing whilst the amount of fish captured is stable or declining, and it is aquaculture that is filling the shortfall (FAO 2009). In 2006, global production of farmed salmon (*Salmo* spp. and *Oncorhynchus* spp.) amounted to 1.5 million tonnes and represents the largest volume of farmed marine fish by species (FAO 2008). Published work to date (Naylor *et al*. 1998, 2000; Naylor & Burke 2005; Pinto & Furci 2006; Tacon & Metian 2008; Anon 2009) has used whole fish weight-based calculations to estimate that salmon farming uses between 3.2 and 8.5 kg of capture fish to produce 1 kg of farmed salmon and thus conclude that salmon farming is a net user of marine seafoods rather than a net producer. This highlights concern that large fisheries for fishmeal and fish oil could collapse and raises the issue of the responsible use of this resource by the salmon industry. However, this calculation method is an over simplification of the resource usage because it neglects the nutrient composition of both the capture fish and the salmon, thus ignoring the value of the production to human nutrition. The lipid content of capture fish varies enormously between species and with weight, environmental conditions and season (Windsor & Barlow 1981; Tsukayama 1989; Galdos *et al*. 2002). The average lipid content of fish used in the manufacture of fishmeal and oil can be estimated by using average yields of fishmeal and oil from capture fish. Average yields of 5% fish oil and between 22.5 and 26% of fishmeal have been reported (Pinto & Furci 2006; Tacon & Metian 2008). This equates to a lipid content of 7% in the capture fish, assuming 69% protein and 8% lipid in fishmeal and 100% lipid in fish oil (NRC 1993). This is close to the reported concentration of lipid in the dominant species caught for fishmeal and oil (Peruvian anchovy, *Engraulis ringens*) of ca. 6% (Windsor & Barlow 1981). Harvested salmon (3+ kg) grown on modern high lipid feeds, on the other hand, contains ca. 20% lipid on a whole body basis (Einen & Roem 1997; Berge *et al*. 2005; Hemre & Sandnes 2008). In protein, the capture fish concentrations are close to that of the whole body of harvest-sized Atlantic salmon at 16–18% (Windsor & Barlow 1981; Einen & Roem 1997; Berge *et al*. 2005; Hemre & Sandnes

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2008). Because the lipid content of salmon is nearly three times higher than in capture fish calculations of reliance should preferably allow for this difference, which can be easily achieved by using, not simple weight-to-weight ratios, but nutrient-to-nutrient ratios. This approach is comparable to the one used in Life Cycle Assessment methods, for example Ayer & Tyedmers (2009).

Calculated Fish In to Fish Out ratios (FIFO) used by, for instance, Pinto & Furci (2006) and Tacon & Metian (2008) assume a yield of fishmeal and fish oil from capture fish to calculate the weight of capture fish required to produce the fishmeal and fish oil used in each unit weight of feed. Because the production of fishmeal also yields quantities of fish oil, the weight of capture fish required for the production of fish oil is only calculated on the extra fish needed to produce the amount of fish oil used in the feed thus avoiding double counting. Feed conversion ratio (FCR) is used to convert the amount of feed used to the amount of farmed fish produced. Concentrations of fishmeal and fish oil used currently in salmon farming mean that more fish are needed to supply the demand for fish oil than are needed to supply the demand for fishmeal (Tacon & Metian 2008). But the FIFO calculations used by the above-mentioned authors do not encourage good environmental practice because feeds that use very different amounts of marine resources can produce the same FIFO number. Figure 1 calculations assume a yield of 22.5% fishmeal and 5% fish oil from caught fish and a FCR of 1.25 (as Tacon & Metian 2008 for 1997 salmon data). The example shows that a feed containing 720 g kg^{-1} fishmeal plus 160 g kg^{-1} fish oil has the same FIFO ratio as a feed with no fishmeal and 160 g kg^{-1} fish oil. Because the encouragement of good environmental practice is the major objective of measures such as the FIFO ratio, this is an unfortunate failing of the equation used by Tacon & Metian (2008) and other authors.

We propose a simple 'Marine nutrient dependency ratio' (MNDR), for which the amount of each marine-derived nutrient used to feed salmon is divided by the amount of each nutrient produced as a result of salmon farming. The nutrient ratios for proteins and lipids are of primary interest and are termed here as 'Marine Protein Dependency Ratio' (MPDR) and the 'Marine Oil Dependency Ratio' (MODR), respectively.

The benefits of using ratios based on nutrients rather than weight are several. Nutrient-based ratios reflect the resources used by aquaculture because feed manufacturers use proteins and lipids, not whole fish. Reductions in the amounts of marine nutrients used will be reflected in a more favourable ratio (just as long as growth or feed efficiency is not compromised) meaning it will encourage good environmental practice. In contrast, weight-based ratios will encourage the capture of fish that yield high amounts of oil to reduce the measured dependency. Furthermore, nutrient-based ratios allow for the comparison of MNDRs between farmed species, despite differences in the body composition of these species. This is of particular importance given that food agencies (for example Scientific Advisory Committee on Nutrition 2004) presently recommend the consumption of high lipid fish for human health reasons. Separating the dependencies on protein and lipid improves our understanding of where research effort may be most effectively focused. Finally, because feed manufacturers closely control the ingredients used in feeds, it allows the measurement and auditing of feeds for their reliance upon both marine protein and marine oil sources.

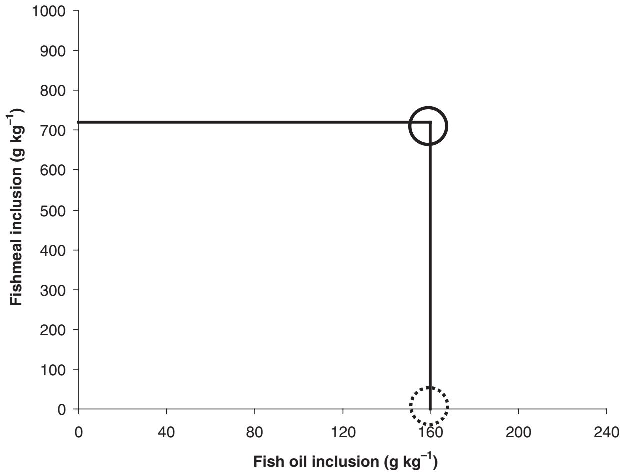

Figure 1 Combinations of fishmeal and fish oil inclusion (both as g kg^{-1} of feed ingredients) that give a Fish In to Fish Out (FIFO) ratio of 4.0 are connected by the solid line. Any feeds with fishmeal and fish oil inclusions that are to the right or above the line have a FIFO ratio above 4 whilst inclusions that are to the left or below the line have a FIFO ratio of <4. Assumes a yield of 22.5% fishmeal and 5% fish oil from caught fish and a feed conversion ratio of 1.25 (as Tacon & Metian 2008 for 1997 salmon data). Two feeds are highlighted as examples. The feed shown by the solid circle (containing 720 g kg^{-1} fishmeal and 160 g kg^{-1} fish oil) has the same ratio as the feed shown by the dotted circle (containing no fishmeal and 160 g kg^{-1} fish oil) despite using very different amounts of marine ingredients.

The challenges in reducing the reliance on marine protein differ greatly from the challenges of reducing that of marine oils. Cardiovascular health benefits of the n-3 long-chain (≥C20) poly unsaturated fatty acids (n-3 LC-PUFA), in particular eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), from fish oil are widely accepted. Several studies report significant inverse trends between n-3 LC-PUFA

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intake and cardiovascular disease (ISSFAL 2004). Other potential benefits of n-3 LC-PUFA in the areas of inflammatory diseases, brain development and function and mental health have been reviewed (Ruxton *et al.* 2007). The fatty acid profile of salmon flesh reflects the fatty acid profile of the feed given (Bell *et al.* 2003; Jobling 2004). Thus, there is a need to ensure acceptable n-3 LC-PUFA concentrations in farmed salmon fed diets with increased replacement of the dietary fish oil by plant oils. In contrast to proteins, a high replacement of dietary fish oil by plant oils can be easily made without a measurable decrease in growth (for example Torstensen *et al.* 2005).

The composition of proteins is similar across salmon and many other fish species (Connell & Howgate 1959; Njaa & Utne 1982), and the protein components of salmon are preserved across a wide range of dietary protein sources (Espe *et al.* 2007; Hevrøy *et al.* 2008). Thus, the potential health benefits of fish proteins for the consumer because of effects on metabolism (Lavigne *et al.* 2001; Ruzzin *et al.* 2007) are maintained irrespective of the feed composition. Because plant proteins contain anti-nutrients and often poorer amino acid profiles, the challenge in using them to replace fish proteins is instead focused on ensuring that the salmon remain healthy with high growth rates and feed efficiency (Torstensen *et al.* 2008).

In this article, we demonstrate the benefits of separating the dependencies on marine protein and marine oil with two feeding trials (termed 'tank' and 'commercial' studies) where growth, feed efficiency and EPA and DHA in the salmon fillet were monitored. The trials reported here aim to demonstrate a reduction in the dependency on marine protein and oil to <1 and compare the growth and fillet composition of fish fed a control feed with those fed a low marine ingredient feed in practical environment. In both studies, the composition of the control feed is similar to commercially available feeds at the time to maintain relevance of the work. The reduction in marine ingredients used occurred predominantly in the protein fraction; only slight reductions in fish oil inclusion were made to maintain sufficient EPA and DHA levels. Protein or fat sources from land animals were not used to replace marine ingredients because the use of most land animal proteins is currently prohibited in the European Union.

Materials and methods

Calculations of MPDR and MODR

Dietary proteins and oils or lipids from all capture fish, shellfish or zooplankton were counted as marine sources irrespective of purpose for which they were caught. The lipids contained in fishmeal and other marine sources were counted as part of the dietary marine oils used.

$$\mathrm{MPDR} = \frac{\mathrm{MPfeed} \times \mathrm{PrtMP} \times \mathrm{FdGvn}}{(\mathrm{Wt}_{t1} \times \mathrm{PrtSalm}_{t1}) - (\mathrm{Wt}_{t0} \times \mathrm{PrtSalm}_{t0})} \quad (1)$$

$$\mathrm{MODR} = \frac{(\mathrm{MOfeed} + (\mathrm{MPfeed} \times \mathrm{LpdMP})) \times \mathrm{FdGvn}}{(\mathrm{Wt}_{t1} \times \mathrm{LpdSalm}_{t1}) - (\mathrm{Wt}_{t0} \times \mathrm{LpdSalm}_{t0})} \quad (2)$$

where MPfeed, concentration of marine proteins (e.g. fishmeal) in the feed (%); PrtMP, average concentration of protein in the marine protein sources used (weighted by their inclusion level and expressed as a proportion); FdGvn, feed given (kg); Wt, weight of salmon at start of period ($_{t0}$) or at end ($_{t1}$) in kg; PrtSalm, concentration of protein in salmon at start of period ($_{t0}$) or at end ($_{t1}$) in %; MOfeed, concentration of marine oils (e.g. fish oil) in the feed (%); LpdMP, average concentration of lipid in the marine protein sources used (weighted by their inclusion level and expressed as a proportion); LpdSalm, concentration of lipid in salmon at start of period ($_{t0}$) or at end ($_{t1}$) in %.

Tank study

Atlantic salmon, *Salmo salar*, (initially 60 per tank, average weight = 352 g) were individually tagged using a passive integrated transponders and reared in seawater supplied tanks over a 329 day period were fed either a 'Control' or a 'Low Marine' feed (Table 1). Fish were weighed at the start (day 0), at three intermediate times (days 62, 148 and 246) and at the end of the study (days 327–329). As the fish grew, the feed size was increased, the dietary protein to energy ratio was decreased, and other nutrients were altered in line with normal practice because of size-dependent nutrient requirements, but at all stages were comparable between the two test feeds. Fish were reared in cylindrical fibreglass tanks with a water volume of 0.5 m^3. Each tank was supplied by running seawater (salinity 33 g L^{-1} and temperature 8–9 °C) at a flow rate of 0.8 L kg biomass^{-1} min^{-1}. A continuous lighting regime was used. Fish were fed slightly above apparent satiation three times daily using an automatic feeding system, and the waste feed collectors allowed the estimation of the actual feed intake. The growth trajectory for each tagged individual was modelled with a repeated measures hierarchical linear mixed-effects model (Pinheiro & Bates 2000) with individuals nested within tanks and feed as the main factor. Cubic splines were used to describe the non-linearity of the growth trajectories of the 236 individual growth trajectory observations from fish kept in eight different tanks

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Table 1 Ingredient composition (g kg^{-1}) and nutrient profile (g kg^{-1} except where noted) of feeds used in the tank study. Weighted average is based on the consumption of each feed size during the study

	4 mm		5 mm		7 mm		Weighted average	
Feed size	Control	Low Marine	Control	Low Marine	Control	Low Marine	Control	Low Marine
Fishmeal	410	263	359	213	300	163	321	179
North Atlantic fish oil	164	134	150	142	188	171	178	163
Vegetable protein concentrates[1]	205	325	195	360	190	343	192	345
Vegetable oil	98	138	144	159	141	163	138	160
Carbohydrates-based binders[2]	105	114	136	100	170	128	158	121
Micro premixes[3]	18	27	16	27	11	34	13	32
Nutrient profile								
Protein N*6.25	446	445	427	439	382	383	397	398
Lipid	311	302	327	325	348	333	341	329
Sum of N-6 fatty acids (g kg^{-1} of total FA)	98	124	108	140	104	127	104	129
EPA + DHA (g kg^{-1} of total FA)	111	91	100	82	97	88	99	87
Marine proteins	280	185	245	149	210	114	223	126
Marine oils	202	159	183	161	213	182	205	176

DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; FA, fatty acids.
[1] Includes soy protein concentrate, pea protein concentrate, wheat gluten, sunflower meal.
[2] Includes wheat, faba bean meal.
[3] Includes vitamin, mineral, amino acid and pigment premixes.

with four tanks on each feed. The 95% credible intervals (CI) for quantities of interest were computed by a posterior simulation of the model parameters (Gelman & Hill 2007) in which 1500 simulated values were used for each parameter. FCR was calculated by dividing the amount of feed consumed with weight gain. FCR values were compared between the feeds with a general linear model. Statistical modelling was conducted with the R language (R Development Core Team 2008) and its lme4 package (Bates *et al*. 2008).

Norwegian Quality Cut (NQC) fillets from five initial individual and 15 final pooled NQC fillets (three pools of five fish each grouped by round weight) for four tanks per diet were taken for lipid and fatty acid composition. For the final sampling, separate fish were used for the NQC and whole body composition. For the initial sampling, the same fish were used for the NQC and whole body composition. The NQC was used as analysed whilst the whole body result comprised the NQC result and the result from whole body without the NQC pro-rated by their proportional weights. Total lipid was extracted from 1 g of diet or flesh homogenates by homogenizing in 20 volumes of ice-cold chloroform/methanol (2 : 1, v/v) using an Ultra-Turrax tissue disrupter (Fisher Scientific, Loughborough, UK). The total lipid fraction was prepared according to the Folch method (Folch *et al.*1957) with non-lipid impurities removed by washing with 0.88% (w/v) KCl. The lipid weight was determined gravimetrically after evaporation of solvent under nitrogen and desiccation in vacuum for at least 16 h. The preparation of fatty acid methyl esters from the extracted lipid before separation, identification and quantification on the gas chromatograph (GC) is described in (Bell *et al*. 2003). The increase in load of EPA + DHA (mg $fish^{-1}$) was calculated from fish sampled at the start and at the end of the study. Similarly, the increase in load of fat (mg $fish^{-1}$) during the study was calculated. The ratio of the two gives the increase in EPA + DHA per unit fat of the fillet during the course of the study. To estimate the concentration of EPA + DHA in the fillet of salmon grown from first feeding to harvest weight using lipids with the same fatty acid profile as used in this study, the fillet fat content of a 5 kg fish was assumed to be 18.5% (Einen *et al*. 1998; Mørkøre *et al*. 2001). The amount of EPA + DHA in a harvest-sized fish was thus calculated as the product of the assumed fat fillet fat content and the calculated amount of EPA + DHA as a per cent of fat deposited. Protein retention was calculated from 100 times the ratio of the amount of protein consumed (itself calculated from the product of the dietary protein content and the amount of feed consumed) and the increase in the protein load of the average weight fish during the study. Lipid retention was calculated on a similar basis.

Commercial study

The study was conducted at EWOS Innovation's commercial sea site at Oltesvik, near Sandnes, Norway. A total of 229 578 Atlantic salmon, initial average weight 1196 g, were distributed between 12 pens (each 15 × 15 × 12 m deep) and

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Table 2 Ingredients (g kg^{-1}) and nutrient profile (g kg^{-1}except where noted) of feeds used in the commercial study

	Control	Low marine
Fishmeal	285	153
North Atlantic fish oil	199	181
Vegetable protein concentrates[1]	335	437
Vegetable oil	126	158
Carbohydrates-based binders[2]	37	62
Micro premixes[3]	17	9
Nutrient profile		
Protein N*6.25	389	378
Lipid	353	353
Sum of N-6 fatty acids (g kg^{-1} of total FA)	90	119
EPA + DHA (g kg^{-1} of total FA)	153	130
Marine proteins	190	98
Marine oils	216	190

DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; FA, fatty acids.
[1] Includes soy protein concentrate, pea protein concentrate, wheat gluten, faba bean meal, sunflower meal.
[2] Includes wheat meal.
[3] Includes vitamin, mineral, amino acid and pigment premixes.

fed either a 'Control' or a 'Low Marine' feed (Table 2) in a randomized block design, three blocks based on smolt origin and stocking density). All pens were equipped with a camera to monitor appetite, and feeding level was adjusted manually. Sample weight measurements (200 fish per net pen) were made at start on 13 October 2007 and on 59, 122 and 218 days after the start. The fish were harvested between 254 and 275 days after the start of the study (the time span reflected practical necessities of processing large numbers of salmon) during which the number and gutted weight of all fish was recorded for each pen. The average growth trajectory of each pen was modelled with cubic splines using pen means in a repeated measures hierarchical linear mixed-effects model (Pinheiro & Bates 2000). The effect of the feed on growth was estimated with this model using feed and block as fixed-effect factors. Each feed was replicated in six pens but for both feeds one pen was omitted from the results because of a feeding failure. Ninety-five per cent CI were estimated as described above for the tank study.

Fish from the same pen were pooled by weight with seven fish forming each pool. Thirteen pools of fish were taken at the start and three pools of fish per pen at the end. NQC fillet sections were analysed for fat content and fatty acid profile as described for the tank study. The increase in load (g fish^{-1}) of EPA + DHA was calculated from fish sampled at the start and at the end of the study as follows. The initial load of EPA + DHA in the fillet was estimated by fitting a regression model between initial fillet EPA + DHA and initial fish weight. Similarly, the final load of fillet EPA + DHA was estimated by fitting a linear model between final fillet EPA + DHA, final fish weight and type of feed but with a mixed-effects model using pen as the level of random variation (Pinheiro & Bates 2000). These models were used to estimate the final EPA + DHA load for a 5 kg harvest size fish for both feeds and the initial load for an average-sized fish at the start. The amount of EPA + DHA deposited during the trial for both feeds was calculated as the final concentration minus the initial concentration divided by the increase in the fillet mass. Fillet weight was assumed to be a constant 60% of fish weight for all across all weights.

Feed and raw materials analyses

All dry ingredients were ground, mixed and extruded using Wenger X-85 extruder. The extruded feed was dried, and the oil was added in a vacuum coater. All the chemical analyses were run in duplicates. Nitrogen was determined after total combustion using a Nitrogen-Analyser (Perkin Elmer, 2410 Ser. II, Norwalk, CT, USA), crude protein content calculated assuming that proteins contain 16% N. Dietary fat content was determined gravimetrically after extraction with ethyl acetate (Losnegard *et al*. 1979). Dry weight and ash contents were determined gravimetrically after freeze-drying the samples and dried to constant weight in an oven at 550 °C, respectively. Amino acid composition of the feed raw materials was analysed by near infrared reflectance (Fontaine *et al*. 2001). Amino acid composition of compound feed and faeces was analysed according to Llames and Fontaine (1994).

Results

In Table 3, the columns headed '1997 usage' and '2007 usage' takes data from (Tacon & Metian 2008) and compares the weight-based fish-to-fish method with the nutrient-based method proposed in this article. It is clear that the calculation method used makes a big difference because the nutrient-based methods estimate a dependency that is approximately one-third of the weight-based method. As described earlier, this is mainly because of the large difference between lipid concentrations in salmon compared to the capture fish. The table shows how useful it is to separate the protein and oil from each other because there has been differential development for them. In 1997, salmon farming was more dependent on marine protein than on marine oil but by 2007 they are almost equal. This development is hidden if only weight-based ratios are used. The estimated dependency of

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Table 3 Estimated dependency ratios of farmed salmon on capture fisheries or marine nutrients

	Data from Tacon & Metian (2008)		Low marine feed in tank study described in this article
	1997 Usage	2007 Usage	
Tacon & Metian 2008 method of calculation	7.5	4.0	2.9
MPDR[1]	2.57	1.20	0.66
MODR[2]	2.15	1.13	0.80

[1] MPDR, Marine Protein Dependency Ratio, see Eq. (1) in Materials and Methods.
[2] MODR, Marine Oil Dependency Ratio, see Eq. (2) in Materials and Methods.

salmon farming in 2007 on both marine protein and oils was slightly above 1 meaning that salmon farming is currently now close to be marine protein and oil neutral. Furthermore, part of fishmeal and fish oil production is based on filleting waste from species caught for human consumption, and it can be reasonably argued (Naylor *et al.* 2000) that such waste streams should not be included in these calculations. Hence, the figures in Table 3 for 1997 and 2007 may overestimate dependency. Certainly, it is clear that in the 10 years from 1997 to 2007, dependency has decreased by about half.

Figure 2 shows the individual weight measurements from the tank study for the low marine ingredient and control feeds together with average growth trajectories. The average weight gain over the study for the control feed was estimated as 7.4 g fish^{-1} day^{-1} (95% CI, CI = 6.8–8.0). The growth of the fish on the low marine ingredient feed was on average 7.3 g fish^{-1} day^{-1} (95% CI 6.7–7.9). The growth on the low marine feed was on average only 1.7% less than that of the control (95% CI from 12% less to 11% more). The FCR of the control feed was 0.88 (unit of feed given per unit of weight gain), and the difference to the low marine ingredient feed was 0.001 with a 95% confidence interval of −0.027–0.029 that is about ±3% of the control feed. Thus, conversion of both feeds to growth was practically equal.

In the commercial study (see Fig. 2 for data and growth trajectories), the growth of the fish on the control feed was on average 13.7 g fish^{-1} day^{-1} with 95% CI 12.2–15.2 (averaged over the block effects). The corresponding value for the low marine ingredient feed was 12.8 g fish^{-1} day^{-1} with a 95% CI 11.4–14.2. The wider CI is a reflection of the cage environment used to compare the feeds. Using the data from the tank study, MPDR and MODR are both well below 1 in contrast to 2.9 for the weight-based ratio as shown in the final column in Table 3. For the commercial study, it is not

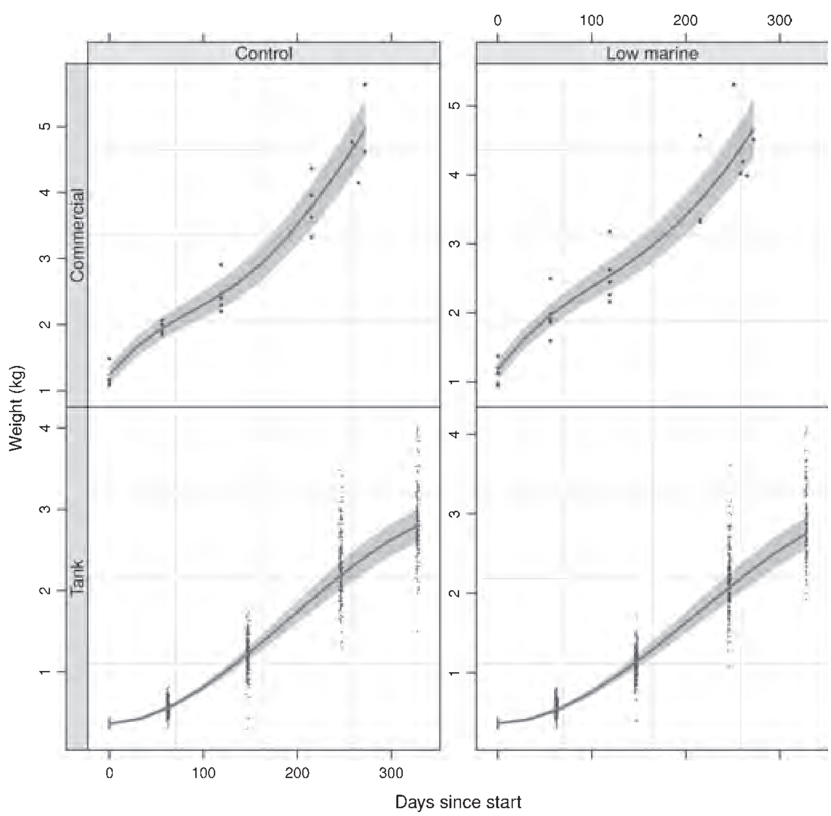

Figure 2 The profile of weight development in the tank and commercial studies for the control and low marine feeds. For each plot, the line shown is the average growth trajectory with the 95% credible interval shown by the shaded area. For the tank study, each dot represents an individual fish weight, for the commercial study each dot represents the mean weight of fish in a pen.

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feasible to calculate the ratios because of the uncertainty in the actual food consumption.

The protein and lipid retentions were similar for both feeds in the tank study reflecting similar growth, feed efficiencies and dietary protein and lipid compositions. It is important to ensure that farmed salmon still contain high concentrations of EPA and DHA despite a reduced reliance upon marine ingredients in salmon feed. In the commercial study, the EPA + DHA concentration in the fillet was analysed for 5 kg harvest size fish. In the tank study, the fish were smaller than harvest size so the analysed EPA + DHA deposited was expressed as a per cent of the lipid and multiplied by the amount of lipid expected in the fillet of a harvest-sized fish (ca. 18.5% fillet lipid, Einen *et al.* 1998; Mørkøre *et al.* 2001) to estimate the harvest size concentrations. The fillet of Atlantic salmon fed the low marine feeds can be expected to contain 1.1 or 1.6 g of EPA + DHA per 100 g fillet based on the tank and commercial study, respectively (Table 4).

Discussion

In contrast to a recent study (Torstensen *et al.* 2008) whose authors found a growth depression when simultaneously replacing both fish meal and fish oil, our findings support the fact that high replacement of both marine protein and marine oil to achieve dependencies less than one for both is possible without any significant loss in growth of salmon. Their oil replacement was higher than ours (70% versus 50%) but our protein replacement was higher (13% marine proteins in our study versus 20% fish meal plus some krill meal), suggesting that the growth depression was a combined effect of both oil and protein replacement. Our study did not have several replacement levels so the interaction could not be tested. Another recent study on the rainbow trout showed growth reduction occurred when all fish meal was replaced by plant proteins with no replacement of oil (Overturf & Gaylord 2009). However, there was a marked difference in the dietary lipid levels between the feeds that could partly explain the growth differences (19.2% in the fish meal feed and 13.6% in the plant protein feed).

The tank-based study reported here used individually marked fish to closely monitor fish performance and increase statistical power. Fish were offered feed amounts above appetite and the uneaten feed collected and quantified so that differences in the resulting growth and the nutrient utilization could be accurately determined when growth was maximized. The commercial study used feeds of a similar composition to those in the tank study. However, in commercial-sized pens, it is not feasible to collect and quantify uneaten feed, hence in such circumstances feeding to excess is both environmentally and financially unacceptable, so growth differences may be attributable to feed amounts given rather than nutritional quality. Additionally, finding the relatively small number of tagged fish in a pen containing tens of thousand salmon is a

Table 4 Growth and fillet lipid and fatty acid composition for tank and commercial studies

	Tank study		Commercial study	
	Control	Low marine	Control	Low marine
Initial average weight (g)	354	351	1151	1241
Final average weight (g)	2888	2872	4741	4745
Number of days	327–329	327–329	254–275	254–275
Initial protein content of the whole body (g per 100g)	18.2	18.2	NM	NM
Initial lipid content of the whole body (g per 100 g)	10.9	10.9	NM	NM
Initial lipid content of the NQC[1] fillet (g per 100 g)	6.9	6.9	12.1	12.5
Initial EPA + DHA content of the NQC[1] fillet (g per 100 g)	1.1	1.1	1.77	1.82
Initial n-6 PUFA content of the NQC[1] fillet (g per 100 g)	0.28	0.28	0.69	0.73
Final protein content of the whole body (g per 100 g)	17.2	17.0	NM	NM
Final lipid content of the whole body (g per 100 g)	18.5	18.3	NM	NM
Final lipid content of the NQC[1] fillet (g per 100 g)	12.9	13.2	14.6	15.8
Final EPA + DHA of the NQC[1] fillet (g per 100 g)	0.94	0.89	1.71	1.68
Final n-6 PUFA content of the NQC[1] fillet (g per 100 g)	1.13	1.44	1.10	1.50
Protein retention, whole body basis (%)	48.8	48.0	NM	NM
Lipid retention, whole body basis (%)	65.2	65.7	NM	NM
Estimated EPA + DHA deposited (g per 100 g fillet weight) of harvest-sized fish[2]	1.24	1.13	1.74	1.61

DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid; NM, not measured.
[1] NQC, Norwegian Quality Cut which represents a section of fillet (cross-section between dorsal fin and anal vent).
[2] See Materials and methods for details of calculation.

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challenge so the salmon were not tagged for this study. Adding variation in the environmental conditions and the expectation is that the commercial-sized net pens will show larger variability than our tank study. Nonetheless, the data are valuable because the conditions of use are similar to those of commercial salmon farming, and thus the comparison is useful to determine whether the findings in the tank studies are also likely to apply in a commercial environment. The feeding studies confirm that the growth on the new low marine ingredient feed is promising and close to the control. The low marine ingredient feed has not had a major effect on the growth of the salmon despite the fact that the amount of marine protein used is substantially less than the amount of salmon protein produced.

Recommended consumption levels of EPA and DHA for humans vary widely (ISSFAL 2007) but most lie within the range of 200–500 mg day^{-1}. Assuming that dietary intake of EPA + DHA comes only from salmon and that two portions of oily fish are consumed per week as recommended by the American Heart Association (AHA) and given a portion size of 140 g (following the standard UK Food Standards Agency (FSA) portion size) this means that the target concentration of EPA + DHA in the edible muscle of salmon fillets needs to be at or above 0.5 g per 100 g to meet the lower target and at or above 1.25 g per 100 g to meet the upper target. The estimated concentrations in a harvest-sized fish are above the lower target and are either close to the upper target or above it in both of our studies (Table 4), whilst the yield of salmon lipid is more than the usage of fish oil (final column of Table 3). The differences in muscle concentrations of EPA + DHA between the studies are in line with different concentrations of the fatty acids in the feed (compare Tables 1 & 2) and suggest that good control of the fatty acid profile of the feed can lead to acceptable and consistent EPA + DHA concentrations in the fillet. In both studies, the fishmeal and fish oil used was sourced from North Atlantic capture fish. It would be considerably easier to achieve high EPA + DHA levels with fishmeal and fish oil made using other capture fish species, such as anchovy or menhaden because such species contain higher concentrations of those fatty acids (NRC, 1993). For consumers requiring a very high n-3 fatty acid profile, it may be sensible to produce tailor-made salmon using feeds with a marine oil as the only lipid source because a higher response of some clinical measures has been observed in subjects consuming fish that have been reared on feeds high in such oils (Seierstad *et al.* 2005). However, such salmon are not likely to have a MODR below 1, and our aim here is to explore ways to reach the recommended n-3 LC-PUFA consumption whilst minimizing dependency ratios. A small increase in n-6 fatty acids was observed in the low marine diets compared to control diets for the tank (Table 1) and commercial studies (Table 2) and was reflected in an increase in the n-6 fatty acid level in the fillet (Table 4). The n-6 fatty acid level in the fillet can be controlled in the fillet of Atlantic salmon fed low marine oil diets through the inclusion of low n-6 fatty acid plant oils (Bell *et al.* 2003). Dietary n-6 fatty acids have been suggested as pro-inflammatory; however, there is little direct evidence regarding negative effects in the human diet currently available (Harris *et al.* 2009).

The benefit of expressing the reliance of salmon farming on capture fish in terms of nutrients instead of weight-based ratios is evident from the results shown earlier. On weight-based calculations, the difference in reliance between proteins and oils that is obvious in the nutrient-based dependency ratios would not have been recognized. The recognition of the difference has allowed for research to be focussed on reducing the protein reliance, which was higher than oil reliance for both 1997 and 2007 data. However, it is clear that protein reliance is now lower in the new generation low marine feeds reported in this article. Even if the marine oil dependency is also <1 for the new feeds, the nutrient-based dependency ratios clearly suggest that the next focus should be more on reducing the reliance on marine oils. This is challenging if the high concentrations of n-3 LC-PUFA in farmed salmon are to be maintained because fish oil is currently the major source of these fatty acids in salmonid diets. However, R&D may offer future solutions if algae and/or genetically modified oil seeds can be supplied at competitive prices, volumes and n-3 LC-PUFA content to replace fish oil (Turchini *et al.* 2009).

In conclusion, we assert it is now possible for salmon farming to be a net producer of marine resources without reduced growth rate or feed efficiency and still meet the n-3 LC-PUFA requirements of the human consumer.

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Salmon Aquaculture Dialogue Public Comment #1

Comments from the Coastal Alliance for Aquaculture Reform and Pew Environment Group

October 3, 2010

Dear Salmon Aquaculture Dialogue;

Although CAAR and Pew are steering committee members for the SAD process, we offer these comments to the process to articulate more clearly our core positions for our fellow steering committee members and to other colleagues.

Please note that our comments are in Italics and current SAD standards language is normal text. Please note also, that in some cases not all of the references are listed but will be provided to the process via our efforts in the Steering Committee.

Thank you for your consideration,

Coastal Alliance for Aquaculture Reform

Pew Environment Group

General Comments

Title: "Draft standards for better salmon aquaculture"

We understand the goal of this process to be:
Develop and implement verifiable environmental and social performance levels that measurably reduce or eliminate key impacts of salmon farming and are acceptable to stakeholders. Recommend standards that achieve these performance levels while permitting the salmon farming industry to remain economically viable.

We suggest that the current standards do not achieve these goals on a number of points. The process was not, in our estimation, engaged to only identify "better" or "responsible" aquaculture, it was also intended to identify practices that are simply unsustainable. The existence of an economic activity is not in and of itself a reason to certify practices that are common or better than average, but still have substantial ecological or social impacts.

Permitting continued economic viability does not mean an acceptance of the status quo, of exact business models or of some predetermined rate of financial return or profit. As long as we are not demanding impossible achievements it should be the industry's job to meet standards in a way that satisfies their business needs. We must emphasise that the Dialogue is not a mandatory process; no one MUST comply with these standards, but those who do will gain benefit from the association of these standards with the rigour and credibility of the participating environmental and social justice NGOs. Finally, while many sustainability improvements can have an immediate cost savings for private business, not all will because some of the negative impacts associated with these activities are currently un-valued or undervalued by traditional markets. This is the entire point of certification – demonstrating that these kinds of costs have been internalized and are being appropriately accounted for and dealt with – and thus increased costs are to be expected and rewarded. There is a need to properly clarify the theory of change associated with this process. We suggest at a minimum using the word "better" instead of "responsible" and articulating the theory of change right under the title or in a footnote to make it as clear as possible.

Process Scope

Discussions about what percentage of the industry may or may not be certified by this process are underway and as yet unresolved. In light of the discussion above, this debate needs clarification on the theory of change for the process and on the issue of ecological or social bottom lines – i.e. some practices simply do not fit the certification model regardless of whether they inhabit some top percentage of global performance. The figure of 20% of the global industry as being eligible for certification is often used, but this number has yet to receive scientific backing or a specific description of how and why that number might be appropriate. While recognizing that the top percentage of existing performance does potentially set an achievable bar, we do not agree that some top performance percentile must be certified regardless of actual measurable outcomes in the environment and communities. The maximum percent that we would support being certified at this time must be coupled with certain ecological and social bottom lines. There are major challenges to measurably improving the ecological of net pen aquaculture systems via a certification scheme. Thus, there is a need to ensure that certain ecological bottom lines are met before giving a green-seal of approval. In addition, the proposed continuous improvement and measurable changes to performance are required for certification to be achieved and verified. There is simply not enough evidence to suggest that a significant segment of the salmon aquaculture industry is already sustainable and we have engaged in this process in an attempt to make a very bad situation better.

Baseline information

Certain gaps in actual operational performance are still outstanding.

- *If the standards are based on a percentile then we MUST have real data to inform where this bar is set. Otherwise we must set prohibited or required real world conditions based on what the science says in necessary to afford realistic and precautionary protection, as well as the necessary data for adaptive management.*
- *This data does not need to be presented publicly necessarily but stakeholders must be able to verify and use it for drafting the standards.*

Use of the word "should"

The word "should" appears in this document and we want to make it clear that it not appropriate to be used when referring to practices that are required to differentiate certified from non-certified practices. It needs to be replaced by "shall" or "must".

Accounting for Externalities

We recognize that there are compromises being made by everyone involved in this process but we want to highlight the importance of accounting for environmental and social externalities associated with the production of farmed salmon. We point this out to emphasize the point that we support finding a solution that works for everyone, which requires altering the economic model to allow social and environmental sustainability to be appropriately recognized. Therefore, we suggest that strong rationale accompany any industry attempt to claim that compliance with any part of the draft standard is not economically feasible.

2.1 Benthic impacts

The proposed criteria seem to be focused on identifying and minimizing the potential impacts of salmon aquaculture on the environment. However, there are real and lasting impacts that need to be addressed in a standard such as this.

There needs to be indicators and standards that require:

• operators to first accurately measure what the bottom profile, current speeds and direction, zones of deposition and benthic fauna are prior to commencing operations;

• operators to measure the actual impacts of their operations on the marine environment; and,

• specify acceptable minimum standards of disturbance that would be tolerated within the certification spectrum (i.e sulfide levels, levels of biodiversity, etc.). This would include the need for regular monitoring of the benthos in the vicinity of the farm while it is operating to gather information that can be used to determine the extent of the impact.

For example, under the British Columbia Finfish aquaculture waste control regulations, operators were required to monitor the facility in accordance with a series of guidelines (Schedule A FAWCR – See: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/24_256_2002#section4) before applying for registration of the facility. They were not permitted to stock a facility with finfish unless the facility was registered under the regulation.

They were then required to monitor the facility at several sampling stations while it was operating in accordance with a specified monitoring plan starting within 30 days of peak finfish biomass for each production cycle and if the mean free sulphide concentrations at a facility sampling station exceeded a specified level they were required to move to enhanced monitoring and if it exceeded 1300 um at or beyond 30 metres from the net pen array they were required to fallow the site and could not re-stock the site with fish until continued monitoring showed that sulphide levels decreased to levels below the "fallow" trigger level.

Our assessment of the situation in British Columbia has been that a sulphide level of 1300 um is too high and should be at least half of that.

Criterion 2.4: Interaction with critical or sensitive habitats and species

"Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have"

In Canada, not all farms have undergone environmental assessments and many are situated within areas identified as critical/sensitive habitats i.e. Rockfish Conservation Areas (RCA). A report released by the Auditor General for Canada found that it was unclear how environmental screenings were satisfying the requirements of the Canadian Environmental Assessment Act (CEAA). For one half of the screenings in their sample, the report found, "the determination of environmental effects was weak, often consisting of checklists or generic statements, and provided limited or no analysis or explanation of how environmental effects were rated. The lack of a documented rationale makes it impossible to ascertain to what extent requirements were considered." We are concerned about the ability of government agencies to determine the significance of any negative impacts from salmon aquaculture to the environment and the measures necessary to mitigate those impacts. We do not anticipate that this will improve in the future and, furthermore, we are unclear at this time whether the new Canadian Pacific Aquaculture Regulations will be used to circumvent the legal triggers that currently require an environmental assessment of new and amended salmon aquaculture projects. For these reasons current Canadian Environmental Assessment Reports and the proposed Canadian Pacific Aquaculture Regulations cannot be relied on as substantive documentation for meeting Criterion 2.4.1.

Critical analysis based upon identification of habitats formally designated as critical/sensitive i.e. Marine Protected Areas (MPAs), Rockfish Conservation Areas (RCAs) must be used to identify and select sentinel species or locations of importance in a designated management area. Once these can be identified and a management plan for them developed and implemented they can be reviewed to determine if the company has a measurable track record for achieving the levels and if not implement monitoring that will allow reporting that can be audited for certification after a set number of production cycles. We recommend two, with flexibility for producers that can demonstrate a strong likelihood of compliance based on existing operational and ecological data. . This indicator must be incorporated into the Area Based Management Scheme and sampling carried out with that work. It is acknowledged that some types of operations, particularly closed containment ones, may be able to operate sustainably in proximity to some sensitive species/habitats. Likewise, it must be recognized that some areas will simply not permit co-habitation of farming operations and sensitive or endangered species/habitats. None of these recommendations should be taken to suggest that certification would exempt from local regulations, restrictions…etc.

What standard(s) might be added to complement 2.4.1 and minimize potential effects of farms on critical, sensitive or protected habitats and species? Are there particular species or habitats for which we should develop a standard related to minimum distance of farms from those species or habitats?

This question raises additional questions about the overall criteria for siting requirements.

We suggest that distance standards be developed for areas that have wild salmonids for at least the presence of salmonids that migrate at 1 gram or less (e.g. pink and chum salmon) or are inherently vulnerable to being challenged by disease (e.g. Sea trout or Atlantics). Distance indicators could also be related to the number of farms in the area and the amount of salmon habitat / km^2. Salmon habitat is defined as any saltwater coastal waterway that is connected to wild salmon rivers.

Potential criteria for id of sensitive habitat/species:

- *Recommended as under elevated threat by a national or provincial science or regulatory agency*
- *Formally listed for protection (see P1)*
- *IUCN, UNESCO, FAO, or RFMO designation of elevated threat*

Potential indicators of special and/or temporal exclusion requirements:

- *Utilises similar habitat or feed as potential escapees*
- *Susceptible to interbreeding with escapees*
- *Sea lice transfer*
- *Shared pathogen susceptibility, especially the potential for exotic diseases*

Criterion 2.5: Interaction with wildlife, including predators

The SC is still considering whether there are additional exceptional circumstances that would allow for killing of either marine mammals or birds.

We would not support exceptions for killing of populations noted as endangered or threatened according to the IUCN. In addition, the currently footnoted exception for accidental entanglement is not acceptable. Likewise, discussions around nuisance animals do not warrant exemptions. The design and operation of the farms is the subject of certification and they are most certainly responsible for the technology and operational practices on their farms that create the conditions of both entanglement and habituation to the farm by wild animals.

We propose the following standards for Criterion 2.5. These have been developed by the Shrimp Aquaculture Dialogue and would help better align the dialogues.

Allowance for intentional lethal predator control of any protected, threatened or endangered species as defined by the International Union for Conservation of Nature (IUCN) Red List,[1]or state, local or national governments	None
Allowance for use of lead shot for predator control of non- protected, threatened or endangered species	None
Establishment of a scientifically substantiated predator monitoring program that documents the frequency of visits, species, and number of animals interacting with the farm	Yes

Criterion 2.6: Cumulative impacts on biodiversity

In practice, the SC has found it very challenging to develop standards that accomplish the intended goal of this criterion. Indicator 2.6.1 attempts to provide an additional layer of security by identifying a sentinel species that would be a reference point for the overall health of the ecosystem. In principle, there is agreement that it's a good idea. In practice, it is very difficult to identify an appropriate sentinel species in all salmon-producing regions. In addition, there are concerns that this standard may hold farms accountable for population declines that have nothing to do with the farm. Finally, it would likely require data gathering that would exceed a single farm's ability. It requires further discussion to determine if it's viable. One option would be to identify within the SAD a select group of regional sentinel species for farms to include in the risk assessments that are being developed under standard 2.4.1. The SC recognizes a need to further explore this option and brainstorm additional options for how to address this issue within the standards. Suggestions for how to do so are appreciated.

Once again this principle would be greatly assisted by the requirement of a credible(which needs definition) Environmental Impact Assessment that would ensure that all critical species and cumulative impacts are identified up front and sentinel species monitoring plans are implemented to assess cumulative impacts. It would represent a first step and a legitimate extension of the SAD TWG process.

PRINCIPLE 3: PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS

General Comments on P3

Nearly all of these standards are designed to manage sea lice impacts, there needs to be consideration of other pathogens and an attempt to collect data so that their impacts can be better addressed in future versions of the standards. There are reportedly ways to sample seawater to determine the presence of pathogens which could allow for a standard such as no detectable increase in pathogens to be considered. In general, while we recognize that testing sensitivity is very high and has significant cost, this data is essential baseline for utilising

[1] IUCN red lists can be accessed via *(*www.**iucnredlist**.org).

the types of management recommended by all experts – area management, adaptive management, and precautionary management. The previous discussion on internalising externalised costs is also relevant here in that this type of testing is needed to be able to make more accurate standards related to pathogens and more clearly establish the relationship between the presence of pathogens on farm and the wild ecosystem risks and impacts.

Title for Principle 3

We suggest that a definition of health accompany the standards that includes at a minimum biodiversity, resilience, productivity, (characteristics of a population), and distribution of pathogens within that population.

Criterion 3.1 Introduced or amplified parasites and pathogens

3.1.1

The standard needs to clarify that this standard is mandatory, supported by a regulatory framework. If there is not a mechanism for ensuring all area farms are compliant with an acceptable area based management scheme the farms in the region in question would not qualify for certification.

Suggest adding ", verifiable" to the first sentence of 3.1.1.

3.1.5

Change language "Knowledge of Timing of wild salmonid outmigration and juvenile periods is well established and monitored."

Guidance suggestions include:

- *Establishment of a sampling program for juvenile salmon during the outmigration period*
- *Must include all species affected in the region sampled.*
- *Establish most probably times and defensible variation buffers to identify the periods of critical vulnerability*

3.1.7

Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids). Maximum 0.5 mature sea lice per fish or 3 total sea lice.

The standard needs to be based on maximum number that is lethal for wild fish that have been published in the literature for the region (In BC, this number is less than 1 louse per fish). From this a formula is needed to work out what the farm fish level should be to meet this.

We also suggest that a wild fish indicator be given consideration given that is what we are trying to protect. For example, the published literature suggests that 0.75 – 1.6 lice / g is a lethal limit for juvenile salmon. Consideration needs to be given to setting up an indicator that considers this more carefully (Wells et al 2006; Wagner et al 2003).

3.1.8

In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.

Keeping regional farmed fish abundance below levels that cause sea lice outbreaks would be helpful for many reasons, including preventing resistance evolution in lice. However, the science on what constitutes safe lice levels on farmed fish is not well developed. We strongly support considering a maximum farm fish abundance for key areas of production.

3.1.9

Period of demonstrated compliance with standards in 3.1 prior to initial certification

This standard is critical; farms that cannot demonstrate their compliance in a measurable and auditable way should not receive certification, especially not with conditions that can be met after the certification is granted as the Marine Stewardship Council allows. With the degree of uncertainty still likely in some standards, we need to err on the side of demonstrable sustainability to preserve credibility for the standards and its supporters and avoid confusion in the marketplace. This recommended time period is one production cycle for items which the company has pre-existing targets, measurement and record keeping and two production cycles where a farm must set up new systems and demonstrate ability to monitor and comply. We suggest that consideration be given to the organic model where certification is granted after a three year transition period from conventional practices. We want to state very clearly that it is not an acceptable argument that the ASC needs to certify salmon in the short term to remain viable. Salmon is one species under the ASC certification and a weak standard for salmon or poorly executed auditing and certification process will reduce the credibility of all ASC certified aquaculture products.

3.1.4, 3.1.7, 3.1.8: The SC is considering how to set global maximum sea lice levels that are meaningful in different regions and jurisdictions. The following concepts are guiding the deliberation.

We are in full support of considering the concept of limits of sea lice but would like to point out again that there needs to be more consideration for other pathogens beyond sea lice.

Treatment cannot be relied upon over the long term to achieve a low level of sea lice given the evidence of resistance in major salmon farming regions globally. In addition, the acute and chronic impacts of the treatments, some of which are classified as marine pollutants (e.g. SLICE), to marine life. Therefore, we do not agree that trading off higher use of chemicals for lower levels of sea lice is valid under these standards. Acceptable sea lice levels must be set based on the numbers of farms, the total amount of farmed fish and farm-based parasite in the farming area, and the presence of wild salmonids. We also do not subscribe to the idea that juvenile salmon migration periods are the only time where a precautionary level needs to be set given the presence of overwintering salmonids (e.g. Chinook and coho in BC, sea trout in Europe).

We stress that the science of sea-lice transmission is well understood, there is a growing body of literature that points to the fact that when you put too many hosts in water you get higher levels of sea lice (SEE SAD SEA LICE REPORT). Scientific research has shown that stocking information, including the density of fish in farms as well as fish age, may impact lice and disease levels[2,3]

One recommended strategy is to establish the natural baseline levels of sea lice and set that to be the target level where there are salmon farms, essentially indicating that we want to certify farms that do not amplify the

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[2] Murray AG, Peeler JP. 2005. A framework for understanding the potential for emerging diseases in aquaculture. Preventive Veterinary Medicine. 67(2-3): 223-235.

[3] Tilman D, Kassman KG, Matson PA, Naylor R, Polasky S. 2002. Agricultural sustainability and intensive production practices. Nature 418: 671-677.

risk of sea lice to wild salmonids. Guidance documents for how to establish baseline levels and how to translate them into on-farm lice levels need to be developed and these would form the basis of the global standard.

We suggest that the SAD at a minimum needs to acknowledge that other species are at risk due to sea lice impacts such as herring and other important species. These species need to be identified as part of the Environmental Impact Assessment.

As noted earlier, sea lice cannot be effectively used as a proxy for all pathogens and additional measures are needed, especially as the pathogen equation will cover potential interactions with species other than salmonids.

Prohibiting the certification of farms sited in areas that pose the greatest risk to wild salmonids, such as areas where juveniles are most vulnerable, or areas in proximity to stocks of special concern (on national at risk lists or the IUCN Red List of Threatened Species).

We strongly support this suggestion for incorporation into the standards. It would truly simplify the determination of "safety" in wild salmon zones and would support Standard 2.4. It also becomes a defacto indicator on the question of siting.

Criterion 3.2 Introduction of non-native species

3.2.1

This standard currently does not effectively address risks of continued escapes of domesticated salmon. Both conditions 3.2.1 A and B must be met under this standard.

"Widely used" must be defined and there must be a strong rationale to justify the definition that is chosen.

We suggest that tagging or tracing escapes be encouraged within the guidance or BMP manual as it will be important to have incentives for change around this. We would also propose that an indicator that requires the active monitoring for the selected impacts of escapes. Passive "observe and report" or voluntary reporting mechanisms are not adequate.

We also suggest that some escapes monitoring standards such as:

Indicator: Allowance for presence of escaped farmed salmon in adjacent rivers or freshwater bodies

Standard: none

Criterion 3.4 Escapes

3.4.1 Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes. No more than 0.1% more than the documented accuracy of the counting machines or counting method used

We are concerned that this may create the wrong incentives. We also feel that 0.1% is still too high and that reporting and documenting guidance needs to be included and well thought through,

3.4.2 Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control

We think 200 is still high and suggest that a rationale be presented for why that number was chosen.

We suggest that the basic requirement be that ANY escapes are too many and that in some systems an escape of 200 fish could catastrophically overwhelm the resident wild population.

Incidences "out of the farms control" are difficult to imagine or justify. As in the discussion around animal entanglement many of these issues are basic siting, technology and operations.

PRINCIPLE 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER

Criterion 4.1 Traceability of raw materials in feed

4.1.1

Presence and evidence of traceability of all raw feed ingredients with regard to country of origin.

In addition to country of origin we suggest adding language that requires the traceability to the same level of detail that will be necessary to establish the sustainability rankings required (Fish Source and MSC are the current proposed schemes) in Criteria 4.2 and 4.3.This would include, for example, the species and specific fisheries management unit as well as whether the resource was processing by-product from a food fishery or from a directed reduction fishery.

Criterion 4.2 Use of wild fish for feed

4.2.1 – 4.2.2:

There is a need to further justify these numbers and articulate the plan to continuously improve. There is a proposal to discount by-products which, if accepted, would certainly argue for much lower numbers. Are these numbers good performance relative to the global industry?

The calculations for various ratios need more specificity in relation to species being reduced because the one factor that can make a non-trivial difference is variable yield of meal and oil between species, regions and time of year. If the traceability requirements are being met for other parts of the feed related criteria, than a more accurate yield equation should be possible.

4.2.3: Once again more rationale and background needs to be presented to justify this standard in our view. We are concerned that it is a biased view that does not account for the ecosystem services of pelagic fish and the need for direct human consumption of these fish to support global food security (see Tacon paper). We think there is a need to present numbers for other species like forage fish and present those numbers along with the numbers for salmon so that the consumer can make an informed choice.

We are also concerned that FPI measurements benefit farms whose salmon can consume wild fauna transiting through the cages. In the worst extreme this measure could create an incentive to site farms where they can eat what passes through their cages. How do you ensure that salmon are not eating other wild fish? This is a big concern in British Columbia and we would like to see a standard that explicitly bans feeding farmed salmon on locally present wild fish regardless of whether this feeding is intentional or unintentional.

FFDR

We want to be clear that this standard is mandatory in our view and should not be removed under any circumstance.

We make substantive additional comments on the proposed equations in our Appendix IV comments later in this document.

Criterion 4.3 Source of marine raw materials

4.3.1: COMPLIANCE WITH ISEAL ACCREDITATION

We are concerned that the current standards could allow for an ISEAL certification scheme that does not adequately achieve acceptable ecological and social benchmarks and suggest that consideration be given to adding some criteria that a scheme must comply with.

We would like to see a standard that prevents feeding salmon or waste farm salmon to salmon. See FTAD standard 5.3.5.

Fishsource criteria must be 8 for AT LEAST the key indicators of Fish Source scores related to biomass, ecosystems and management. It is possible that some others at 6 might be acceptable on an interim basis. We would consider other interim steps if sufficient rationale and justification can be presented

We would like to emphasize that failure to achieve these benchmarks will be unacceptable and we would not support their revision because the industry cannot meet them without thorough, documented, and justified rationale.

Criterion 4.4 Source of non-marine raw materials in feed

4.4.1	Documentation of use of transgenic plant raw material, or raw materials derived from genetically modified plants, in the feed	Yes, for raw materials containing more than 1% transgenics

We do not support the inclusion of GMO feed ingredients in these standards given that there are uncertain risks associated with their use. We suggest that there is a need for significant rationale that justifies their inclusion and demonstrates how the SC has considered the risks of their use to the environment and to human health.

See also earlier comments below about inclusion of energy inputs for non-marine ingredients.

Criterion 4.6 Energy Consumption and GHG emissions on farm

Remove "on farm" from the title. Some inclusion of fish capture and processing for feed is recommended in 4.6.3. Discussions are still pending on issues of fish processing being captured in various parts of the standard.

We strongly support including energy use for fish capture as it's important in terms of scale and it can vary GREATLY between species targeted, with gears used and over time meaning that some sources are better than others. Feed producers will likely need to require this of the fisheries or brokers from whom they buy their raw material.

The definition of what energy (E) we are measuring; is it to only be for E transformed ("used") at the farm site or does the standard include E transformed/used to service the farm - i.e. in delivering feeds, personnel, smolts etc. We strongly support the latter approach.

Parallel data for non-marine feed inputs needs to be included. These will take on more importance as fish meal and oil substitution increases and we should start collecting data now.

Also, regardless of what is included or excluded, the standard must clearly request and track different forms of energy used (diesel, electric and source, on-site renewable, etc.). This can be very important as a MJ of diesel has a very different set of impacts in relation to the target indicators than a MJ of electricity. This is also true in relation to the assessment of the reduction and processing E inputs; there may be little difference in total E needed to turn fish and other ingredients into feed, but a plant running on coal powered electricity is significantly *different in terms of pollution and GHG than one powered by gas, hydro or renewable energy sources. This data needs to be collected.*

Criterion 4.7 Non-therapeutic chemical inputs

4.7.1	Copper concentration in the sediment outside of the Allowable Zone of Effect (AZE) at marine grow-out sites	34 mg Cu/kg dry sediment weight
4.7.2	If the copper level in the sediment is greater than the allowed level in 4.7.3, presence and evidence of a risk assessment conducted by a qualified third party demonstrating that the copper concentration in the sediment does not represent an environmental hazard	Yes

We don't support the allowance of copper in these standards. Net cleaners are available and can be used without any copper and are likely being used by the top % of the global salmon farming industry. This standard doesn't raise the bar as it should. Copper is harmful in the sediment and becomes more toxic with age, or as sites are fallowed and sulphide replaced with oxygen during benthic recovery.

The British Columbia "contaminated site" levels for copper for sensitive marine sites is 67 ug/g (mg/kg). The proposed SAD standard approaches this at 34 mg/kg and should be lowered to as near zero as possible.

Also, there are no proposed standards for other metals of concern like Zinc or Cadmium. Zinc, like copper, by itself can be toxic to marine organisms. But in combination the toxicity of the two is magnified. There needs to be a minimum overall standard for metals if any other level than "zero" is set.

PRINCIPLE 5: MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER

Criterion 5.1 Survival and health of farmed fish

5.1.3 *Footnote 37 in the draft standard suggests that a company veterinarian be responsible for identifying diseases that are a concern in the wild environment of a farm. We recommend that some requirement be made that these "diseases of concern" be either generated on a regional basis as part of the SAD guidance or that a third party wild fish biologist not in the employ of the salmon farming industry be consulted for the list of diseases for a given region. This could also help address the potential for farms in the same region to make radically different judgements on which diseases pose a significant threat.*

Note: *The Coastal Alliance for Aquaculture Reform (CAAR) has recently made a submission on pathogen and pest treatment regulations in Canada. The majority of these are relevant to SAD. The summary is below and the entire document is appended for references and context.*

Canadian Fish Pathogen and Pest Treatment recommendations from CAAR:

- *The new regulation will also need to regulate the deposit of the wastes excreted by fish that have been treated with, or fed, drugs or pest control products. Testing should also address sediment health, and the risks of bioaccumulation and oxygen depletion.*
- *Lethality testing procedures should be conducted on marine and/or estuarine organisms.*
- *Toxicity testing must be conducted for chronic impacts in addition to acute impacts*

- *Toxicity testing must be conducted on whole product formulations for those products that may be identified as "deleterious substances", not just the active ingredient*
- *All ingredients must be listed on the product label*
- *The risk assessment must be a transparent process*
- *The proposed regulation must require monitoring and specify the timing and duration of the monitoring and which substances must be monitored for*
- *The intent of notification must include the protection of the public*
- *Reporting must be direct, timely, consistent and transparent*
- *The framework for the new regulation should promote the use of processes, practices, products and technologies that lower environmental risk, impacts and pollution*

5.1.6 Percentage of dead fish that are recorded and receive a post-mortem analysis	100%
We recommend PCR level pathogen testing for presence, to be supplemented by on-farm monitoring for identified diseases and notification of wild fish management authorities so surveillance programs for wild fish can be informed with this information or developed to react to it.	
5.1.7 Maximum mortality rate of farmed fish during the previous two production cycles	≤25%

5.1.7 The SAD SC is considering whether to allow for one or more exceptional mortality events over a period of years if the mortalities are caused by specific incidences (e.g., algal blooms), extraordinary environmental events or atypical disease that are documented to be out of the control of the farmer.

Some rationale / justification for this percentage needs to be included and substantiated by baseline information from existing industry practice. The number seems high.

We do not recommend allowances for exceptional mortality events unless credible supporting evidence can be made that these are not due to inherent weaknesses of the technology, siting and operation of farms.

5.1.8 the proposed value of 40% or less seems exceedingly high. Baseline data on what is the existing range of unexplained mortalities would be helpful in creating a standard that pushed performance, but accepting nearly half as a mark of superior performance is not supportable.

Notes on the rationale: the commentary on prevention of disease acts as a reminder that farms demonstrating containment and separation from the wild should be granted exemptions or reduced intensity of monitoring for these standards as they have invested significant capital in technological solutions.

Criterion 5.2 Contamination levels and health effects in local non-target organisms

5.2.2 Allowance for concentrations of selected chemicals and therapeutants in the benthos	TBD

The SAD is wrestling with how to create a measureable standard that would ensure treatments are being used in a responsible way and not threatening non-target species. Based on expert input, the substances of greatest concern are sea lice treatments because of their toxicity.

We think this standard should be zero or data collection associated with benthic monitoring at a minimum. We would also encourage that farms allow researchers to come and test the sediments at the farm sites.

The SAD should consider a standard based on Chronic Effect Levels. It is more likely that the levels of harmful substances from fish farms will be in the range that causes chronic rather than acute toxicity (e.g. impaired moulting crustaceans). There should be a requirement that operators show that the chemicals they are using meet minimum chronic toxicity endpoints. Environment Canada has chronic marine toxicity testing methods (http://www.ec.gc.ca/inre-nwri/default.asp?lang=En&n=9DC31CC7-1)

Criterion 5.4 Resistance of parasites, viruses and bacteria to medicinal treatments

5.4.4 Use of antibiotics listed as critically important for human medicine by the World Health Organization	None

We do not support the use of Antibiotics that are critical to human health under these standards in any way. Other dialogues have banned them and we suggest that SAD does the same.

Criterion 5.5 Biosecurity management

5.5.5 Re-occurrence of a specific disease over more than one generation	TBD

The SAD is debating the appropriate standards for fish transport and addressing re-occurring diseases.

5.5.5 How can this standard be written in a way that addresses its core intent, which is not wanting to certify farms that have repeated outbreaks of diseases that pose a threat to wild populations and ecosystems?

At a minimum, any farm that is the subject of a prolonged or repeated disease outbreak should be required to immediately de-populate the site to prevent the spread of disease to wild stocks and adjacent farms.

Where the disease is an exotic or a persistent, endemic organism that causes high mortality (e.g. IHNV), the affected farms should be fallowed for a minimum of three months, or in cases where the pathogen can survive more extensive periods of time in the ambient environment (sea, brackish or fresh water) until it can be shown that levels of the pathogen have dropped to background.

PRINCIPLE 6: DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER

<u>Minimum wage</u> - these standards are to give a bonus/incentive to the top 20% of companies who do the best. Minimum wage is not the best. Minimum wage is the worst. No BC salmon farms pay minimum wage. 50% above minimum wage is perfectly reasonable. (In BC that would be $12 (instead of 8$) - which they all pay now.

48 hour week maximum - we won the 40 hour week 70 years ago! At minimum this must say 40 hour week or the country's established hours per week.

"Basic needs wage" is entirely undefined and meaningless. As it is currently worded it gives the illusion that this means something, but it doesn't. I think it should be scrapped unless it can reference some real standard like some ILO determination of basic needs by country. Since this obviously doesn't exist (or it would be included) - scrap it.

6.8.1 - Talks about effective grievance procedures at 100% - if they are effective, you can't have 30% failure in 6.8.3 - they all have to be resolved. (grievances don't all get resolved in favour of the worker (to say the least) so all we are saying is 100% of them have to be dealt with and resolved.) In BC maybe 5% don't get resolved because we a talking about the worst employers - this standard should not reflect the worst employers.

6.8.1 is not going to be fair and effective unless there is a final independent arbitration procedure.

The only thing notably missing is a whistleblower protection section.

The Dialogue is exploring how to ensure a minimum social performance at primary[4] processing facilities that are used by a farm that seeks certification under these standards. One option is to require that a farm demonstrates that the primary processing facilities that it uses are certified under some other scheme that looks at labor and social issues, such as an ISO standard.

We believe that the credible certification of the processing plants is a major issue that must be addressed by the SAD and the ASC and that failure to do so will result in a significant brand risk to the ASC. We understand that it is beyond the original scope of the ASC but suggest that the SAD find a way to ensure that it is dealt with very soon by the ASC if it cannot be addressed by the SAD.

PRINCIPLE 7: BE A GOOD NEIGHBOR AND CONSCIENTIOUS CITIZEN

Criterion 7.1 Community Engagement

7.1.1

Ensure that all First Nations views are considered both pro and con.

7.1.2

How do you define stakeholders? This is very important to ensure that all views are heard

7.1.3

This will require much more detail and guidance in order to ensure that it's effectively audited.

7.1.4

[4] Primary processing refers to the first order of processing. It does not include re-processing at second or third processing facilities, as may occur for salmon that are processed multiple times in multiple facilities around the world.

There is a need for greater detail on the guidance that includes how the selection of the third party is made. We would suggest that under no circumstances is the government the third party.

7.1.5

Add "and consultation" after "……….effective communication"

We would also not support the displacement of any community under these standards by salmon farming. That is an uncertifiable situation in our opinion.

Other comments for 7.1

- *A detailed definition and auditing guidance is required for "Consultation"*
- *Better definitions of what is meant by community engagement and what constitutes appropriate community representatives are also needed.*

Rationale

- *This needs to say something about removal where there is no solution e.g. moving away from migration routes.*
- *Please remove all "shoulds" from this section.*
- *Please expand this sentence "Among the impacts to minimize pollution that could affect communities (e.g., noise or air pollution)" as these are the impacts of least of concern to communities.*

Criterion 7.2 Respect for indigenous and aboriginal cultures and traditional territories

7.2.1

Please add after "acknowledge" "respect, and understand". This is important because understanding First Nations rights means respecting Traditional Ecological Knowledge, the presence of homesteads or forming former? villages, fishing spots. In British Columbia, many First Nations have names of all the places and sites because they were significant to them in some way. These may not always be documented in a way that works for western society but need to be respected under these standards. We suggest that the SAD makes a more active attempt to engage First Nations in British Columbia who have been affected by salmon farms to ensure that the standards adequately respect their rights and knowledge.

7.2.2

Change to "Evidence of established agreements with communities in the traditional territories". Agreements must be in place before any salmon farming activity is allowed to take place. The issues are too complicated to hope that they can be resolved in every case.

7.2.3

What does support from governance structures mean? This may not be appropriate because First Nations in many cases simply do not trust governments. There also needs to be a paper trail of the consultation that is deemed adequate by those consulted. We would suggest that at a minimum adequate consultation includes face to face meetings by issues of concern, band by band, and territory by territory. Consultation also means that the group being consulted has adequate time and resources (e.g. to hire expertise if necessary) to understand the proposal and respond to their satisfaction. It also means that the involved parties have access to information that is required to make their assessment. Hiding behind proprietary interests is simply not appropriate and that *needs to be written into the guidance. 60 days is the minimum time for consultation assuming all information necessary is available, up to 1 year would be better. A statement from council that is signed by the majority of members stating that they have been adequately consulted is a standard worth considering by the SAD that includes phone numbers and email addresses for the auditor to contact. Band council resolution is the strongest as it has legal standing.*

Criterion 7.3 Access to resources

There are no rights without the resources and therefore access is an important part of maintaining First Nations rights. FN should not have to subsidize multinational corporations.

7.3.1

***Change language to**: Changes undertaken restricting access to or affecting supply of vital community resources without community approval mttc were never consulted on this issue*

Evidence of assessments of company's impact on access to resources this must be done by First Nations.

What about compensation for impacts on bivalves, shoreline effects, etc. Far field impacts are much more than they are willing to admit.

Use of lights are a big problem for attracting wild fish. Need to have access to the stomach contents.

Smolt Production Facilities

We support the proposal that the standard allow only closed or semi-closed smolt systems to be certified in areas of wild salmonids. Our opposition to certification of fish raised in smolt pens within salmonid systems is based on:

- Risk of dilution of the native gene-pool by hybridisation with escaped fish; recent work has shown that precocious parr play a very large role in successful spawnings. This means that there is a high risk that farm escapees could hybridise with native fish without ever having left fresh water.
- The risk that availability of uneaten feed from the pens will disrupt the migratory behaviour of native anadromous fish
- The risk of spread of disease and freshwater parasites

We have considered whether it would be reasonable to include a 'phase-in' period for farms which use smolts reared on open net pens in salmonid systems. However, since certification will be offered on a farm-specific basis, and since over 50% of smolts raised in Scotland are currently raised within closed/semi-closed systems, we do not believe that it is too onerous to ban all net-pen-raised smolts from the start.

Appendix II: Area-based management scheme

Participation in an effective area-based scheme for managing disease and resistance to treatments is required under the SAD standards. This appendix outlines the main components of the area-based management scheme that the SAD standards require under Criterion 3.1 and 5.4.

Definition of "area"

The following explanation of 'place-based' was recently developed by Kim Houston and Jake Rice at DFO for use in Canadian Marine Ecosystem based management:EBM/ABM starts from a perspective that is inherently "place based" rather than the traditional "population-based" or "sector-based" approaches to management. This shift means that spatial patterns within the ecosystem that may be relevant to the functioning of the ecosystem or to the potential impacts of various uses of the ecosystem are considered and accounted for in the management regime. It also means paying particular attention to challenges posed when the spatial boundaries for management decisions differ from the spatial scale on which the population, community, or ecosystem processes are functioning. The hierarchical nesting of ecosystem processes means that there is no single spatial scale that is "right" for all policies and management measures. Rather, the "place-based" means that policies and management must function coherently in each "place" they are applied, taking into account the spatial scales of the key ecosystem processes and of the pressures associated with all the human activities being managed.

We would suggest that exclusion zones based on vulnerable lifestages be given consideration. In addition, consideration for the appropriate scale based on the geographic and ecological considerations need to be incorporated.

ABM components and guidance

In order to be considered as applicable under the SAD standard, the ABM scheme used by a farm must ensure that there is

- Clear documentation of the farms/companies included in the ABM, contact people (including contact information) and mechanisms for communication

  This must include data access and transparency with NGO and Academics.

- Stocking: records must demonstrate that all stocked fish are of the same year class and stocking dates were coordinated with other farms.

  Fish must be stocked in the same calendar year and be the same age class when they are stocked.

- Transport: farms must provide evidence (e.g., name of boat) that only closed wellboats are utilized for the transport of fish and there is no movement of stocked net cages. The SC is considering also requiring documentation of routes of travel.

  We would suggest that well boats must control their discharge

- Production levels: on-farm and area farm density must be based on biological and geographical factors in the farming area. A rationale for on-farm and farm area density must be available for the auditor. Farmers know that this is an issue (e.g. yellow island). Management mechanisms must be in place to reduce density in times of outbreak (articulate comparison with MSC etc).

  This obviously needs a clear definition that accounts for variability and the need to ensure that there is a management mechanism to reduce density.

- Who pays for this work? Needs to be considered a cost of doing business.

  There is a need to have an idea of the expense of the monitoring activities. This is a necessary *mechanism to account for costs currently externalised to the environment or society as discussed in the introduction comments. Also, the cost of this should not be the governments alone to bear and the industry utilising the common resource should be expected to pay (e.g. several successful examples of pollution control technologies by manufacturing firms which include product substitution, process modification, voluntary work-practice standards, and alternative technologies (e.g. smokestack scrubbers)).*

There is considerable research showing that firms that incorporate sustainability into their operations do better financially over the long term[5]. Although implementing sustainability practices often costs more in up-front investment, they are more economical over their full life span. This is demonstrated when opportunity cost is considered – that is, what would it cost NOT to move toward sustainability. A life-cycle analysis, which compares the full cost stream over the investment's lifetime, allows an organization to fully understand the true cost of such investments.

Further consideration needs to be given to public transparency mechanisms under this section

Appendix III: Cumulative impact assessment for disease and parasites

Components of the cumulative impact assessment

There needs to be clarity to the greatest extent possible about what the requirements are for compliance with all of these components prior to certification. We would suggest that if full compliance is not possible immediately then distance metrics need to be put in place as an interim precautionary starting point.

The cumulative impact assessment must include, at a minimum, the following information:

- <u>Presence of and proximity to wild salmonids</u>: farms must document the presence or absence (Very hard to do this) of salmonid species that migrate near (define – link to area based definition) their farm and within the area covered under the ABM and, where salmonids are present, the cumulative impact assessment must include all of the following
    - information that defines the approximate health of those populations (at the broadest level).

      To the greatest extent possible there needs to be guidance on how to decide what matters. We would suggest that criteria be included that if any population declines adjacent salmon farms that can be linked to the salmon farming activities then certification is revoked. We understand the challenge of demonstrating the link but we believe it's an appropriate precautionary stance to take in this case.
    - the relative density of wild salmon in the farming area

      This needs to ensure that the SAD is looking at this from an elevated risk perspective and not creating exclusions or exceptions.
    - the known and possible migration routes near the farming area and the likely size of smolts during outmigration

      We would suggest adding guidance that farms demonstrating complete separation are exempt.
- <u>Farm and farm area density</u>: the assessment must be able to provide a scientifically credible rationale

[5] *UNEP Finance Initiative Asset Management Working Group (2006) 'Show Me The Money: Linking Environmental, Social and Governance Issues to Company Value'.*

for the farm's production density and provide information on how the approximate carrying capacity of the farming region as well as the presence and density of other farms was considered in determining the farm's density

Appendix IV - Feed resource calculations and methodologies

We have several comments on the current status of this principle.

1) As written there is a significant hole in the standard by repeatedly and in numerous ways focusing your interest on "forage fish" (feed fish, small pelagics etc) used. For example, only fishmeal and fish oil that is derived directly from a pelagic fishery (e.g. anchoveta) is to be included in the calculation of FFDR. The problem is that this invites gaming or cheating as it could be interpreted to exclude species used for meal and oil that are not technically small pelagics or forage fish in any reasonable construction. This would include all use of Blue whiting, Norway pout, and Jack mackerel - all major species destined for reduction and mainstays of current aquafeeds. Moreover, other species like all of the sand lances are clearly not pelagics but they would likely be thought of as forage fish. In our opinion there is no reason to purposely exclude consideration of each important species destined for reduction and language should be changed to clearly include all marine species used in feed.

2) The inclusion of default values of yield of meal and oil, while reasonable at face, will also invite gaming and seriously challenge the credibility of the standard. Differences in yield of meal and oil are non-trivial in the measuring the actual impact and it is highly unlikely that anyone would substitute a lower, more accurate and known value for either of these. Given the two defaults yields identified, it is not likely we would see a lower value for meal yield used and 22.5 is at the high end of the spectrum, while 5% for fish oil is will probably be substituted for in many instances (but again only where the values are larger as it will reduce the wet mass of fish implied). And given the range of oil yield values known, the effect can be dramatic e.g. a good "typical" yield form menhaden is 14-16% while from Blue whiting is down around 2%.

3) The equations set out do not generate a ratio as intended, simply a value. The ratio only exists when this wet mass value is compared to the mass of fish produced. Similarly, inputing a % inclusion value in the equations is confusing. What we want is a mass (essentially the fraction of the total feed milled) of meal and oil used. Then the equation will yield a mass value as an output that can be compared to the mass of salmon grown for a ratio.

4) The FFDR equation should be written in a slightly more sophisticated way that discourages the blind lumping of all species used in the feed. The way it is, the analyst simply needs to add up the entire mass of fish meal in a diet, divide by 22.5 and multiply by the eFCR. This clearly encourages the overlooking of major differences that exist between sources of meals and oil. An alternative formulation for meal is presented below and the same modifications would be used for oil:

FFDRm = ((FM1/Y1)+(FM2/Y2)+(FM3/Y3)+…) x eFCR

Where: FM is the mass of fish meal of a given species in the average feed fed,
Y is the annual average yield of meal derived from a given species, and
The integers 1,2,3 etc represent the individual source fish used,

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Nell Halse
*Organization/Company: Cooke Aquaculture
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	Criteria /Indicator /Standard	Comment by Cooke Aquaculture	Proposed solution or amendment
Principle 1	1.1.1-1.1.5		
Principle 2	2.1.1	This will create challenges in some of our geographical regions, especially areas with exceptionally deep water sites, sites with hard bottom or sites with low current. We have seen major inconsistencies in sulfide readings with triplicate samples taken at the same station. Some jurisdictions have already moved away from redox due to its variability. Video analysis plays a more important role in these areas.	Need to make provision for naturally occurring anoxic situations and sites with deep water, hard bottom or low current.
	2.1.2	This method has not been shown to be useful in all areas. It is not practical in some areas due to the lack of expertise and available resources as well as the high cost to producers.	Need to find a simpler method to achieve this intention that is more feasible. Further consideration should be given to the Shannon-Weiner index, Hurlbert's index or other related methods of determining biotic diversity. However, any such index must be useful in both hard and soft bottoms, as well as for bottoms, which are a few meters below the cage or those in much deeper waters which may be characterized by naturally occurring anoxic conditions.
	2.1.3	Due to the vast differences in benthic faunas amongst all the geographic regions and gradations of hard to soft bottoms where salmon are farmed, establishing a meaningful global standard would be extremely difficult.	Producers should be required to meet the existing regulations which were written to meet the needs/address the variation in the benthos of the individual areas.
	2.2.1	Value should be in mg/L not % saturation. Should define sampling parameters and procedures, how deep, where within the farm, inside the cage/outside the cage.	Change to read "weekly average readings on farms should be X.XX mg/L.

		It is not practical to prescribe specific times of the day due to seasonal variations in daylight. Farmers have been successful in keeping fish healthy using aerators and reduced feeding.	Footnote 7 – averaged weekly from a minimum of 2 daily samples taken at X depth at X location on the farm.
	2.2.2		
	2.3.1	The only practical method would be to do the sampling at the feed plant. On farm verification would be challenging and the procedures as cited are very vague and do not present a realistic and consistent method for sample collection on farm.	Testing requirement should be for the feed plant.
	2.4.1	In many areas, this is already part of the licensing process and 'Approvals to Operate' are awarded by the regulator only after a thorough analysis is conducted of the site's previous performance.	If company is in a region where there are site application procedures in place and an Approval to Operate is required by the regulator, these should be sufficient. Alternatively; if a site has an Environmental Management System in place; it is sufficient (providing the auditor feels the aspect register is adequate for the site/surroundings).
	2.5.1-2.5.2		
	2.5.3	While we have been successful in deterring predators like seals by using weighted outer nets, there may be some circumstances in unique areas when there may be no other option both from a personnel safety, and product safety and containment perspective (ex tuna and sharks forcing their way into cages, which is hazardous to site staff and divers) than to take more aggressive measures.	The SC should approve the flag raised at the bottom of this section and allow for exceptional circumstances that would allow for euthanizing of either marine mammals or birds by a designated authority.
	2.6.1	This is an unreasonable burden to place on farms, especially when there could be negative changes to the so called sentinel species population that are not related to farming activities.	Remove from standard. If the farm is in conformance with 2.4.1 then this should not necessary.
Principle 3	3.1.1	While our company believes in this approach and has been aggressive in promoting it, the standard should consider areas where BMAs are not available or are still under development. Farms should not be penalized if BMPs are not in existence, but encouraged to work with partners to develop them.	If bay management programs exist, producers need to demonstrate their participation in them. If bay management programs do not currently exist, farms must be able to demonstrate their active participation in efforts to develop BMPs with neighbouring farms and regulators.
	3.1.2	Farms have no authority to sample wild fish populations. In fact we would be breaking the law in some jurisdictions if we were to capture them for sampling. In Canada, this is the responsibility of the federal government. Our company actively participates with government and academia in R&D directed at understanding the environment in which we farm.	Should be managed by regulatory authority with support where practical from companies.
	3.1.3	Sea lice sampling on wild fish is beyond the scope of farming operations.	Our company regularly partners with government, academia and NGOs

		However, collaboration with researchers should be encouraged. Our company actively participates with government and academia in R&D directed at understanding the environment in which we farm.	in R&D projects. While we have neither responsibility nor authority to investigate the health of wild salmon stocks, we are willing to participate in collaborative projects where it makes sense to do so.
	3.1.4	The notion of a global standard for maximum sea lice levels should be rejected. Because there are so many and varying kinds of ecological and geographical factors, this decision is best left to fish health professionals who can provide the best advice based on their assessment of local conditions. For example this was done in 2010 for areas that required treatment in New Brunswick based on historical information, geographical & hydrographical factors, and the expertise of veterinarians and other knowledgeable specialists.	Suggest requirements be restated as: • Farm must have a fish health management plan that includes lice management practices to be executed under the direction of a veterinarian. • Farms must meet local regulatory requirements relating to lice management.
	3.1.5-3.1.9	Again, wild lice sampling is beyond the salmon farmers' responsibility and authority.	These should be removed as requirements for farms since we cannot be held responsible for measuring conditions in wild stocks. This is especially true for wild salmon in Atlantic Canada, which have been designated as a species at risk and in the US where they are listed as an endangered species. This is a federal government responsibility.
	3.2.1		
	3.2.2		
	3.3		
	3.4.1	The most accurate counting equipment states accuracy within +/- 2% during **best** performance, meaning you could expect to see <u>higher</u> deviations. Any % +/- would not be known until after the site has been emptied at which point the WWF label would have already been applied to the product.	Need to remove this clause because of challenges in the accuracy and precision of current technologies for determining fish numbers. Consideration should perhaps be given to a percentage of fish lost during a production cycle.
	3.4.2	It is virtually impossible to count the loss of 200 fish in a cage of 30,000. It would be better to focus on ensuring that farms have an effective containment protocol complete with breach reporting requirements that meet regulated specifications.	Proof of completion of corrective actions from local regulators after escape events or potential events have occurred. Amend to focus on regulated containment structures and protocols with appropriate reporting requirements.
	3.4.3		
	3.4.4		
	Rationale	Our current practice of growing one generation of fish at a time and not moving fish once they are stocked until harvest means that 'leakage' is no longer an issue. Our practice of pumping fish in and out of the cages and	Remove "leakage" form this section. Alternatively, ask for verification of stocking and harvesting practices using single year class farming and pumping technologies.

		directly from harvest vessel to plant have eliminated the possibility of leakage.	
Principle 4	4.1.1		
	4.2.1	This is only possible if companies are using fish oil from fish that are processed for human consumption. Once there is an effective replacement for fish oil to supply omega 3 this may be possible but not before. The certification procedures and guidelines seem to be very vague and do not have many fisheries certified at present. It may not be possible for many of the fisheries to meet these guidelines.	This area needs further examination and refinement to establish realistic goals.
	4.2.2	Not possible at present due to the low level of local oil supplies even with our high level of fish oil replacement in the diet.	Needs more consideration before setting standard.
	4.3.1	This level of certification may not be possible at this time and there is no way to be sure about what the situation will be in 5 years.	Needs more consideration before setting standard.
	4.3.2		There is need to examine this area in conjunction with the fish meal producers and their organizations (IFFO and others?) and develop approaches which will improve the use of the resource for food (not bio-diesel) and still allow the salmon industry to continue to use the resource in a responsible manner in the situations where there are no other options at this time. Perhaps companies could be asked to demonstrate R&D and initiatives to reduce reliance on fish oils?
	4.3.3	This may not be possible. Need to determine how many fisheries are on this list.	More details of the requirements need to be provided.
	4.3.4		
	4.4.1	The limits should not be greater than those that are imposed on North American agriculture production processes (i.e. poultry).	Agree
	4.4.2	Verifying whether or not the products contain all GMO crops or a blend may be impossible.	More consideration is needed to determine methodology of verification of the contents of materials.
	4.5.1	While we are committed to recycling our usable waste, we are severely challenged by the lack of suitable recycling facilities and opportunities in remote locations.	This indicator needs to be amended to give consideration of current challenges with recycling possibilities in remote locations. Perhaps farmers could be asked to demonstrate availability of local recycling programs and leadership toward developing them where they do not exist.
	4.5.2		Need to define "disposed of properly".
	4.6.1		Need Appendix 5 completed before comments can be made.
	4.6.2		

	4.6.3	Would need a copy of the Standard to understand what is actually being asked for, and whether or not the information is available or how to collect the information.	ISO 14040 was updated in 2006, yet the 1997 version is referenced.
	4.7.1	Agreed that heavily fouled nets must be cleaned in appropriate land-based facilities. However, the standard should provide for the removal of early fouling organisms onsite on a continual basis to prevent heavy bio-fouling.	Amend to include preventative light cleaning of early biofouling organisms to prevent heavy biofouling taking place.
	4.7.2	We agree with this indicator.	
	4.7.3	There are other environmental sources of copper and this requirement does not take into consideration background levels of copper and other metals in the sediments.	Remove the absolute max allowable Cu concentration and give consideration to other sources (natural and otherwise) of Cu.
	4.7.4	Amendments to 4.7.3 are required before this can be considered.	Amend 4.7.3 first and then revisit this standard.
	4.7.5	Our products are approved by appropriate regulations which may vary from country to country.	Change to "according to the legislation in the country/area of operation in which the nets will be treated and deployed.
Principle 5	5.1.1-5.1.4		
	5.1.5	Agree with the standard.	
	5.1.6	This would be very expensive and of questionable additional value to a proper statistical sampling protocol.	Develop a trigger level, when x% of mortalities occur within certain time frame, or a x% peak in mortalities, then a representative number of fish must be sent for analyses.
	5.1.7	The flagged standard needs to be given further consideration before useful comments can be provided.	Define list of exceptional mortality events (algae blooms, atypical disease, sea lice, etc.) that are suggested as requiring more consideration in the flag associated with this standard.
	5.1.8	We should not think of 40% unexplained mortality as a high number when in reality on an overall basis it is a low number. On an otherwise healthy site that is stocked with 250,000 fish, having 5% overall mortality, the number of unknown mortalities to be greater than 40% is 5001. With 20 cages on site, that's only an average of 250 fish out of a cage of 12,500 with unexplained mortality over a usual growing period of 18 months. Additionally we should be more concerned with a farm that has 38% unexplained mortalities with an overall mortality rate of 15%; than with a farm with 5% overall mortality and 42% of them unexplained.	Remove the threshold of 40% and amend the standard to focus on fish health professionals demonstrating that they are tracking mortalities (and related records of potential causes); and that they are analyzing data in a proactive manner to identify trends, possible issues, and potential changes in farming practices that may be required to reduce mortalities.
	5.1.9	Agree.	
	5.2.1		
	5.2.2	Remove	More clarification needed to be considered as an indicator.

	5.3.1	Agree	
	5.3.2		
	5.3.3		
	5.3.4	Veterinarians need to be able to prevent the outbreak of disease by prescribing treatment based on presence of pathogen, if it is determined this is the best health management plan.	Clarification needed re pathogen and disease.
	5.4.1	Conflicts with 5.3.4	Clarification needed.
	5.4.2		
	5.4.3	Certain diseases and parasites may improve with changes in season – reduction of sea lice in winter due to increased freshwater, improvement in winter ulcer due to warmer temperature and less stormy conditions in spring and summer.	"Immediate harvest of fish" should be revised to include withdrawal time after medication has occurred as well as the size of the fish (only harvest if marketable).
	5.4.4	Veterinarians are health professionals and should be given the respect and recognition they deserve and be allowed to treat using medications as approved for use.	This flagged standard when re-written needs to pay heed to national regulations which will govern veterinarian procedures.
	5.5.1		
	5.5.2		
	5.5.3		
	5.5.4		
	5.5.5	Need to see the re-written standard before we can comment.	Rewrite the standard.
Principle 6	6.1.3-6.1.3		
	6.2.1		
	6.2.2	All of our student workers are covered under the terms of regulated work conditions.	Standard should require evidence of collaboration with schools to create meaningful work placements and employment policies to discourage young people from dropping out of school for work purposes.
	6.3.1		
	6.4.1-6.4.2		
	6.5.1-6.5.5		
	6.5.6	Agree with the standard	
	6.6.1-6.6.3		
	6.7.1		
	6.7.2	In countries like Canada and the US where both labour and businesses are strictly regulated the legal requirements should suffice.	Agree, such a policy should be in place.
	6.8.1-6.8.3		
	6.9.1-6.9.2		
	6.10.1		
	6.10.2	Farming salmon in the Atlantic region is seasonal job; and work requirements	No issue

		vary accordingly. Our cage site workers are aware before they begin that during summer there will be significant hours and during winter there will be fewer hours, primarily due to meeting the nutritional requirements of the fish. Overtime is not limited or restricted. It is of course paid to meet any required regulations.	
	6.11.1		
Principle 7	7.1.1-7.1.3		
	7.1.4	Need definition of what is meant by health effects (both positive and negative) on community	Clarification required.
	7.2.1-7.2.3		
	7.3.1		
	7.3.2	This indicator needs further clarification. What constitutes evidence of assessment? When would the assessment need to be done? For new sites? When complaints are received for existing sites? What are vital resources defined as?	Indicator needs further clarification.
	Appendix IV	See comments related to Sections 4.2 and 4.3	The concerns expressed re Sections 4.2 and 4.3 need to be addressed before the calculations in Appendix IV can be used effectively.
General Comments			The introduction/purpose and scope has a very negative tone towards aquaculture and should be reworded. A sea site should be allowed to be certified independent of the hatchery as there are no indicators shared in the standard other than Principle 6.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1		1.1 sounds like one non-conformance on discharge permits is one too many. That would be an issue as nearly every farm has an issue from time to time on discharge related matters.	Needs to be provision for corrective action to occur before certification is denied.
Principle 2		Re change in phosphorous from inlet to outlet: we need to know what is proposed before useful comment can be made. Since it is a percent, they must factor in that there will be a large % increase when wells are used. There are also other parameters like nitrogen, BOD, TSS and DO, which are not quantified.	Actual proposed levels need to be suggested in order to assess if they are reasonable or not.
Principle 3		No comment	
Principle 4		See comments under SW Standards above.	
Principle 5		5.1.6 calls for analysis of 100% of morts for cause. This is impossible and unnecessary to determine cause.	Utilize widely accepted statistical sampling procedures for assessing cause.
Principle 6		See comments under SW Standards above.	
Principle 7		See comments under SW Standards above.	
General Comments		There needs to be more work done on fleshing out the indicators and standards for smolt production before useful comments can be made.	

Formulario de Comentarios para Borrador de Estándares Diálogo sobre Salmonicultura

Primer periodo de Comentarios Públicos: 3 de agosto al 3 octubre de 2010

El Formulario de Comentarios completado debe ser enviado a la dirección de correo electrónico: salmonaquaculture@wwfus.org hasta las 11:59 p.m. EDT del 3 de octubre de 2010.

*Nombre: Alfonso Márquez de la Plata
*Organización/Empresa: Empresas AquaChile
*Dirección de correo electrónico:

Nota: Es absolutamente obligatorio que complete toda la información solicitada y marcada con asterisco (*), ya que todos los comentarios serán publicados en el sitio web del Diálogo sobre Salmonicultura, citando la fuente de ellos (nombre de quien comenta e institución a la cual pertenece), lo cual se encuentra alineado con la política de transparencia del Diálogo. La dirección de correo electrónico no será publicada, pero es necesario contar con ella para clarificar la información en caso de ser necesario.

COMENTARIOS SOBRE LOS ESTÁNDARES PARA ENGORDA DE SALMONES

Principio	**Criterio/Indicador /Estándar** (ej. 2.1.2)	**Comentario(s)**	**Solución propuesta o corrección**
Principio 1			
Principio 2	2.1.1	Redox>0	Redox > 0 hasta 60 metro de profundidad.
	2.1.1	Sulfuro	Aun no se conoce ni validar este nivel en Chile
	2.1.2	AMBI	Aun no se valida AMBI en Chile
	2.2.1	Definir metodología	Uso de oxigenómetro de cada centro
	2.3.1	Rango exigente	Flexibilizar a 1.5
	2.4.1	Definir metodología	Definir metodología
	2.5.1 y 2	Eliminar indicador	Es una solución positiva para el predador
Principio 3			
	3.1.2	Es poco viable realizarlo por centro	Reformular
	3.1.3	No aplica	Eliminar para Chile
	3.1.4	Definir por especie de pez y por especie de parásito	Indicador por especie de pez y tipo de parásito
	3.1.5 , 6 y 7	No aplica	Eliminar para Chile
	3.1.8	Definir por especie de pez y por especie de parásito	Indicador por especie de pez y tipo de parásito
	3.4.1	Rango exigente	Flexibilizar a 2% y contemplar efectos por robos

Principio 4	4.2.1 y 2	Cambiar FFDR por FFER	Flexibilizar
	4.3.3	Ampliar a otras certificaciones	
	4.4.2	Rango exigente, las agricultura avanza muy rápido en la incorporación de organismos transgénicos.	Flexibilizar a 5%
	4.6.1 y 2	Otorgar plazo de implementación	3 años post publicación estándar
	4.6.3.	"que cumpla con ISO"	Debe estar abierto cualquier entidad certificadora
	4.7.5	No habla de la legislación chilena.	Incluir la legislación de CHILE
Principio 5	5.1.7	Se deberá indexar al tipo de patología que le afectó	Rango variable en función de las patologías especificas o predominantes por región.
	5.1.8	No aplica información previa	Informar desde la publicación del estándar
	5.2.2	Definir metodología	
	5.4.1	Es poco viable realizarlo por centro	Reformular
	5.4.4	Requerirá de metodología de actualización, que pasa si un medicamento cambia de categoría…	
Principio 6	6.4.2	Se debe definir incidencias.	Considerar Sentencias de tribunales en la materia como indicador.
	6.6.2.		
	6.6.3.	Se debe tener cuidado de no confundir "transparente" con "público".	Se realiza de manera transparente entre empleador y trabajador.
Principio 7	7.1.5.	No se entiende el indicador	Definir un indicador específico y cuantificable.
Comentarios Generales			

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Michel Courat
*Organization/Company: Eurogroup for Animals
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			*Animal welfare is widely accepted as an important aspect of sustainability and conservation. OIE fish farming guidelines argue for the ethical requirement to ensure the welfare needs of farmed fish. To gain widespread acceptance, to WWF members as well as to the general public, sustainability standards need to include animal*

			welfare as well as animal health. *The standards should require that all farmed fish should be slaughtered humanely by such methods as percussive stunning followed by bleeding or electrical stun/killing. The use of pre-slaughter sedation, e.g. using Aqui-S, followed by humane killing, should be considered.* *Standards should also ensure fish welfare with respect to stocking density, water quality, lice treatment, handling processes, breeding, artificial lighting regimes, pre-slaughter feeding and transport.* *We recommend that WWF involves animal welfare scientists in drawing up these standards.*

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fair-fish

fairness with the fish we eat

World Wildlife Fund
Mrs Katherine Bostick
Aquaculture Program Officer
1250 24th Street, NW
USA-Washington DC 20037-1193

October 3, 2010 (by EMail)

Critical comments on the 2nd draft of standards for responsible salmon aquaculture by the Salmon Aquaculture Dialogue (SAD)

Dear Katherine

Thank you for the opportunity to comment on the second draft again.
We decided to focus on the two following issues.

1. Animal Welfare

> *Quote of SAD 2nd Draft: «Animal welfare (i.e., farmed fish welfare and wildlive interactions, including treatment of and impacts on predators) has been raised by some stakeholders as an issue for the SAD to address. Wildlive interactions will be addressed under Principle 2. The SC has decided, however, not to comprehensively address farmed fish welfare in the standards document, as the SC believes that 1.) farmed fish welfare does not fall under the mandate of the SAD and was not part of the rationale for creating the SAD, 2.) the SC does not have appropriate expertise on the issue, 3.) other fish welfare standards and processes already exist, and 4.) there is potential to partner in the future with other certification programs that address farmed fish welfare. The SC expects that some aspects of farmed fish welfare will be addressed, indirectly, under the standards (e.g., through several environmental and fish health standards).»*

Any certification scheme for aquaculture should address animal welfare as it is, together with ecologicy and sustainability issues, **the core concern.** Aquaculture is about rearing and treating animals first of all.

If you really think that animal welfare «does not fall under the mandate of the SAD», you will sure have to correct this in future – then certainly under pressure of consumers instead of proactively by your own will.

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The fair-fish association is supported by members, donators and und project grants.
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If really the SAD «does not have appropriate expertise on the issue», why did you not seek for it when inviting people to your dialogue?

If really «other fish welfare standards and processes already exist», why do you not integrate them in the SAD standards by name as mandatory?

Fish welfare is more than just health of the fish. Fish health is an outcome of fish welfare. Conversely, factors enhancing fish welfare do of course embrace fish health, but many other factors are responsible also, e. g.:

- species appropriate structure of the artificial habitat (allowing a variety of flow velocities, light/shadow, withdrawal of subdominant individuals, a.s.o.)
- species appropriate stocking density (which is a component of fish welfare and not to be discussed with regard to fish health solely)
- avoidance of rapid temperature changes, of noise and freightening
- minimum requirements for handling, transportation, stunning and killing
- minimum requirements for rearing practices (species engineering)
- a.s.o.

Lack of animal welfare in a fish farm is directly linked with a range of subsequent issues which, by the way, have economical consequences:

- increased disposition to disease and increased rates of medicamentous treatment
- increased inclination to (genetically) engineer the species in order to render the animals more «robust»
- increased tendency to escape from unappropriate living conditions
- increased mortality
- loss of flesh quality

It is hard to understand how a scheme fostered by WWF and other NGOs can just look away when it comes to the «leading characters» in aquaculture. <u>How could you ever bear in mind to establish a standard which addresses more or less any issue – besides the most important one?</u>

2. Wild fish in the feed

The formulas presented in the draft are too complicated in practice – and much too permissive given the imperative to reduce forage wild fish in the fish feed to an absolute minimum.

We advocate a more determined and more pragmatical formula which clearly limits the use of forage wild fish to one-fifth of the farmed fish weight while making best use of fish by-products and waste fish, as defined in the fair-fish standard for aquaculture:

> *6.1 Feed components that originate from wild fish caught for feeding purpose may not exceed a fish in : fish out ratio (FIFO) of 0.2 : 1.0 on the farm in question, i. e. for the production of 1 kg farmed fish (harvest live weight) at the most 200 g of wild fish (live weight) may be fed.*
> *This FIFO does not embrace:*
> - *Fishmeal and fish oil which verifiably origin from by-products (trimmings) of processed farmed fish, but at the maximum the weight that can be produced out of the by-products provided by the farm in question.*
> - *Fishmeal and fish oil which stem from the following sources but do not exceed a maximum of 30% of the total of fishmeal and fish oil employed by the farm in question:*
>   - *by-products of fish (certified or not)*
>   - *not marketable fish from certified sustainable fisheries*
>   - *not marketable fish which had to be fished away by directive of the competent fishing authority in order to keep up the ecosystem's equilibrium*

6.2 As far as available, the farm in question employs fishmeal and fish oil products approved by one of the following certification schemes: fair-fish, a bio-label, MSC or Friend of the Sea.

6.3 Fishmeal or fish oil it shall not originate from the species to be fed.

Such prescription can be managed by the feed producer and be controlled alongside with other criteria for fish feed.

In practice, for Salmon farming this would mean a farm could employ fishmeal up to the following amount per kg of farmed fish (harvest live weight):

- 22,2% of 200 g wild fish = 44.4 g fish meal
- 22,2% of 30% per kg of farmed fish (harvest live weight)= 66.6 g fishmeal (supposed the by-products represent 30% of the harvest live weight and are recycled to fishmeal)
- 47.6 g (30% of the total of fish meal employed by the farm)

Thus up to 158.6 g fish meal per kg farmed fish (harvest live weight) would be tolerated even under the strict fair-fish approach. This satisfies about 50% to 75% of what is usually employed today. It should not be so difficult to drive the Salmon industry there, should it?

Similar calculation has to be made with fish oil of course.

Any foresighted Salmon farmer who claims to produce sustainable and to present an alternative to the depletion of fish stocks **should aim at phasing out his fishmeal and fish oil input** according to such calculation (and even to zero) before public pressure urges him to do so overnight.

<u>It is hard to understand how organizations like WWF claiming to protect the seas and its species can bargain with the aquaculture industry about reducing wild fish input just a little bit.</u>

Conclusion

As we already pointed out on March 9, 2009 in our critical comments on the first SAD draft: Unless the Salmon criteria do not yield a good answer to the two questions discussed above, there is no true need of another certification scheme in aquaculture. With the criteria presented in the second draft ASC is just bringing in more of the same. Who needs this if not an industry lacking in will for change?

As to other issues of SAD, we support the points brought forward by the Atlantic Salmon Trust and by the Coastal Alliance for Aquaculture Reform.

Kind regards

fair-fish association

Billo Heinzpeter Studer
Director

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Mike Mitchell
*Organization/Company: Findus Group
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	2.5.1 - 2.5.3	The SAD does not adequately protect salmon farms from predator attack – in particular from seals. With a total prohibition on lethal despatch *and* the use of acoustic deterrent devices (ADD's) the only means left for sea cage farmers to protect against seal attack would be barrier nets. These bring with them additional concerns and can in particular cause entanglement and entrapment of diving birds – so, not an ideal solution. **Can we support a standard which effectively leaves farmed animal stock inadequately protected from attack by wild animals?**	Whilst we would not wish to lobby on behalf of seal shooting as an option except perhaps in very exceptional circumstances, the use of ADD's is something which we would wish to investigate further as a potentially acceptable solution to this problem. Current ADD's work largely on the basis of volume and whilst reasonably effective in deterring seals can also be detrimental to the hearing and navigation of migratory mammals such as porpoises, dolphins and other small whales. However, recent technology in this area appears to be having some success with the development of frequency based ADD's, where the volume is not detrimental but the noise itself is aversive to the animal (the seal equivalent of nails dragged down a blackboard). We should consider a position where properly deployed ADD's of the correct type is an acceptable alternative for predator control.

Principle 3			
Principle 4	4.2.1 – 4.2.3	FFDR is a means of limiting (reducing) the amount of marine materials within the feed. It is particularly of concern to the UK market as our initial calculations indicate that the prescription of an FFDR ratio of 2.4 would in practice result in a maximum fish oil addition of 10% - this would reduce the omega-3 fatty acids in the edible product by half and with an undesirable increase in omega-6. It could be argued that the nutritional detriment to the UK's most widely consumed oily fish (and therefore the most valuable dietary contribution of n3 long chain polyunsaturated fatty acids) would imply a public health impact resulting in increased cardiovascular disease and inflammatory disorders. We take issue with the premise stated in the SAD Rationale – that 'Most wild small pelagic fish resources are fished at capacity or overfished.' Small, highly fecund, fast reproducing pelagic species form some of the most abundant fish stocks on the planet – and those most widely used in the formulation of feed diets for farmed salmonids in the UK and Scandinavia are also amongst some of the world's best managed fisheries. To accept the premise at face value prejudices the agenda against the usage of wild captured marine materials in animal feeds per se. The secondary debate which follows but which should not be confused with the biological sustainability issue is; whether or not it is desirable to feed wild captured fish to animals rather than to human	We support the voluntary reduction in forage fish dependency through the substitution of wild fish with non-marine feed ingredients alongside the responsible use of wild captured feed materials where market conditions favour higher nutritional values in the edible flesh. Our view is that so-called forage fisheries (low trophic level species) should be sourced from responsible fisheries as defined by the FAO CoC or sustainable fisheries as certified by independent third parties such as the MSC. The imminent introduction of a new Fish Assessment Model by the MSC in 2011 which takes a more precautionary approach to low trophic level fisheries further strengthens the rationale that MSC certified sustainable marine materials should be accepted by the SAD – and perhaps through a 'discount' ratio, the use of materials derived from MSC certified fisheries can be used to offset FFDR values.

		beings. Common sense would dictate that the primary use for all captured fish should be for direct human food consumption - wherever possible. There are cases though, where sustainable catches are in excess of the market demand for human food – especially for small, bony species. In these cases, we would argue that the secondary use of these catches should be for the feeding of farmed fish designated for human food rather than for feeding other terrestrial animals such as pigs and poultry or for other uses such as bio-fuel production. **Do we accept the fundamental premise that the SAD should incentivise the reduction or set limits on the inclusion of wild captured marine materials in feeds?**	
	4.3.4	The condition set for the exclusion of human food by-products which are categorized as 'vulnerable, endangered or critically endangered, according to the IUCN Red List of Threatened Species' would effectively preclude a high proportion of UK, European and Scandinavian trimmings from SAD compliant diets on the basis that it is likely that they will comprise Atlantic cod (*Gadus morhua*) which is classified by IUCN as 'vulnerable' Whilst IUCN methodology requires the aggregation of all populations, it is a mistake to consider Atlantic cod as a homogeneous population. Some populations of Atlantic cod are below biological reference points but the larger more northerly stocks are abundant and are well managed.	Whilst we would not wish to incentivise or condone the use of trimmings derived from vulnerable or endangered species as ingredients of farmed fish feeds, the use of the IUCN Red List as a sole means of assessing the status of wild captured species is not acceptable. Determination on suitability/prohibition needs to based on a more population specific basis and therefore needs to take into account scientific stock assessments such as those carried out by ICES. As a minimum, the ban on species classified as 'vulnerable' should be withdrawn.

		Do we believe that the IUCN classification is an adequate sole indicator of the abundance of fish stocks?	
Principle 5			
Principle 6			
Principle 7			
General comments			

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3	3.1.1S – 3.1.2S	A significant point from a UK point of view is that there is a presumption against the use of net pens in fresh water. The prohibition on the use of net pens in water systems where there are indigenous wild salmonids would exclude a major part of Scotland's industry (Scottish Office figures for the whole Scottish sector showed 50% of juvenile production taking place in net pens in 2008). Investment in contained smolt production in Scotland would be costly and require a fundamental change in the industry infrastructure. The Norwegian industry is a model which demonstrates that	We should perhaps consider this as the correct direction of travel - contained systems do offer many mitigating benefits when considering the potential impacts on fresh water eco-systems but on the basis that the SAD should in principle be technology neutral, we would prefer that best practice management be taken into account. There is a multi party containment group in Scotland currently creating engineering, training and husbandry standards to prevent escapes in freshwater which will be auditable and enforceable by the Scottish Executive. Our suppliers would prefer that

		contained smolt production is both possible and practical – but they have evolved down that line over several decades whilst Scotland went down the fresh water loch net pen route. **Do we support a standard which invokes a technology requirement which effectively excludes a major proportion of UK national production?**	demonstration of compliance with the new requirements should be considered to satisfy the intent of the WWF standards.
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			

Date:	Document :	Organization Commenting :
October 1, 2010	**WWF Salmon Standard**	Fisheries and Oceans Canada

Clause No./ Subclause No./ Annex (e.g. 3.1)	**Paragraph/ Figure/Table/Note** (e.g. Table 1)	**Type of com- ment**[1]	**Comment (justification for change)**	**Proposed change**
Overall document		ge	Many of the suggested standards are unrealistic. In many cases, small operations will not be able to meet these standards due to organizational make-up and costs of implementation.	A gradual or "stepped" approach might render the adoption of the standards more realistic, especially for small operations.
Introduction page 7	Purpose and Scope of Standards	ge	The overall tone of the Introduction and Purpose of the standards is negative. "…develop measurable, performance-based standards that minimize or eliminate the key negative environmental or social impacts of salmon farming…." This sets a negative tone for the whole industry, with a tacit message that salmon farming does harm. No human activity is without an effect on the environment; however, there are many significant benefits from salmon farming.	"…develop measurable, performance-based standards that ensure an environmental and economically sustainable salmon farming industry, with an overall goal of minimizing effects on environmental parameters".
Introduction page 8	Biological and Geographical Scope to which the Standards Apply	ge	Exactly what should be considered under the "trout" document versus the "salmon" document? Here, the scope is defined on the basis of the genera *Salmo* and *Oncorhynchus*, but some species under these genera are considered trout (*Salmo trutta* and *Oncorhynchus mykiss*). Is the distinction actually whether the wild counterpart is anadromous or freshwater? Elsewhere in the document "marine" conditions are discussed. Perhaps the Scope of this document should be defined on the basis of freshwater or marine?	Clarify the scope of the standard regarding the species it is intended to cover.
Unit of certification to which standards apply	Page 8	te	Standards are said to apply to "… the corresponding hatchery(ies)…". Hatcheries exist under a unique set of conditions, conditions that differ dramatically from those of net pens. The same standards cannot apply to both.	Remove the phrase, "… and the corresponding hatchery(ies) from which the fish farmed at the site originates."
1.1.2		ge	How is this relevant? In addition, tax laws may not be applicable to Aboriginal communities in Canada.	Remove from the standard.
2.1	2.1.1	te	AZE: Where oceanographic conditions exist that could push the below cage deposition beyond the circular Allowable Zone of Effect. Applying a circular precautionary standard will create an inequitable difference among farms simply due to oceanographic conditions. As a result, sediment characteristics that would be considered acceptable within the AZE (under	Add a clause that acknowledges that currents or other oceanographic conditions can result in a non-circular AZE. If recognized, the circular standard AZE would not apply. Alternately, allow that levels as determined by the country's regulatory agencies be accepted as

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October 1, 2010	**WWF Salmon Standard**	Fisheries and Oceans Canada

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			the cage), will be subject to strict impact assessment (2.1.1, 2.1.2, 2.1.3) despite the fact that the farm is operating under acceptable operating parameters.	meeting the standard.
2.1	Page 15, paragraph 3	te	The requirement for two or more benthic worm species or macrofauna to be present.	There should be a requirement for a baseline survey to roughly establish the number of different species that are actually there before establishing a minimum acceptable number for impact assessment.
2.1	Page 16, paragraph 1	te	Extensive benthic surveys to establish baseline species diversity index in virgin site would be cost prohibitive for small farms (given the need for expensive sampling equipment and expertise required to identify benthic species). Also, if farm is established, how does farm establish a baseline (the bottom has already been affected by the culture operation). AMBI Indices have not been established for many oceanographic settings in Canada.	Remove the need for benthic sampling and surveys and a species diversity index. Sediment chemical measures proposed elsewhere in the standards (e.g., sulphides, redox) can act as an effective proxy of benthic impact.
2.1	2.1.1	ed, te	Wildish *et al.* DFO Technical Report shows that a cross-comparison of redox probes resulted in huge variability. It is recommended that redox probes should be used in concert with sulfide probes and not in isolation (even though the current document states that redox probes are used globally and pose less risk of false positives relative to sulfide probes).	“or” should become “and”
2.1		te	What about indicators and standards for hard-bottom or mixed-bottom settings?	It should be clearly stated in section 2.1 that these indicators and standards apply to soft-bottom substrates only.
2.1		te	What about organic content or total volatile solids? Redox and sulfide estimates not reliable in far-afield locations on small-boat operations. Easy and cost-effective to collect and analyze.	Add to indicators/standards
2.1.3		ge	The minimum of this standard (2 or more abundant taxa) to indicate low benthic impact does not seem reasonable. Captellid polychaetes, and some species of siponid polychaetes, are well known to colonize	Reconsider how many macrofauna taxa need to be present to indicate low benthic impacts. Consider increasing the minimum of this standard, perhaps by basing it on a certain

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			sediments with high organic enrichment. These species (in addition to others) are considered pollution indicator species. Areas of high organic enrichment are often characterized by high abundances of these indicator species and absence of all other species. The presence of two or a few taxa may simply be reflective of high organic enrichment. The minimum of this standard should be increased to account for pollution tolerant species.	biologically acceptable percentage of the number of taxa in the reference areas.
2.2	2.2.1, page 17 paragraph 1	te	Dissolved oxygen standards: There should be the need to establish regional, seasonal, and diurnal dissolved oxygen levels and changes as well as set the depth of sampling, location in the cage, probes used, etc. The oxygen depletion associated with the culture operation would then be realistically assessed against a verifiable natural baseline, resulting in an equitable relative measure of depletion.	Change the standard to a percentage of the natural baseline. The will allow the assessment to be made relative to natural oxygen fluctuations in the environment. For example, set the acceptable depletion to 50% of the natural levels, thus varying according to natural fluctuations.
2.3		te	A single maximum level of nutrient release cannot be given for rivers and lakes in general. This must be determined on a case by case basis as not all environments and temperatures are the same for lakes and rivers.	Maximum level of nutrient release from production should consider the existing aquatic environment of receiving waters in making sure that the nutrient level does not surpass the environment capacity.
2.3			There is the need to distinguish between particulate and dissolved nutrients.	Title should be …Particulate nutrient release….
2.3		te	Inorganic trace-elements are also released with feed and faecal loss.	This section should not be limited to nutrient loss.
2.3	2.3.1	te	Excess feed or feed wastage does not always take place in the form of fine dust or broken up feed particles. Whole feed pellets pass through netpens during feeding trials.	Waste feed should not be referred to as fines – important for 1) calculation of feed loss by weight; 2} modeling of all size-fractions of waste material.
2.3	2.3.1	te	Percent loss of feed is very difficult to quantify and therefore would be a difficult standard to follow.	Remove percent loss of feed indicator.
2.4.1		ge	It is reasonable to assume that farms will have direct or indirect effects on the ecological functioning of nearby habitats. The loss of ecosystem services and functions	Incorporate habitat restoration requirements that replace lost ecosystem services. Compensatory mitigation will account for direct damage as well

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			from farm practices must be compensated for by habitat restoration and compensatory mitigation.	as the time it takes for the restored habitat to reach full ecological functionality. This will require continual monitoring of an identified proxy of ecosystem functioning.
2.4.1	Additional information - flag	ge	Salmon farms near rivers where natural populations exist increases the risk of impact should escapes occur, or the risk of disease or parasite transfer. Additional standards were requested; proposed text noted in next column. Rationale for the text is that it is based broadly on the NASCO Protocols for the Introduction and transfer of salmonids 1992 (NAC (92)24) and Canada's National Code for Introductions and Transfers of Aquatic Organisms 2003.	Cage rearing in freshwater or estuaries should only be conducted in locations where risk assessment clearly demonstrates that the risk is low.
2.4	Additional information - flag	ge	Identification of highly valued ecosystems in the farm proximity is required to evaluate potential lost ecosystem services and functions. Highly productive habitats such as salt marshes and seagrass beds must be considered in farm siting and practices.	Develop regulations for specific habitats.
2.4	Page 18, Additional Information	te	We agree with the content of this paragraph inasmuch as it describes the fundamental problems with this standard.	
2.5.3	Indicator	ed	Exception in footnote should be part of main indicator statement.	Add ". . . except in situations that compromise personal safety."
2.6	Page 20, paragraph 2	te	We agree with the comments regarding the problems with establishing a standard to deal with this criterion. There are too many influencing factors involved which make it impossible for the farmer to be responsible for conducting the necessary research. Additionally, there is an assumption here that the fish farm is detrimental to the sentinel or sensitive species. Research has demonstrated that a local population of a sensitive species (lake trout) benefitted from the presence of the farm. A more balanced approach is needed.	Remove this criterion or develop a more balanced approach as suggested in the latter part of the Comment.
PRINCIPLE 3: PROTECT THE		te	All of the pathogens or parasites that are found on or in salmon raised in salmon farms are also found in wild salmonids and in some cases non-salmonid species.	Add a lead statement: All salmonid species, introduced to waters containing wild salmonids

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HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS			This has been the case since long before any salmon farming existed. How can we only consider farms as sources of pathogens when we have no idea of rates of pathogen transfer between wild hosts and the amount of variability that may occur between years? Why does the rationale only discuss sea lice (pages 22-24)? All species of Pacific salmon must be considered when examining potential impacts of farms. For example, many people believed that sea lice from salmon farms were responsible for the observed declines of Fraser River sockeye last season. At the same time Fraser River pink and chum salmon are doing well even though they migrate to ocean at a much smaller size and undertake the same migration past salmon farms as the sockeye. So risk should be assigned for each species of salmon separately, rather than lumping all species together.	must be free of disease.
3.1.1	Indicator	ge	Not all farms are part of an “area based scheme.”	A phased-in approach should be allowed to enable farms to be certified with the understanding that area-based management schemes would be developed.
3.1.1	Particulars about indicators/standards referenced in Appendix II	ge	Missing from Appendix II are constraints on the movement of fish between jurisdictions where different regulations exist.	Add text addressing movement of fish between jurisdictions (national and/or provincial borders).
3.1.3	Indicator	ge	While sea lice are of significant concern, there are other pathogens that operators need to consider instead of being mandated to pour all resources into sea lice research.	Suggest ending the indicator after the first sentence.
3.1	3.1.6	te	“Measure lice levels on wild juveniles during out migration …” Counting sea lice is lethal to the salmon. This cannot be done in Eastern Canada, as wild Atlantic salmon in the Inner Bay of Fundy is an endangered species and is, therefore, protected.	Remove indicator 3.1.6. Significant differences exist between East and West coasts for Canada. No wild Atlantic salmon in the West.

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3.1.5	Indicator	ed	Timing related to what and monitored by whom? Surely not the producers. Therefore, this is beyond the scope of producers to implement and puts their operations at the mercy of others to do this. If this indicator remains, it could place producers into non-compliance for issues that they cannot manage or control. This would not be acceptable.	Delete or clarify.
3.1.4, 3.1.7 and 3.1.8		ge	It is unfair to impose a standard for sea-lice levels as there are too many variables and influences (e.g., water temperatures) that are beyond the control of the farmer.	Remove indicators that impose standards for sea-lice levels.
3.1	Rationale, first paragraph	ge	Sea lice is not a disease.	Re-write to clarify.
3.1	Additional information	ge	0.5 motila female sea lice per fish is not realistic.	Develop more realistic indicator.
3.2.1	Indicator	ge	3.2.1 If a non-indigenous species is being farmed, evidence and documentation that the species is already widely used in commercial production locally by the standards release date; The underlined statement above is not acceptable since it prevents sustainable and responsible expansion of the industry AND, one of the following is met: ~~A) There is no evidence of establishment or impact in adjacent ecosystems~~ B) The species has been approved for aquaculture use by a process based on ICES code of practice on the introductions and transfers of marine organisms or comparable protocol Statement B, above, is all that is required for this indicator.	Change the indicator to reflect only section B.
3.2	Additional information – last sentence	te	The reference to ICES is disturbing. Why question something that has already been supported by an international scientific organization?	Remove the sentence.
3.3		te	What about the culture of sterile transgenic strains?	Add indicator and standard dealing with this

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				condition (e.g., triploid transgenic strain).
3.3		ge	Until a standard is developed which can be readily managed, no culture of transgenic fish except in land-based facilities with determined low risk of escapes would provide an operational guideline at this time.	Culture of transgenic fish should be restricted to land-based facilities.
Footnote 15 on page 25		ge	Transgenic strains are not necessarily more hazardous than conventional strains used in aquaculture. Regulation should be on a case-by-case basis. Genetically enhanced fish (*such as those* created by selective breeding) can be as different from wild-type trout as are transgenic strains.	
3.4	3.4.2	te	Escape episode definition is set at 200 fish. Should be set to a percentage of the production from that cage. This is more realistic as an escape of 200 individuals from a cage of 10000 fish might not be noticed but a loss of 10% would be significant.	Assign a cage production percentage (TBD) to the definition of an escape episode.
3.4	Footnote 16	te		Vandalism should be included.
3.4	Additional information – last paragraph	ge	With regards to the issue of interbreeding, there can be two relevant indicators, and two relevant standards. The first has to do with the detection of interbreeding/ introgression using genetic marking (this is different than parentage determination via molecular genetic marking) OR genetic identification via parentage or grandparent determination. The second indicator could be directed at minimizing the likelihood of interbreeding once an escape occurs, either through the use of triploidy, OR other possible mechanisms assuring that released salmon either a) fail to survive in the wild or b) fail to successfully reproduce.	Further clarification regarding what is meant by “interbreeding” and how it is intended to apply in this standard is required. Clarification of indicators is also warranted.
3.4.1		ge	There should be an indicator and standard associated with the reporting of escapes when the difference between expected and observed is greater than a set amount (e.g., 0.1%)	
4.1.1; 4.2.1 thru	Indicators	ge	These indicators are beyond the control of producers	Delete.

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4.2.3; 4.3.1 thru 4.3.4			and wholly within the control of feed manufacturers; therefore, they are inappropriate for this standard.	
4.4	4.4.1, page 33	te	Presence and evidence of a responsible sourcing policy……	Define "responsible" (this is not clear enough without specifications).
4.4	4.4.2	te	Regarding the use of ingredients derived from transgenic crops, the standard of 1% seems somewhat arbitrary. Levels should be set based on knowledge of the biological effects of the ingredient. In addition, we do not think the level of transgenic products used for ingredients is known. For example, for any given batch of soy or corn, can a feed manufacturer ascertain what percent is GM? This would preclude or limit the use of inexpensive alternatives to marine products.	Remove section.
4.5	Additional information	te	This is inconsistent with the desire within the standard as remote locations may be chosen to satisfy other location requirements where recycling or other disposal facilities may not be available.	Remove section.
4.6.2	Indicator	te	Additional information and a preliminary protocol for monitoring, measuring and reporting GHG emissions is required to enable a more informed decision to be taken with respect to this proposed standard.	Create protocol for monitoring GHG emissions in Guidance documents.
4.7.1 and 4.7.2	Indicators	ge	Effluent treatment for the purposes of effluent from net cleaning operations needs to be defined.	Clarify the definitions of effluent and effluent treatment - provide definitions.
4.7	4.7.3, 4.7.4	te	An absolute value of Cu should not be used as a reference indicator.	Geonormalization should be used to account for background variations in Cu concentrations according to grain size spectrum, organic content, mineralogy, etc.
4.7	4.7.4	ed	Are 4.7.3 and 4.7.4 both necessary?	Suggest combining into one indicator.
4.7	4.7.5	te	Canada should be included.	Include Canada in list of countries.
5.1.2	Indicator	ge	Is there accreditation to be required for the Fish Health Professional? Is this a veterinarian?	Clarify requirements.
5.1.4	Indicator	ed	Smolt indicator should be in smolt section at the end of the document.	Move to appropriate section.

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5.1.7	Indicator	ed	Exception in footnote should be part of main indicator statement.	Indicated exceptions to be added to phrase as well as "mortality rate of KNOWN CAUSE…." to complement 5.1.8. The causes of mortality of concern should be listed. For example, losses of fish due to 'acts of God' should not cause a producer to be non-compliant.
5.4.3		ge	How many +ve bioassays constitute confirmed resistance?	Clarify for standard
5.5	5.5.2	te	Fish farms do not spread disease. Disease occurs naturally in the environment, can spread to the farm, and then can spread back to wild fish.	Add lead statement: Disease flow is bidirectional between farmed and wild fish.
5.5	5.5.5, page 43	te	Re-occurrence of a specific disease over more than one generation.	The standard for this should be written "a plan for stronger biosecurity and containment measures must be demonstrated if re-occurrence of a specific disease over more than one generation … OR "'Number of occurrences for specific diseases (to be listed) over more than one generation.'" Standard should list an acceptable number that will vary by disease considered."
5.5	5.5.5	ge	Repeated outbreaks are not entirely within an operator's control as there are other influences that contribute to outbreaks.	
Principle 5	Section 5, page 42: One of the more serious risks …	ge	5.5.3 If the fish population is healthy, why would transportation in closed systems or well boats be necessary? 5.5.5 How can this standard be written in a way that addresses its core intent such that it does not want to certify farms that have repeated outbreaks of diseases that pose a threat to wild populations and ecosystems? How does this address farms that become routinely or sporadically infected due to transfer of pathogens from	If the fish population is healthy according to certified veterinary testing, there should not be a requirement for transportation of cultured fish in closed systems or well boats. This standard should be written in a way so as to deny certification to farms that have experienced repeated outbreaks of diseases that pose a verifiable demonstrated threat to wild populations and ecosystems. Also, it should address the situation where transfer of pathogens from the

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			wild fish? Example IHNV in Atlantic salmon farms in BC. – did they go to the ocean carrying IHNV? This may not be true.	wild populations to aquacultured fish may be routine.
6.7.2	Indicator	ge	What is implied by requiring producers to 'ensure social compliance of its suppliers and contractors'? More detail is required. Does this include the local gas station, taxi services, etc. This could become unwieldy to implement.	Clarify intentions and meaning of “suppliers and contractors.”
7.1.2 and 7.1.3	Indicators	ed	Are both indicators needed?	Combine into one.
7.1.5	Indicator	ge	The mandate here should be to ensure that the benefits exceed the costs and that the project is in compliance with the pertinent policy and regulatory frameworks.	Reword the indicator to comply with normal policy and regulatory requirements.
7.3.1	Indicator	ed	What is considered “approval”? How will opposition of some but not all community members be handled to achieve a decision? The term "restricting access' in the indicator must be better defined; as it reads, this is a 'zero tolerance' approach. Approvals are valid only within the scope of community jurisdiction to 'approve'; otherwise this indicator gives the community veto power over any development, even those that are responsible and sustainable within the scope of applicable policy and regulation.	Provide a general definition of approval in the context of this indicator.
2.2.1S and 2.2.2S	Indicator (smolt)	te	These indicators are similar.	Suggest combining into one indicator. For 2.2.2, a detailed protocol is required specifying the location, number and frequency of samples.
2.2.4S and 2.2.5S	Indicators	ge	These indicators are not necessary as the parameters are covered under 2.2.7S and 2.3.1S	Delete
2.2.7S	Indicator	te	A standard regarding a total phosphorus concentration limit in receiving waters is ill-advised. One single standard cannot possibly be applied to all receiving	Delete.

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			bodies. For example, a hatchery may discharge into a eutrophic urban waterway.	
2.3.1 thru 2.3.5 on page 61	Reference Numbering	ge	Should these indicators have the suffix "S"?	Add the suffix "S," if appropriate.
2.3.1S	Indicator	te	The maximum level of phosphorus in effluent must be defined as "above background levels" in the receiver	Provide definition.
2.5.1S	Indicator	ed	Exception in footnote should be part of main indicator statement.	Add ". . . except in situations that compromise personal safety."
3.1.1S	Indicator	ge	Not realistic for Canada – salmonids occur naturally in most if not all bodies where net pens could be used for this purpose.	Removal of indicator and standard from document. It would be sufficient to require the operation to abide by Introductions and Transfers Protocols and Environmental Assessment requirements.
3.1.2S	Indicator	ge	Issues in Chile are not necessarily issues in Canada – clause limits production type in countries unnecessarily	Removal of indicator and standard from document.

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Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Tobias Aguirre
*Organization/Company: FishWise
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	2.1	*Need stronger, more diverse minimum requirements for suitable siting conditions.*	*There needs to be indicators and standards that require:* *• operators to first accurately measure what the bottom profile, current speeds and direction, zones of deposition and benthic fauna are prior to commencing operations;* *• operators to measure the actual impacts of their operations on the marine environment; and,* *• specify acceptable minimum standards of disturbance that would be tolerated within the certification spectrum (i.e sulfide levels, levels of biodiversity, etc). This would include the need for regular monitoring of the benthos in the vicinity of and proximal to the farm while it is operating to gather information that can be used to determine the extent of the impact.*
	2.4	*We support the inclusion of this Criterion*	

		but suggest that requiring an Environmental Impact Statement or Assessment should be the first part of assessing cumulative impacts. The assessment can then be critically analyzed and used to identify and select sentinel species or locations of importance in a designated management area. Once these can be identified and a management plan for them developed and implemented they can be reviewed to determine if the company has a measurable track record for achieving the levels and if not implement monitoring that will allow reporting that can be audited for certification after a set number of production cycles. We recommend two, with flexibility for producers that can demonstrate a strong likelihood of compliance based on existing operational and ecological data. This indicator must be incorporated into the Area Based Management Scheme and sampling carried out with that work. It is acknowledged that some types of operations, particularly closed containment ones, may be able to operate sustainably in proximity to some sensitive species/habitats. Likewise, it must be recognized that some areas will simply not permit co-habitation of farming operations and sensitive or endangered species/habitats. None of these recommendations should be taken to suggest that certification would be exempt from local regulations, restrictions…etc.	
	2.4		*We would suggest that distance standards be developed for areas that have wild salmonids for at least the presence of salmonids that*

			migrate at 1 gram or less (e.g. pink and chum salmon) or are inherently vulnerable to being challenged by disease (e.g. Sea trout). Distance indicators could also be related to the number of farms in the area and the amount of salmon habitat / km^2
	2.5	*We would not support exceptions for killing of populations noted as endangered or threatened according to the IUCN. In addition, the currently footnoted exception for accidental entanglement is not acceptable. Likewise, discussions around nuisance animals do not warrant exemptions. The design and operation of the farms is the subject of certification and they are most certainly responsible for the technology and operational practices on their farms that create the conditions or both entanglement and habituation to the farm by wild animals.*	*We propose the following standards for Criterion 2.5:* • *Prohibition of intentional lethal predator control of any protected, threatened or endangered species as defined by the International Union for Conservation of Nature (IUCN) Red List,[1] or state, local or national governments* • *Prohibition of the use of lead shot for predator control of non- protected, threatened or endangered species* • *Establishment of a scientifically substantiated predator monitoring program that documents the frequency of visits, species, and number of animals interacting with the farm*
	2.6		*Once again this principle would be greatly assisted by the requirement of a credible Environmental Impact Assessment that would ensure that all critical species and cumulative impacts are identified up front and sentinel species monitoring plans are implemented to assess cumulative impacts.*
Principle 3	General	*Nearly all of these standards are designed to manage sea lice impacts, there needs to be consideration of other pathogens and an attempt to collect data so that their impacts can be better addressed in future versions of the standards.*	
	3.1.1		*The standard needs to clarify that this standard is mandatory, supported by a*

			regulatory framework. If there is not a mechanism for ensuring all area farms are compliant with an acceptable area based management scheme the farms in the region in question would not qualify for certification. *Suggest adding ", verifiable" to the first sentence of 3.1.1.*
	3.1.5		*Guidance suggestions include:* • *Establishment of a live sampling program for juvenile salmon in the spring months* • *Must include the most vulnerable species affected in the region sampled.* • *Establish most probable times and defensible variation buffers to identify the periods of critical vulnerability*
	3.1.7		*The standard needs to be based on the maximum number for wild fish that have been published in the literature for the region. From this a formula is needed to work out what the farm fish level should be to meet this.* *We also suggest that a wild fish indicator be given consideration, given that is what we are trying to protect. For example, the published literature suggests that 1 lice / g is a lethal limit for juvenile salmon. Consideration should be given to setting up an indicator that considers this more carefully (Wells et al 2006; Wagner et al 2003).*
	3.1.9	*This standard is critical; farms that cannot demonstrate their compliance in a measurable and auditable meaningful way should not receive certification. With the degree of uncertainty still likely in some*	

		standards, we need to err on the side of demonstrable sustainability to preserve credibility for the standards and its supporters and avoid confusion in the marketplace. This recommended time period is one production cycle for items which the company has pre-existing targets, measurement and record keeping and two production cycles where a farm must set up new systems and demonstrate ability to monitor and comply.	
	3.1.9	*Treatment cannot be relied upon over the long term to achieve a low level of sea lice given the potential for resistance and also due to the acute and chronic impacts of the treatment to other ecosystem features. Therefore, we do not agree that this is a trading off higher use of chemicals for lower levels of sea lice is valid under these standards. Acceptable sea lice levels must be set based on the numbers of farms, the total amount of farmed fish and farm-based parasite in the farming area, and the presence of wild salmonids. We also do not subscribe to the idea that juvenile salmon migration periods are the only time where a precautionary level needs to be set given the presence of overwintering salmonids (e.g. Chinook and coho in BC, sea trout in Europe).*	*One recommended strategy is to establish the natural baseline levels of sea lice and set that to be the target level where there are salmon farms, essentially indicating that we want to certify farms that do not amplify the risk of sea lice to wild salmonids. Guidance documents for how to establish baseline levels and how to translate them into on-farm lice levels need to be developed and these would form the basis of the global standard.* *We suggest that the SAD, at a minimum, needs to acknowledge that other species are at risk due to sea lice impacts such as herring and other important species. These species need to be identified as part of the Environmental Impact Assessment.* *As noted earlier, sea lice cannot be effectively used as a proxy for all pathogens and additional measures are needed, especially as the pathogen equation will potential cover potential interactions with species other than salmonids.* *We support this language: "*Prohibiting the certification of farms sited in areas that pose the greatest risk to wild salmonids, such as

			areas where juveniles are most vulnerable, or areas in proximity to stocks of special concern (on national at risk lists or the IUCN Red List of Threatened Species)."
	3.2.1	*This standard currently does not effectively address risks of continued escapes of domesticated salmon. Both conditions 3.2.1 A and B must be met under this standard.*	*We suggest that tagging or tracing escapes be encouraged within the guidance or BMP manual as it will be important to have incentives for change around this. We would also propose that an indicator that requires the active monitoring for the selected impacts of escapes. Passive "observe and report" or voluntary reporting mechanisms are not adequate.* *We would also suggest that some escapes monitoring standards such as:* *Indicator: Allowance for presence of escaped farmed salmon in adjacent rivers or freshwater bodies* *Standard: none*
	3.4.2	*We think 200 is still high and suggest that a rationale be presented for why that number was chosen.*	
Principle 4	4.1.1		*In addition to country of origin we suggest adding language that requires the traceability to the same level of detail that will be necessary to establish the sustainability rankings required (Fish Source and MSC are the current proposed schemes) in Criteria 4.2 and 4.3.This would include, for example, the species and specific fisheries management unit as well as whether the resource was processing by-product from a food fishery or*

Principle 4	4.1.1		*In addition to country of origin we suggest adding language that requires the traceability to the same level of detail that will be necessary to establish the sustainability rankings required (Fish Source and MSC are the current proposed schemes) in Criteria 4.2 and 4.3.This would include, for example, the species and specific fisheries management unit as well as whether the resource was processing by-product from a food fishery or from a directed reduction fishery.*
	4.2.1-4.2.2	*There is a need to further justify these numbers and articulate the plan to continuously improve*	
	4.2.3	*More rationale and background needs to be presented to justify this standard in our view. We are concerned that it is a biased view that does not account for the ecosystem services of pelagic fish. We think there is a need to present numbers for other species like forage fish and present those numbers along with the numbers for salmon so that the consumer can make an informed choice.* *We are also concerned that FPI measurements benefit farms whose salmon can consume wild fauna transiting the cages. In the worst extreme this measure could create an incentive to site farms where they can eat what passes through their cages. How do you ensure that salmon are not eating other wild fish? This is a big concern in British Columbia and we would like to see a standard that explicitly bans feeding farmed salmon on locally present wild fish regardless of whether intentional or unintentional.*	

	4.6	*Remove "on farm" from the title. Some inclusion of fish capture and processing for feed is recommended in 4.6.3. Discussions are still pending on issues of fish processing being captured in various parts of the standard.* *We strongly support including energy use for fish capture as it's important in terms of scale and it can vary GREATLY between species targeted, with gears used and over time meaning that some sources are better than others. Feed producers will likely need to require this of the fisheries or brokers from whom they buy their raw material.* *The definition of what energy (E) we are measuring; is it to only be for E transformed ("used") at the farm site or does the standard include E transformed/used to service the farm - i.e. in delivering feeds, personnel, smolts etc. We strongly support the latter approach.* *Parallel data for non-marine feed inputs needs to be included. These will take on more importance as fish meal and oil substitution increases and we should start collecting data now.* *Also, regardless of what is included or excluded, the standard must clearly request and track different forms of energy used (diesel, electric and source, on-site renewable, etc.).*	
	4.7.1	*We don't support the allowance of copper in these standards. Net cleaners are available and can be used without any copper and are likely being used by the top % of the global salmon farming industry. This standard doesn't raise the bar as it probably should.*	*There needs to be a minimum overall standard for metals if any other level than "zero" is set.*

		Copper is harmful in the sediment and becomes more toxic with age, or as sites are fallowed and sulphide replaced with oxygen during benthic recovery. *Also, there are no proposed standards for other metals of concern like Zinc or Cadmium. Zinc, like copper, by itself can be toxic to marine organisms. But in combination the toxicity of the two can be. magnified.*	
Principle 5	5.1	5.1.3 *Footnote 37 in the draft standard suggests that a company veterinarian be responsible for identifying diseases that are a concern in the wild environment of a farm. We recommend that some requirement be made that these "diseases of concern" be either generated on a regional basis as part of the SAD guidance or that a third party wild fish biologist not in the employ of the salmon farming industry be consulted for the list of diseases for a given region. This could also help address the potential for farms in the same region to make radically different judgements on which diseases pose a significant threat.*	
	5.1.7	*Some rationale / justification for this percentage needs to be included and substantiated by baseline information from existing industry practice. The number seems high.* *We do not recommend allowances for exceptional mortality events unless credible supporting evidence can be made that these*	

		are not due to inherent weaknesses of the technology, siting and operation of farms.	
	5.2	*We think this standard should be zero or data collection associated with benthic monitoring at a minimum. We would also encourage that farms allow researchers to come and test the sediments at the farm sites.*	*The SAD should consider a standard based on Chronic Effect Levels. It is more likely that the levels of harmful substances from fish farms will be in the range that causes chronic rather than acute toxicity (e.g. impaired moulting crustaceans). There should be a requirement that operators show that the chemicals they are using meet minimum chronic toxicity endpoints.*
	5.4	*We do not support the use of Antibiotics that are critical to human health under these standards in any way. Other dialogues have banned them and we suggest that SAD does the same.*	
	5.5.5	*At a minimum, any farm that is the subject of a prolonged or repeated disease outbreak should be required to immediately de-populate the site to prevent the spread of disease to wild stocks and adjacent farms.*	*Where the disease is an exotic or a persistent, endemic organism that causes high mortality (e.g. IHNV), the affected farms should be fallowed for a minimum of three months, or in cases where the pathogen can survive more extensive periods of time in the ambient environment (sea, brackish or fresh water) until it can be shown that levels of the pathogen have dropped to background.*
Principle 6		*<u>Minimum wage</u> - these standards are to give a bonus/incentive to the top 20% of companies who do the best. Minimum wage is not the best. Minimum wage is the worst.* *<u>48 hour week maximum</u> - At minimum this must say <u>40 hour week or</u> the country's established hours per week.* *<u>"Basic needs wage"</u> is undefined and therefore should be removed.*	

	6.8.3	*They* <u>*all*</u> *have to be resolved.*	
	general	*We believe that the credible certification of the processing plants is a major issue that must be addressed by the SAD and the ASC and that failure to do so will result in a significant brand risk to the ASC. We understand that it is beyond the original scope of the ASC but suggest that the SAD find a way to ensure that it is dealt with very soon by the ASC if it cannot be addressed by the SAD.*	
Principle 7	7.1.1	*Ensure that all First Nations views are considered both pro and con.*	
	7.1.2	*Definition of stakeholders is needed*	
	7.1.4	*There is a need for greater detail on the guidance that includes how the selection of the third party is made. We would suggest that under no circumstances should a government be the third party.*	
	7.1.5	*We would not support the displacement of any community under these standards by salmon farming. That is an uncertifiable situation in our opinion.*	
General comments	7.1	*A detailed definition and auditing guidance is required for "Consultation"* *Better definitions of what is meant by community engagement and what constitutes appropriate community representatives are also needed.* *This needs to say something about removal*	

General comments	7.1	*A detailed definition and auditing guidance is required for "Consultation"* *Better definitions of what is meant by community engagement and what constitutes appropriate community representatives are also needed.* *This needs to say something about removal where there is no solution e.g. moving away from migration routes.* *Please remove all "shoulds" from this section.*	
	7.2.1	*Please add after "acknowledge", "respect, and understand". This is important because understanding First Nations rights means respecting Traditional Ecological Knowledge, the presence of homesteads or forming villages, fishing spots. In British Columbia, many first nations have names of all the places and sites because they were significant to them in some way. These may not always be documented in a way that works for western society but need to be respected under these standards. We suggest that the SAD makes a more active attempt to engage First Nations in British Columbia who have been affected by Salmon Farms to ensure that the standards adequately respect their rights and knowledge.*	

13/09/2010

Comments to **SALMON AQUACULTURE DIALOGUE**
Draft standards for responsible salmon aquaculture

by Arne Fjälling PhD, Engineer, Swedish Board of Fisheries, Institute of Coastal Reserach

Relevant text excerpts in **bold**, comments in Word format.

"Criterion 2.4: Interaction with critical or sensitive habitats and species INDICATOR STANDARD
Draft Salmon Dialogue Standards for Public Comment, August 3, 2010 Page 18 of 74
2.4.1 Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have Yes
Rationale
The intent of the standard(s) under criterion 2.4 is to minimize the effects of a salmon farm on critical or sensitive habitats and species. The habitats and species to consider include marine protected areas or national parks, established migratory routes for marine mammals, threatened or endangered species, the habitat needed for endangered and threatened species to recover, eelgrass beds and High Conservation Value Areas (where defined).
Indicator 2.4.1 is designed to ensure a farm is aware of any nearby critical, sensitive or protected areas, understands the impacts it might have on those areas, and has a functioning plan in place to address those potential impacts.
Additional information
The distance from critical, sensitive or protected habitats and species was also considered as an additional standard to build on 2.4.1. However, distance needed may vary by species or habitat that a farm is trying to protect. Requiring a minimum distance away from sensitive areas is difficult, as the actual risks will vary so greatly depending on the habitat and situation. Unless the standards clearly define a subset of particular habitats or species to which the standards are applicable and set a distance based on the potential for salmon farming to affect those particular types of habitats or species, they would not necessarily be meaningful or effective as standards. What standard(s) might be added to complement 2.4.1 and minimize potential effects of farms on critical, sensitive or protected habitats and species? Are there particular species or habitats for which we should develop a standard related to minimum distance of farms from those species or habitats?
Criterion 2.5: Interaction with wildlife, including predators INDICATOR STANDARD 2.5.1 Number of days where acoustic deterrent devices were used 0, within two years of the date of publication of the SAD standard 2.5.2 Prior to the achievement of 2.5.1, evidence that if acoustic deterrent devices are in use, the farm is developing and implementing a plan to phase out their use Yes
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2.5.3 Number of marine mammals and birds killed through the use of lethal action8 0

Rationale judge
Scientific literature9 about the use of acoustic deterrent devices (ADDs), also known as acoustic harassment devices, to deter predators from marine aquaculture facilities **show three main conclusions**. First, **ADDS have been demonstrated to damage the hearing capability**

Kommentar: The only reference cited (9) = Fjalling, A, Wahlberg, M and Westerberg H, 2006 Acoustic harassment devices reduce seal interaction in the Baltic Salmon-trap, net fishery, ICES Journal of Marine Science: Volume 63, Number 9 pp. 1751-1758.

of marine mammals (target and non-target species). Second, **they have been demonstrated to force a change in the natural feeding or breeding behavior of some marine mammals**. And, third, **over time** and with regular use, **ADDs begin to act as an incentive that actually attracts rather than deters the target species** (e.g., seals) from the aquaculture facilities. While the devices are effective in the beginning in deterring marine mammals and other predators, they quickly begin to lose their effectiveness and, in almost all cases, become completely ineffective within two years. The standard, therefore, encourages farms not to use ADDs. If they are in use, a plan must be in place to phase out their use within two years of the publication of the SAD standards. During this time, the standard encourages continued research into development of new devices that might be more effective deterrents and have significantly less impact on marine mammals. In addition, the use of lower impact methods, such as predator nets or other systems that minimize the interaction between predators and the cultured fish, would be encouraged.
Additional information The SC is still considering whether there are additional exceptional circumstances that would allow for killing of either marine mammals or birds.
Criterion 2.6: Cumulative impacts on biodiversity

8 Lethal action: Action taken to deliberately kill an animal, including marine mammals and birds. Accidental entanglement is not considered lethal action. Exceptions can be made for actions taken to avoid personal injury.

9 Fjalling, A, Wahlberg, M and Westerberg H, 2006 Acoustic harassment devices reduce seal interaction in the Baltic Salmon-trap, net fishery, ICES Journal of Marine Science: Volume 63, Number 9 pp. 1751-1758.
B.C. Government, 1997, The environmental risks of salmon aquaculture, pp. 35-37
Cox, TM, Read A.J., Solow, A, Tregenza,”

Kommentar: This citation is not correct. I have not studied hearing damage of AHDs/ADDs to marine mammals.

Generally, such a sweeping and strong, not to say dramatic, statement requires exact citation or very strong proof. The papers I have read on the topic so far have described the output of AHDs/ADDs but only speculated on the possible impact on marine mammals. But perhaps there are some new sound scientific studies unknown to me?

Kommentar: This citation is not correct. I have not studied natural feeding or breeding behavior in marine mammals.

The comment as such may be valid, however, since it is very unprecise and includes all (both trivial and serious) effects it would benefit from some more work, and, quite so, some relevant citations.

Kommentar: This citation is not correct. On the contrary to the citation, I did indeed find a long term reduction in seal interaction (with set fishing gear). The citation thus states the opposite of my findings, which is rather remarkably.

There are several “urban legends” on the topic which the text reflects some. The lack of hard long term data on the effectiveness of AHDs was actually the very reason why I made a study of this area.

However, my conclusion after some 10 years of studies is that AHDs/AADs are useful only under certain favourable conditions. Technical difficulites and strong variations in the motivation in seals are two problems. Generally, technical development of fishing gear is more helpful. The situation in aquaculture I cannot assess.

It is important to acknowledge that the terms AHDs and AADs are used for a large variety of sound generators, producing sounds from milliseconds of rather low intensity to seconds of very high intensity, from a single frequency to broadband. Also, different species differ very much in sensitivity. The text needs to clarify this. You just cannot generalize as is done in the text!

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Dr. Ronald H. Loucks/Ruth E. Smith, Science Team
*Organization/Company: Friends of Port Mouton Bay, Nova Scotia
*E-mail address:

Please note:
The comments provided below are based on and limited to the experience with open-net salmon aquaculture in Port Mouton Bay, Nova Scotia

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	**Principle 1**	Certification of salmon aquacultre in open-net cages which discharges untreated waste to the marine environment and uses or has the potential to use antibiotics, anti-foulants and pesticides attempts to establish a legitimacy for this practice, even in bays where the flushing rate is low. Moreover, certification of such practices will confuse and mislead the marketplace and undermine public perception of certification by the Marine Stewardship Council which requires higher standards for other species. South West Nova Scotia is recognized as the lobster fishing capital of the world and this multi-million dollar industry is in the process of adopting Marine Stewardship Council	Certification of salmon aquaculture should be reserved for land-based recirculating containment aquaculture practices.

		certification. Lobster fishermen are strongly of the opinion that open-net aquaculture practices in lobster harvest areas will jeopardize the reputation and marketability of their lobsters.	
Principle 2	**2.1 Benthic Biodiversity and Benthic Effects**		
	2.1.1	The experience in Port Mouton Bay is that the chemical proxy is an indicator of anoxic benthic conditions beneath active salmon cages. However, when wastes are resuspended and move to the far-field (beyond the AZE), sulphides are washed off and the unconsolidated nature of these deposits is more likely to provide aerobic conditions in the top 2 centimeters sampled, and therefore not yield high sulphides or low oxygen conditions, yet still smother marine life, for example, eel grass, kelp, Irish moss, scallops. Our perspective is that the chemical proxy is a one-sided test which can lead to a false negative error: while high sulphides indicate	

	2.1.2	anoxic conditions and waste accumulation, low sulphides do not guarantee the absence of wastes and their adverse effects on marine life. Preliminary results from an on-going study of marine benthic effects during a fallow period of salmon aquaculture in Port Mouton Bay consider Shannon-Weiner and Benthic Habitat Quality (BHQ) indices together with an AMBI or M-AMBI index. (The Benthic Habitat Quality index is derived from core samples which indicate the Redox Potential Discontinuity Layer (RPD) . We note from Hargrave (2010): "Although high values of AMBI were sometimes associated with low values of BQI (Benthic Quality Index) there was no consistent pattern between different locations. AMBI is based on computation using assigned values for sensitivity or tolerance of macrobenthic species to disturbance, but responses of indicator species may differ between locations based on computations using assigned values for sensitivity or tolerance (Bustos-Baez & Frid 2003, Rosenburg et al. 2004). Fleischer et al. (2007) recommended that the BQI with a modified scaling term be used as an index for marine benthic habitat quality rather than an AMBI index." (Hargrave, B.T. 2010. Empiricial relationships describing benthic impacts of salmon aquaculture. Aquaculture Environment Interactions. Vol.1: 33-46)	

		2.4 Interaction with critical or sensitive habitats and species **2.4.1** We note that little research exists on the impact of open net salmon aquaculture on lobster and lobster habitat. It is well recognized that pesticides used to target sea lice are also lethal to other crustaceans (including lobster, crabs) at all life stages. Sub-lethal effects of these pesticides should also be considered. . Observations in Port Mouton Bay have identified several contributing factors to the significant degradation and displacement of lobster fishing grounds: foul odors (lobster have an acute sense of smell and avoid areas with foul odors), absence of prey (e.g. crab), fine-grained nephaloid layer from waste (which can irritate gills of lobster), nuisance algae in traps (lobster don't enter traps filled with nuisance algae) and barren sea bed (devoid of eel grass and kelp refuges – important to lobster habitat). There is little recognition of the potential influence of the sea surface microlayer as a pathway extending to the far-feld. Enriched concentrations of complexes of trace metals, as well as pesticides where they are released, and early stages of lobster larvae and of other species can be expected to be found in this layer. This pathway, comprised at times of the oily sea-surface microlayer 'slicks' from fish farms, has the potential to transport and project adverse effects over considerable distances.	

Principle 3			
Principle 4			
Principle 5	**5..2.2**	In lobster habitat areas, any allowance for concentrations of selected chemicals and therapeutants in the benthos will jeopardize the reputation and marketability of our lobsters.	
Principle 6			
Principle 7			
General comments			

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	**2.2.1S**	With respect to salmon from smolts to grown-out salmon, the capacity assessment requirement requires a model – a coupled hydro-dynamic / water quality model. The model would be used to predict those stocking densities which would avoid eutrophication at both smolt and grow-out stages. Thresholds for eutrophication can be found in, for example in Bricker et al, 2003 www.eisbein.org/documents/ASSETS.pdf	

Comentarios al Borrador de Estándares para la Salmonicultura

Organizaciones:

Fundación TERRAM
Fundación CENDA
Fundación RIMISP

Principio 6

La producción de salmón en Chile no sólo se restringe al cultivo de salmón, sino que la exportación es de productos que van más allá de la engorda. Se incorpora un trabajo de plantas de proceso que generan un producto exportable que sale del país en condiciones de comercializarse directamente a consumidores por los distintos canales de comercialización.

Así, muchas empresas actúan de acuerdo a un modelo de integración vertical, que se complementa con prestaciones de servicios a terceros cuando existe capacidad instalada ocioso en relación a los niveles de producción de los cultivos propios. En la medida que existe una gestión común, la integración vertical supone entonces que las exigencias deben referirse a todo el sistema de proceso. Los auditores deberán entonces estar prevenidos, y analizar si ocurre una gestión en integración vertical de producción de smolts, centros de cultivo y engorda, y plantas de proceso.

El estándar laboral debe referirse a todos los trabajadores bajo un mismo sistema de gestión. La modalidad de multi RUT no significa que se trata de empresas individuales que actúan de forma autónoma. Son situaciones que tratan de generar una situación legal que segmenta a los trabajadores, y disminuye la posibilidad de una negociación sindical con mayor poder para los trabajadores.

La verificación del cumplimiento de los estándares debe realizarse a todas las unidades que intervienen en la generación del bien exportable, que sale en su forma final desde la frontera económica de Chile.

En materia de remuneraciones, el proceso de reorganización actual por el que pasa la industria plantea varias inquietudes. Por un lado, se está materializando una modalidad de contratación en extremo precaria que no proporciona estabilidad en el empleo, y los pagos se realizan por faena, que puede tener una duración de una semana, una quincena, y no hay certeza de renovación. La cobertura de la protección social también es dudosa. Este tipo de contrato sólo puede ser aceptable en tiempos muy limitados de sobrecarga de trabajo, y no puede involucrar a un número relevante de trabajadores. Este tipo de contratos se da en toda la cadena de operación de empresas integradas verticalmente.

La referencia de salario mínimo es realmente un referente de muy baja exigencia para un estándar asociado a empresa de mejor performance. De acuerdo a estándares más elevados, se debiera considerar como referencia para calificar para certificación que los sueldos superan la mediana del mercado para cada tipo de trabajo contratado.

Principio 5

Criterio 5.1.7

Cuando se trata de la primera certificación, el centro debe demostrar que la mortalidad en sus dos ciclos productivos previos ha sido inferior a 25%. Cuando se trata de una unidad ya certificada, entonces se puede generar una renovación condicionada si hubo una exposición a un suceso que no puede manejar el centro. Sin embargo, en el ciclo siguiente debe nuevamente lograr una tasa de mortalidad inferior a 25%. De no lograrlo perdería la certificación, porque las condiciones del sitio no son las adecuadas.

Criterio 5.5.3

En virtud de reducir al mínimo la posibilidad de transmisión de enfermedades, entonces se debe exigir que el traslado de 100% de los peces se realice en las mejores condiciones posibles, realizando las inversiones que sea necesario. SI existen economías de escala los productores deberían asociarse para aprovecharlas y disminuir los costos.

Principio 4

Criterio 4.2.1

La exigencia del FFDR debe ser calculada siempre, aunque provenga de fuentes certificadas, ya que se trata de evaluar la eficiencia alimenticia, y ese es el concepto predominante. ¿Acaso se podría tener un estándar mayor sólo porque los alimentos se compraron a una fuente certificada?

Principio 2

La producción de smolt en lagos o ríos no puede ser considerada válida para la certificación. Los sistemas abiertos ya están en retirada en un número importante de producciones en distintas geografías.

Ingeniería y Construcción: Inlac S.A.

Rogelio Chomon

Producción de smolts de salmónidos en Chile

Propuesta de innovación en base a ventajas comparativas del país.

Prólogo

El presente trabajo tiene por objeto contribuir al debate acerca de las propuestas de solución de mediano y largo plazo, para las empresas salmoneras que deberán reiniciar el desarrollo de las pisciculturas de agua dulce, obviando los problemas que los actuales sistemas en uso presentan.

Se debe indicar que el desarrollo de la propuesta presente considera los conceptos expuestos en el reciente trabajo "Sistemas de Producción de Smolts en Chile" Análisis de alternativas desde la perspectiva ambiental, sanitaria y económica; documento que contó con el patrocinio de importantes actores de la industria salmonera, de la ONG WWF, y de Corfo, siendo liderado este esfuerzo por don Daniel Nieto. Publicación de Julio de 2010.

Como consecuencia de la reciente crisis del rubro, aquí se hace un énfasis en la fase de agua dulce, pues es en esta etapa, previa a la fase marina, cuando se debe iniciar el aseguramiento de todo el proceso. Se trata entonces de proponer alternativas que otorguen a los smolts una determinante calidad sanitaria y productiva, que convierta a estos peces en los primeros agentes de bioseguridad de la producción.

Se trata de plantear una forma algo diferente de "hacer" acuicultura, aprovechando las verdaderas ventajas comparativas de Chile, compatibilizando, los más altos estándares de producción, con los requerimientos medio ambientales más exigentes y desde luego siendo viables, económicamente.

Como se verá, este objetivo se puede lograr perfectamente, combinando recirculación y flujos abiertos con precisas e innovadoras técnicas que los chilenos conocen bien.

Resumen

La propuesta consiste en afirmar que existe un modo más eficiente, ambiental y económicamente para desarrollar las pisciculturas de agua dulce, que el planteamiento en boga que cree que los sistemas de recirculación son la respuesta de futuro. Las consideraciones que se exponen tratan de estimular la reflexión de los inversionistas salmoneros acerca de si realmente se conoce el

desarrollo actual de tecnologías antiguas en el país, que resuelven extraordinariamente bien la problemática de la producción con bioseguridad y a la vez viable ambiental y económicamente. Cuando se afirma que para producir un smolt por año se requiere una inversión basal de no menos de US$1,3 o US$1,5, que es el caso de las propuestas de recirculación, ¿acaso no existen propuestas que reducen esa inversión a la mitad o 60%? Cuando se afirma que los costos operacionales son el 70% del actual precio de venta de un smolt de 120 gr, ¿acaso no es posible operar una instalación que no consuma tanta energía y cuyos costos en esas instalaciones podría ser sólo el 45% de ese mismo precio?

La invitación a conocer este tipo de propuesta, es un desafío a estudiar soluciones existentes que se fundan en las ventajas comparativas de Chile, y que fueron también consideraciones muy importantes que los pioneros de la industria salmonera si tomaron en cuenta. No se trata entonces de teorizar sobre asuntos especulativos.

Se trata de ver que un territorio como el nuestro, que cuenta con un cordón cordillerano tan cercano al mar, que genera pendientes inusitadas, nos regala la posibilidad de disponer de energía gravitacional para desplazar, distribuir y tratar grandes caudales de aguas, en un régimen hidrográfico conocido. A ello se agrega un perfil físico, químico y biológico de determinadas cuencas cuya agua adquiere esas determinadas especificaciones, debido a la influencia de sus suelos que contribuyen positivamente a crear las mejores condiciones de cultivo, que posiblemente hay en el mundo.

¿Conocemos el alcance de estas ventajas para la producción de smolts? ¿Conocemos adecuadamente experiencias e información de instalaciones existentes que si se han desarrollado sobre estas bases? ¿Se sabe que del enorme poder de la energía gravitacional que sumada a la disposición de terrenos apropiados, permite tratar integralmente las aguas?

Se esta a punto de reiniciar las inversiones en una etapa más madura de nuestra principal industria piscícola; demos una mirada a la situación.

I Introducción

Es sabido al interior de la comunidad profesional de la industria salmonera, que los cuerpos de agua continentales están sujetos a una gran vulnerabilidad. Esta vulnerabilidad proviene de la imposibilidad de controlar los diversos agentes físicos, biológicos y químicos que pueden afectar gravemente a los cultivos, ya sea por eventos sorpresivos, ocultos o simplemente de difícil detección. Los efectos de la agricultura, la ganadería, los desechos domésticos e industriales, las indeseadas malas prácticas de algunas actividades turísticas y otras situaciones (León-Muñoz et al. 2007) se sabe que influyen negativamente en la bioseguridad necesaria para los planteles de alevines o smolts cuyo costo es inmenso, por lo que es innecesario insistir en alarmarnos sobre ese punto.

También se sabe que llegará el momento en que la industria deberá salir de lagos, ríos y estuarios pues la situación será insostenible en pocos años. Las diversas situaciones particulares de pisciculturas de agua dulce tradicionales en aguas continentales, que se lograrán mantener en el tiempo tal como fue hasta el fatídico trienio 2007- 2009, no resistirán en definitiva la presión del Estado, de ambientalistas internos y externos, y las recomendaciones y consejos del necesario up grade tecnológico que requerirán los mismos profesionales a cargo de esas instalaciones. Ya se hace notorio que los nuevos sistemas, que buscan confinamiento total, están logrando estándares de prolijidad y aseguramiento de la calidad ostensiblemente superiores a las tradicionales balsas-jaulas, o flujos abiertos artesanales, provenientes de ríos o esteros cuyos caudales sufren tantos eventos que suelen hacer tan difícil la vida de los piscicultores (Sepúlveda et al. 2009).

En definitiva se hará muy difícil la convivencia aceptada de salmónidos en cautiverio con aguas donde cohabitan otras pisciculturas y especies nativas en libertad, donde además, los cursos o cuerpos de agua dulce del caso, son por definición lugares de uso público

Por estas conocidas consideraciones y otras que la industria conoce, se hará necesario un notable cambio en la bioseguridad de los cultivos en su fase de agua dulce. El asunto es serio y pre supone una inversión de algunos cientos de millones de dólares. Sólo con el objeto de fijar ciertos órdenes de magnitud de la situación que se plantearía para lograr que toda la producción de alevines y smolts de agua dulce que la industria requiere y requeriría en poco tiempo más, es bueno recordar cierta información:

- La máxima producción anual de salmónidos fue en el año 2008, y llegó a las 630 mil tons. Se pretende retornar a estos niveles en 5 años más.
- La producción del año 2008 implicó que se produjeran alrededor de 300 millones de smolts.
- Aproximadamente un 30% de los smolts habrían provenido de centros de producción ubicados en estatuarios.
- Un segundo 30% de los smolts habrían provenido de centros de producción ubicados en balsas – jaulas lacustres.
- Y aproximadamente el 40% restante de los ejemplares de ese año, habrían sido producidos en pisciculturas de flujo abierto ubicadas en tierra. De este último porcentaje, no más de un 5% habría provenido de instalaciones de recirculación.

Es necesario aclarar que los centros de cultivo ubicados en los estuarios sureños, se supone que reciben para su funcionamiento - que es más bien terminal - pre-smolts provenientes en la misma proporción antes mencionada de Balsas-jaulas lacustres y centros de flujo abierto.

II Sistemas actualmente en uso para la producción de alevines y smolts de salmónidos.

Como se ha indicado, los sistemas son los siguientes:

- Pisciculturas de flujo abierto, entendiendo estas como, aquellas que mantienen aguas corrientes en un sistema de estanques que contienen el cultivo en sus diversas fases, donde el efluente es volcado a un cuerpo de agua natural, sea o no que de allí mismo se haya extraído el suministro. En este tipo de instalaciones se produce la mayor parte de los pre smolts nacionales, y como se dijo, a lo menos el 30% de los smolts propiamente tales. La fuente del agua puede ser subterránea o superficial, siendo en el primer caso vertientes o pozos desde donde se distribuye por gravedad o se bombea electromecánicamente, y en el segundo caso, ríos y esteros, desde donde se extrae el agua gravitacionalmente en la mayor parte de los casos, y/o por bombeo electromecánico complementario en algunos otros. En general estas instalaciones mantienen un contacto muy corto con la masa de peces (app. 5 minutos), y los sistemas de aseo de los riles y el tratamiento de los efluentes se basa en medios mixtos (sistemas electromecánicos, y gravitacionales por decantación) y prácticamente todos, consideran agentes aeróbicos para el tratamiento de la nitrificación. El confinamiento de los peces es prácticamente total cuando las instalaciones están debidamente diseñadas.
  En general estos cultivos son intensivos con altos índices de densidad.
  La energía que consumen estos centros es muy variable y se diferencia notablemente entre los que hacen uso intensivo de elementos electromecánicos y aquellos que operan con elementos más simples y usan la energía que proporciona el desplazamiento gravitacional de las aguas.

- Pisciculturas lacustres o en ríos, sobre base de Balsas- jaulas. Son las más conocidas. Se entiende como tales los tradicionales sistemas de balsas con jaulas que ocupan áreas autorizadas de algunos cuerpos de agua, donde rotan levemente su ubicación con fines ambientales. La separación con el medio se basa en mallas, y otros mecanismos que hacen algo más difícil el acercamiento de especies nativas. Las densidades de los cultivos son menores en estos sistemas, dadas las características de la recarga de oxígeno en el cuerpo de agua, por lo que es frecuente el uso suplementario de este elemento. El confinamiento del cultivo es relativo. La energía necesaria para la operación de estas instalaciones es la que requieren los diversos elementos electromecánicos para el manejo, y control, así como la implementación de una operación náutica no menor.

- Pisciculturas en estuarios. En las aguas salobres donde se mezclan agua dulce y agua del mar, se logran las condiciones naturales donde se produce la smoltificación final que precede la salida de los salmónidos al mar. Estas instalaciones se parecen a las anteriores pues se aplican casi las mismas prácticas y sistemas de manejo. Como en el caso anterior el confinamiento del cultivo es parcial.

- Pisciculturas de recirculación. Estas instalaciones son las de más reciente aplicación, y se puede decir que a pesar de sus logros, aún se encuentran en una etapa de desarrollo que las hace de muy compleja evaluación. La tecnología aplicada en este tipo de pisciculturas pretende establecer un control absoluto sobre todos los parámetros físicos (caudal, transparencia temperatura), químicos (perfil químico adecuado y estable con preeminencia de oxígeno y algunos otros elementos específicos) y biológicos (ausencia de agentes patógenos) que inciden en el cultivo. Se aplica un sistema de confinamiento total de los peces en cultivo, donde mediante sistemas de filtración electromecánica y biológica, mas un número significativo de sistemas de tratamiento de aguas, se mantendría y renovaría la calidad de ese elemento que de ese modo puede recircular incesantemente. Se extrae del flujo que recircula, aproximadamente un 10% del mismo, igualmente de un modo permanente, de manera que abandonan el circuito excretas y otros elementos, siendo reemplazado por agua fresca que se alimenta mediante pozos profundos que aseguran la calidad del suministro por la certeza que da el agua subterránea. Las ventajas y desventajas de este método provienen de sus características particulares. La complejidad de la mantención las 24 horas del día y los 365 días del año de los diferentes subsistemas que proveen y permiten el desarrollo del cultivo hacen de la operación un proceso en extremo delicado; por una parte se trata de lidiar con organismos vivos cuyo comportamiento no es posible acotar a todo evento y por otra parte el sistema es intensivo en el uso de energía y máquinas que requieren duplicidad y mantenimiento. Esto último debido a que el tratamiento del agua debe ser constante, al igual que la adición de oxígeno, y el uso de diversos mecanismos para remover las alteraciones provocadas por la “respiración” de los peces, las fecas, el alimento no digerido y los cambios en la bioquímica por efecto de la nitriticación ulterior. A pesar que como en las pisciculturas de flujo abierto, en este sistema también se entrega a los cursos o

cuerpos de agua naturales un 10% de las aguas utilizadas en promedio, se considera que el sistema es de confinamiento total.
El sistema está en pleno desarrollo y se espera que permita desacoplar totalmente el cultivo en su fase marina de la cercana disposición de agua dulce continental, de modo que se pueda cultivar salmónidos en cualquier sitio del mundo donde haya mar con ciertas temperaturas admisibles, y sobre todo energía barata.

III Impacto de sistemas actualmente en uso para la producción en Chile

Los impactos que producen las distintas instalaciones productoras de smolts son variados y muy recientemente se ha considerado analizarlos desde 3 puntos de vista: a) Sanitarios; b) Ambientales; y c) Sociales.

a) **Sanitarios**:

Se trata aquí de las enfermedades que afectan a los cultivos y provenientes del medio local o externo. Pueden ser hongos, parásitos, bacterias, virus o la presencia de micro organismos que secretan toxinas y causan diversas formas de envenenamiento. Esto provoca eventos que afectan seriamente el manejo de los cultivos, generando complicaciones en la productividad general del proceso, en especial en el factor de conversión de los alimentos, en el uso masivo de antibióticos u otros químicos pesticidas, y desde luego en la persistencia del stress (Beveridge, 1986).

Lo ocurrido con el virus ISA no fue un evento casual ni único. La enfermedad se propagó bastante rápido en comparación a la reacción de la industria y las autoridades del rubro. Pero antes del ISA debemos reconocer que hubo sorpresivos y serios brotes de Francisella, BKD; Ricketsial, IPN y otras; eventos todos que encontraron también en el medio de agua dulce dispuesto por las salmoneras y la autoridad, un contexto apropiado para su propagación.

Como se ha dicho en diversos informes, seminarios y encuentros acuícolas tanto en Chile como en el extranjero, se entiende que los eventos sanitarios que han perjudicado a los cultivos, tienen también como contrapartida eventos sanitarios que han provocado también daño en el entorno, sea en su flora o fauna como en los paisajes y características ambientales de lugares naturales, como también de lugares habitados.

También es muy importante recordar que casi la totalidad de los eventos denunciados y reconocidos, han ocurrido en lugares donde se han producido dos o tres condiciones constantes: 1.- Se trata de lugares donde no hay confinamiento total (Sistemas de balsas – jaulas ubicadas en cuerpos de agua dulce donde es prácticamente imposible ejercer un control sanitario sin el uso de elementos químicos y físicos que pueden ser muy contaminantes; 2.- Cuando se verifica que los mecanismos de tratamiento de los riles y aguas efluentes han sido frágiles y/o mal manejados; Existe también otra constante entre las condiciones de ocurrencia de estos eventos sanitarios que suele soslayarse, cual es la falta de control por parte de productores y la autoridad fiscalizadora del uso de las malas prácticas en el uso de medicamentos.

Es evidente que en las pisciculturas de flujo abierto estos eventos son mucho menos frecuentes y en las pisciculturas de recirculación, casi inexistentes. Es obvio que en estas 2 últimas alternativas el diseño de los sistemas, en general obliga a disponer de procedimientos mucho más rigurosos que no pueden ser obviados. Estos sistemas no podrían funcionar sin detallados procedimientos que aseguren la calidad de las aguas, siendo por ello sus puntos más vulnerables el tratamiento de riles y aguas efluentes y no la condición de los cultivos propiamente tales.

b) Impactos ambientales:

1.- Armonía del entorno: El impacto visual y paisajístico esta ampliamente documentado y la discusión está en que cuanto tiempo se demorará la recuperación de esas alteraciones. La basura, el daño a pequeños ecosistemas o los malos olores alrededor de las pisciculturas, son básicamente producto del desaseo y falta de cuidado; como es el caso del uso de elementos plásticos que quedan abandonados. Y por ello ha sido objeto de innumerables denuncias y reportajes, de manera que estos impactos ambientales se ha entendido correctamente, serán subsanados sólo con la obediencia a las normas vigentes, no siendo esos impactos un problema de diseño de las pisciculturas, sino del modo responsable de su operación de este tipo, o cualquier otro proceso industrial.

2.- Cursos de agua: Se ha dicho que el D.S. 90 de 2000 del MINSEGPRES es insuficiente para cautelar el patrimonio ambiental de ríos o esteros que son receptores de efluentes de pisciculturas de flujo abierto, señalándose que por ser tan altos los caudales, la dilución contemplada permitiría cumplir cómodamente la norma. El problema residiría entonces en la concentración acumulativa de cargas nocivas, respecto de algunos elementos que a la larga causarían un serio problema ambiental en los cuerpos de agua receptores. En este caso la observación de estas instalaciones permite anotar que en efecto aquellas pisciculturas que adolecen de diseños adecuados – pero que cumplen la norma – pudieran provocar lo indicado, en especial en épocas de estiaje. Sin embargo se puede ver también numerosas instalaciones que con diseños de bajo costo y prácticamente iguales en costo de inversión y operación a los anteriores, cumplen holgadamente la norma, permitiendo eliminar totalmente la posibilidad de generar concentraciones perniciosas en ningún plazo. También hay instalaciones que dado el alto costo de los sistemas electro mecánicos para efectuar el tratamiento de las aguas efluentes, trabajan en el límite del cumplimiento, dándose en esos casos un claro ejemplo de diseño antiguo, propio de épocas en que se podía hacer este tipo de inversiones de bajo rendimiento.

La medición de DBO ha permitido apreciar y diferenciar las instalaciones respecto de sus atributos para reponer el estado natural del agua efluente.

3.- Cuerpos de agua: En los cuerpos de agua lacustres se ha descrito desde hace tiempo el impacto de los cultivos intensivos, (Campos 1995); (Campos et al, 1997), (León-Muñoz et al.2007) y otros trabajos que dan cuenta de las concentraciones críticas de fósforo, nitrógeno soluble y otros elementos que alteran seriamente el estado trófico de esos cuerpos de agua. A ello, se agrega la adición de sustancias orgánicas e inorgánicas incorporadas al proceso de producción que mal manejadas producen toxicidad en el medio, caso de los materiales desincrustantes, sustancias anti hongos, anti algas, desinfectantes y anestésicos que sumados a los procesos biológicos de la masa de peces en cultivo provocan o pueden provocar condiciones letales para la vida en sectores cercanos a las instalaciones piscícolas.

Los estudios de los sedimentos lacustres en zonas piscícolas han arrojado evidencia de lo difícil que es resolver el asunto sin una adición masiva, de largo aliento y bien focalizada de oxígeno a los fondos. Los sedimentos alterados cambian el hábitat de la comunidad acuática de esos cuerpos de agua no solo con la contaminación referida sino también pudiendo provocar el contagio de enfermedades exógenas. Finalmente se debe hacer referencia aquí a la situación de especímenes escapados que en ciertos casos logran adaptarse al medio, verificándose que podrían convertirse en depredadores o competidores de la fauna nativa, la que resulta deprimida (Soto et al, 2001; Naylor et al 2005; Arismendi et al 2009)

En este caso los diseños adecuados para resolver estos problemas en los lagos son extraordinariamente costosos y no logran resolver razonablemente bien los problemas, la reciente aparición en USA de una tela que podría separar de modo más seguro las jaulas del entorno, parece que viene sólo a encarecer y hacer más lenta la agonía de estos sistemas. Por lo que el abandono de este tipo de cultivos intensivos es eminente. Está claro que solo produciendo en niveles de densidad de peces muy inferiores a las admisibles económicamente se podría establecer soluciones y en todo caso parciales.

4.- Uso de energía: Como todo establecimiento industrial, las pisciculturas requieren energía. El uso intensivo de energía eléctrica, sea esta producida in situ o suministrada desde redes públicas, genera un importante impacto ambiental que se puede cuantificar cuando se estudia la traza de carbono de los productos finales, pues da cuenta que si bien en la localidad de la instalación no hay emisiones, en realidad estas se trasladan a otro lugar, no resolviendo ambientalmente el asunto. Cuanto más intensivo es el requerimiento energético, y este se logre por medios convencionales el impacto es más serio. Es el caso de los sistemas de recirculación que aparecen como ambientalmente inocuos en su entorno inmediato, pero que generan una demanda eléctrica importante.

c) Impactos sociales

Los impactos sociales negativos que se han producido con la instalación de estos centros de producción de smolts, compiten con importantes impactos positivos que suelen hacer desear que no se consideren importantes a los primeros. En efecto el fuerte impacto en el empleo de las localidades del emplazamiento, por una parte; frente a la pérdida de atractivo visual que afecta a algunos empresarios turísticos pequeños o medianos, suele tender a desaparecer en las mismas localidades, aún cuando estos últimos – seguramente por ser minorías - experimenten pérdidas al sufrir algunas rebajas, el valor de sus terrenos. Asimismo el dinamismo que se imprime a esas localidades con el surgimiento de comercios inesperados para atender transportistas, personal temporal, obras de construcción y otras visitas, hace que la fealdad que experimentan ciertas riberas, con algas inesperadas, fetideces y basuras, sea un costo aceptable para el grueso de esas comunidades, y aún para algunas autoridades. Es comprensible esta reacción dado que los emplazamientos suelen estar en localidades lejanas, usualmente olvidadas y con muy poca exposición. Sin embargo se debe reconocer que ha habido efectos sociales indeseados, especialmente atribuibles, al mal manejo de las instalaciones, dándose esa circunstancia en pisciculturas de diseño antiguo y donde ha habido no poco descuido.

El diseño, entonces si bien es influyente en el caso de algunas pisciculturas de flujo abierto (pues no impiden daños del tipo indicado), en realidad no es eso lo que provoca per sé los problemas; el inconveniente radica fundamentalmente en las malas prácticas de manejo. Por el contrario los sistemas basados en balsas – jaulas lacustres, sumas a los problemas reconocidos y algunas malas prácticas la imposibilidad objetiva de ocultar instalaciones netamente industriales en un paisaje supuestamente turístico.

En suma los sistemas de producción que se utilizan en el país, tienen algunos problemas que se deberán zanjar mas temprano que tarde para recuperar primero la posición de liderazgo de la salmonicultura chilena y dar continuidad a proyectos de largo plazo. Los impactos son ampliamente conocidos y reconocidos por la industria y sus agrupaciones, pero las características de los sistemas expuestos en cuanto a su desempeño económico es algo menos reconocido o siquiera público.

IV Descripción breve de aspectos económicos relevantes como base de comparación de uno de los sistemas de producción de flujo abierto y un sistema de recirculación. (Propuesta)

Como se indicó existirían básicamente 3 sistemas para producir los smolts. Algunas de ellos se ocupan de algunas fases de esa producción y otros que proveen soluciones para todo el procedimiento. Las tres formas más importantes serían:

A) Balsas jaulas, que también se desarrollan en a lo menos 3 modalidades;
B) Flujos abiertos, que tienen 3 o 4 variaciones; y
C) Recirculación, que también presenta pequeñas variaciones.

El presente trabajo se referirá sólo a dos de las variaciones, es decir los sistemas de B) Flujo abierto y a C) Recirculación, en atención a que solo estos sistemas serán los que prevalecerán en el futuro. El uso de balsas jaulas en lagos, ríos, esteros y estuarios, aunque perdurará algunos años, finalmente serán parte de la historia de la salmonicultura continental.

Para los efectos de este trabajo se consideran elementos comunes, o prácticamente de similar valor económico, una serie de procesos y elementos que no se incluirán en los comentarios, pues se entienden que tienen guarismos tan parecidos que no generan diferencias importantes para la comparación entre la eficiencia económica de uno u otro sistema. Es el caso de los alimentos, donde las tasas de conversión y aprovechamiento se consideran similares, así como el valor de los peces juveniles de pesos superiores a los 5 gramos; Se excluye también verificar diferenciales de costos en materia de vacunas, medicamentos y otros productos químicos anti algas, pestes u otras eventualidades de control propias de sistemas abiertos en lagos o ríos.

Aquí, y es este el centro de esta propuesta, la comparación se hará entre sistemas de <u>Recirculación</u> (SR) y un tipo de piscicultura de flujo abierto muy particular; se trata de pisciculturas de <u>Flujo abierto con 100% de suministro de agua de origen subterráneo siendo este, obtenido a través de un sistema de drenaje, donde la energía para desplazar las aguas es puramente gravitacional</u>, (SFAD). Se trataría entonces de comparar dos sistemas que ofrecen las mismas especificaciones de bioseguridad, y de una misma amigable relación medioambiental. Ambos sistemas comparten el concepto de total confinamiento.

En materia de inversiones se excluye comentar comparaciones generales de infraestructura de oficinas, bodegas y otras obras anexas a este tipo de instalaciones; Igualmente no se comenta respecto a las redes de cañerías, estanques o piscinas, pues no se aprecian diferencias notables en sus valores unitarios, pues se supone que el habitáculo de los peces es muy parecido.

Por lo indicado, es necesario puntualizar que la pretensión del siguiente capítulo, es la de verificar las ventajas y desventajas de las dos mejores alternativas que aparecen como factibles para las futuras inversiones de las salmoneras en pisciculturas de agua dulce.

Sin embargo la difícil comparación de "peras" con "manzanas" debe hacerse considerando los verdaderos elementos diferenciadores. Se debe aclarar donde están las diferencias entre ambos sistemas.

Elementos diferenciadores

Agua: Fuente y caudal

Energía: Fuente y requerimientos.

Personal: Cantidad y calificación.

Medio ambiente: Efectos que producen Instalaciones y aguas efluentes.

Tecnología: Procedencia y actualización.

Inversión: Monto inicial y Valor residual

IV .1 Agua, Fuente: Tanto el sistema de recirculación (S.R.) como el sistema de flujo abierto proveniente de drenajes (S.F.A.D.) tienen en común extraer agua subterránea para conformar el flujo de agua que será el soporte del cultivo. La razón consiste en que las aguas subterráneas alumbradas y utilizadas sin que tomen contacto previo con el entorno superficial, no tienen presencia de material orgánico, ni presencia de flora o fauna nativas, y mucho menos vecindad con otras pisciculturas. A esta característica se suma que el perfil químico de esas aguas es extraordinariamente estable, proveyendo así un elemento constante todo el año en cuanto a las características químicas y biológicas del futuro soporte del cultivo, un estudio clave respecto a que aguas son las mas colaboradoras con la nutrición (absorción de calcio por ejemplo), parte eligiendo aguas que harán smolts más fuertes . Chile dispone de varias cuencas hidrográficas con napas extraordinariamente aptas química y físicamente para los efectos requeridos, siendo unas más apropiadas que otras.

Como se dice antes, al eliminar las eventualidades propias de los flujos abiertos y superficiales, se avanza consistentemente en materia de bioseguridad permitiendo concentrar los esfuerzos en las otras variables que no son pocas. Es el caso de la eliminación del gasto derivado de la preocupación por derrames a cursos o o cuerpos de agua superficiales de diversa índole (agrícolas, industriales o domésticos), así como los eventos que generan alteraciones producto del clima (hojas en otoño, aguas barrosas en época de temporales, etc.). Con el suministro de aguas subterráneas se evaden completamente los peligros que se dan en el caso de aguas superficiales, y las inversiones y costos operacionales a que obliga la superación de las eventualidades descritas.

IV .1 Agua, Caudal: Los diferentes sistemas SR requieren un caudal de agua subterránea constante que varía en un rango entre el 3% y el 30% del flujo en el que se sustenta el cultivo. Considerar un 10% de ese caudal como promedio parece ser una cifra representativa para los efectos de comparar ambos sistemas. En el caso SFAD el caudal requerido corresponde al 100% del flujo que sustentará el cultivo. Sólo con carácter referencial – para ejemplificar - podemos señalar que para una producción de unos 6 millones de smolts por año, el diseñador de un sistema SR dice que requerirá un caudal de unos 170 litros por segundo, y mantendrá en el cultivo un caudal permanente que oscilará entre los 1.300 y 1500 litros por segundo; el sistema SFAD requerirá 2.000 litros por segundo, tanto de suministro nuevo y permanente (con una temperatura media no inferior a los 13ºC), y mantendrá para la misma producción ese mismo caudal.

IV .2 Energía: En este ítem es donde se empiezan a observar las diferencias del diseño de los sistemas en comparación. ¿Para que se requiere energía?

a) <u>Para obtener el suministro de agua, mejorar sus condiciones físicas y para distribuirlo en el sistema</u>: El SR requiere energía del sistema eléctrico local o debe generar electricidad propia para operar un sistema de bombeo de gran confiabilidad y con duplicaciones, destinado en primer lugar a extraer de un pozo subterráneo el 10% del flujo de agua que soportará permanentemente el cultivo. Dado el alto costo de operación de este sistema, de inmediato se procede a micro filtrar el agua y someter ese flujo a un calentamiento que permita alcanzar una temperatura por sobre los 15º C. De ese modo la velocidad de crecimiento de los peces aumentará extraordinariamente, permitiendo entre otras cosas, que con un flujo recirculante menor en un 25% o 30% al de un sistema SFAD, se obtenga anualmente una misma cantidad de smolts (6 millones anuales en este ejemplo). La temperatura constante se mantendrá en el sistema adicionalmente, por la aislación con la que se disponen estanques, cañerías y receptáculos. Enseguida otras bombas del sistema deberán mantener la masa de agua en circulación constante permitiendo establecer el soporte del cultivo (esto es mantener un bombeo de unos 1300 a 1500 litros por segundo para suministrar los caudales a un conjunto de estanques de 90 m3 c/u, por ejemplo).

El SFAD efectúa el abastecimiento y la distribución de la totalidad del elemento, utilizando la energía que provee la gravedad. No requiriendo electricidad sino basándose en el diseños hidráulicos, de modo similar que lo hacen las plantas de agua potable tradicionales. Para obtener un mismo número de smolts de producción anual, que el método SR indicado antes, se requerirá un caudal mayor de agua. Si la temperatura constante con que sale el agua subterránea, estuviera en torno a los 13,5ºC (VII y VIII región) o 14,5ºC (región metropolitana), entonces el diferencial de caudal sería en torno al 25%; esto es que el sistema SFAD debería suministrar unos 2.000 litros por segundo para la regiones VII y VIII y unos 1.800 litros por segundo, para la región metropolitana.

b) <u>Para oxigenar y extraer excesos de nitrógeno del agua</u>: El SR requiere electricidad para extraer los excesos de nitrógeno propios de aguas subterráneas, aún cuando se trata de sólo el 10% del flujo en circulación, esta tarea requerirá de elementos electromecánicos para efectuar la separación del nitrógeno e incorporar oxígeno. Es el caso de generar su propio oxígeno a partir de compresores separadores de nitrógeno del aire. En el caso de depender del suministro de oxígeno de compañías especializadas, son estas las que efectúan el gasto de energía, que incorporan en el precio junto al arriendo de los estanques especiales. Es importante destacar aquí, que el sistema SR permite con el uso de cualquiera de sus subsistemas de oxigenación, llegar a niveles por sobre la saturación natural admisible de la masa de agua del flujo, de modo que puede soportar en el mismo caudal mayor densidad, que la esperable en otros sistemas; esta capacidad sumada a la señalada respecto a la mantención de la más óptima temperatura, permiten ahorros de esta un 25% o 30% en inversiones basales tales como piscinas, tuberías y m2 de galpón, estanques etc. En cualquier caso es la adición de oxígeno al flujo en recirculación uno de los mayores gastos en este ítem, pues debe hacerse por medios demandantes de energía.

El sistema SFAD oxigena el 100% del agua (que como en el caso anterior es subterránea y por lo mismo pobre en oxígeno) utilizando la misma energía gravitacional que proviene de la pendiente en la que se hace circular el flujo, y son los pertinentes diseños de cascadas y otros métodos específicos los que permiten llegar a niveles de saturación natural extrayendo excesos de nitrógeno, sin requerimientos de oxígeno envasado o suministrado por un compresor. En cualquier caso se puede en estos sistemas incorporar sobre saturaciones con equipos similares a los usados por los sistemas SR, pero de muy inferior envergadura. Para obtener producciones de smolts idénticas a las de un sistema SR.

Por este concepto, los sistemas SFAD, requieren entonces más terreno (superficie para sus instalaciones) tanto para lo que ocupará el tubo aductor, más terreno para instalar más piscinas en un galpón más grande (se puede considerar unas 3 hectáreas adicionales de terrenos), asunto no tan relevante dentro de la envergadura de este tipo de inversiones.

c) <u>Para efectuar tratamiento primario de decantación y separación de sólidos en suspensión directamente desde cada estanque de cultivo</u> Los diseños para SR y SFAD consideran conceptualmente el más inmediato tratamiento de las aguas, pues mientras menor sea el tiempo de contacto de las sustancias que modifican las propiedades del agua, menor será la alteración a tratar. Por lo mismo menor su costo y menor el tiempo de recuperación. Por ello, la separación permanente y continua de los sólidos en suspensión da inicio a la etapa de tratamiento primaria, en los mismos estanques de cultivo donde están los peces. Para ello nuevamente los sistemas tienen soluciones diferentes aunque en este caso más parecidas. Ambas ocupan la gravedad, pero los sistemas SR se refuerzan con aparatos electromecánicos demandantes de energía eléctrica. El SFAD utiliza casi exclusivamente la fuerza gravitacional mediante diseños específicos apoyados esta vez por bombas electromecánicas de pequeño tamaño, en cualquier caso sustancialmente menores a las requeridas en SR. Estas bombas retiran continuamente la borra que se acumula en el fondo de los estanques de decantación de cada piscina considerando sólidos en suspensión que pesen más de un décimo de gramo.

d) <u>Para efectuar extracción de aguas efluentes para hacer tratamientos siguientes y disponer del flujo ya sea para su recirculación o disposición.</u> Las aguas residuales de un SR - como se pre definió antes – no exceden el 10% del volumen del caudal en recirculación, y que corresponde a las aguas que se reponen continuamente. Este proceso de extracción de ese 10% del sistema en recirculación, termina con el correspondiente tratamiento de ese caudal para ser entregado a algún curso o cuerpo de agua donde administrativamente se dispone del elemento. El tratamiento de esas aguas tiene por objeto cumplir las normas, para lo cual se extrae los sólidos en suspensión que contiene;

asimismo se procede a la desnitrificación del caudal impidiendo que continúe en él el ciclo del amonio; finalmente se realiza una moderada re oxigenación que es parte de la etapa final de purificación por medio de procesos aeróbicos cumpliéndose sobradamente con los límites de la norma. Este tratamiento en las instalaciones SR puede ser igual al usado en los sistemas SFAD si se dispusiera de los declives y terrenos suficientes para efectuar este proceso utilizando medios gravitacionales. Pero es evidente que la ubicación de las pisciculturas SR se busca que esté en lugares cercanos a las concesiones de mar a la que van destinados los peces producidos, de modo que se trata de lugares extraordinariamente planos y sin pendientes relevantes. Esto obliga que todo el trabajo de tratamiento en definitiva deba ser efectuado por equipos ad hoc, consumidores de energía eléctrica. Por otra parte, dado que el 90% del agua efluente del sistema debe retornar al sistema, el tratamiento de esta agua es generalmente diferente y bastante más riguroso. En efecto las aguas que retornan deben ser sometidas intensivamente a purificación, re oxigenación y el necesario re impulso para devolverla al inicio del circuito, esto es un bombeo permanente y continuo las 24 horas del día. Estos procesos se efectúan en base a aparatos electromecánicos y adición de sustancias químicas que colaboran en acelerar, garantizar y homogenizar el resultado de la intervención, de modo que el agua que re ingresa al cultivo se encuentre en perfectas condiciones. Un conjunto de sensores (algunos de sofisticada tecnología) supervigilan y registran la totalidad del proceso de circulación y recirculación, de modo continuo. Con software específicos, y personal profesional de nivel medio alto, se mantiene entonces una súper vigilancia y total control de todas las variables del proceso de producción que acaece en las piscinas de cultivo, disponiendo de herramientas apropiadas para intervenir rápida y eficazmente en caso de algún problema.

El proceso utilizado por SFAD para terminar de tratar las aguas que tuvieron contacto con el cultivo, aunque fuera muy breve, igualmente cumple sobradamente la norma respecto del perfil que deben tener las aguas efluentes. La entrega de agua perfectamente tratada a un curso o cuerpo de agua, también se sostiene enteramente en la obtención de energía gravitacional. Pues los declives de los lugares aptos para la instalación de estos sistemas, al igual que proveen la posibilidad de intercalar artilugios para filtrar, desnitrificar y oxigenar el agua recién salida del subsuelo, también proveen con otros diseños específicos y las necesarias pendientes, para instalar las etapas de decantación, filtrado, re oxigenación, purificación por medios aeróbicos, y el envío del caudal a un curso o cuerpo de agua natural o artificial.

Lo que ocurre posteriormente para disponer de los riles, lodos residuales o material orgánico resultante de los tratamientos de las aguas antes de disponer correctamente de ellas, será distinto para cada tecnología empleada en el tratamiento y su nivel de terminación. Esto consiste en que ciertos lodos tratados químicamente deberán ir a vertederos especializados, y si el residuo consiste en materiales húmedos pero sólidos que no contengan químicos o residuos bioquímicos indeseados, se podrán convertir en abono. La tecnología en el sistema SFAD esta en el último caso. En el caso SR habrá ambas posibilidades, siendo en este último caso más intensivo el proceso en la utilización de energía, pues se deberá incluir el trasporte a vertedero, que en cualquier caso no es muy alto dado los bajos volúmenes.

e) Para el funcionamiento del resto de la instalación piscícola; esto es Oficinas, Baños, Salas de servicio, Bodegas, Laboratorio e iluminación interior y exterior. Una piscicultura SFAD o SR requerirán en términos muy similares - si se trata de capacidades de producción también parecidas - una capacidad (amperaje) eléctrica también igual. Por ello se considera que no hay diferencias relevantes en este ítem.

En resumen, en materia de requerimientos energéticos, si bien en términos absolutos, ambos sistemas consumen una cantidad de energía similar, en términos comerciales y ambientales, lo cierto es que el SR es altamente demandante de energía eléctrica que debe producirse de algún modo, presionando el medio ambiente y los costos operacionales, seriamente. El SFAD en cambio obtiene los mismos resultados con costos ambientales y operacionales poco relevantes, dado que sus instalaciones se aprovechan de la energía gravitacional que brinda la región.

IV .3 Personal: El equipo humano que deberá ocuparse de la producción de smolts, ciertamente deberá tener una capacitación ad-hoc en cualquier caso. El cuidado por las buenas prácticas de Calidad, Seguridad y Salud son indispensables para cualquier clase de piscicultura. Sin embargo la operación de uno u otro sistema (SR ó SFAD), obliga a precisar competencias distintas para la mayoría de ese personal.

En efecto el personal que opera una piscicultura de recirculación, deberá tener entrenamiento especial en el uso de equipos de cierta complejidad y los correspondientes conocimientos de la biología de los peces, como para comprender los fenómenos que se producen en el cultivo, y de ese modo contribuir en su cuidado y productividad manejando las palancas de control de esta sofisticada maquinaria. Esto implica que en general dicho personal a lo menos deberá tener el grado de Técnico piscícola. La manipulación indebida de una serie bastante amplia de instrumentos, abre potencialmente un conjunto de peligros que sólo pueden reducirse o eliminarse a través de una buena capacitación. Por ello, el reemplazo, o la conflictividad del personal es un tema

esencial de RRHH en esas empresas. No se podrá poner a manipular equipo a personal que no tenga experiencia y el debido entrenamiento, ni aún por sucesos de fuerza mayor.
Parte fundamental del entrenamiento para operar SR, proviene en general de los diseñadores de los equipos – la mayoría de ellos extranjeros – por lo que su permanente contacto y asesoría será parte integrante de los costos operacionales. Y finalmente se debe tener en cuenta que parte importante de ese entrenamiento especial, es en verdad extra acuícola, pues obliga a mantenimientos de equipos electromecánicos, electrónicos y electroquímicos que son competencias que no son fáciles de obtener en el mercado local.
Los sistemas SFAD, en cambio, permiten la contratación de personal menos sofisticado y por lo mismo de fácil reemplazo, pues su entrenamiento extra acuícola será menor. Los diseños hidráulicos permiten descansar una buena parte de los cuidados en la física elemental. Esto es que los caudales permanecerán inalterados por pendientes dadas en la construcción, y los tiempos de pasada por el cultivo también serán constantes pues el flujo no podrá luchar contra la gravedad por si solo; y los diseños se ajustan a principios que para ser torcidos requerirían un importante esfuerzo. Es decir, en este caso para poner en peligro la estabilidad base del cultivo, habría que ejecutar obras y tareas costosas, visibles, lentas y ruidosas. La constancia del perfil físico químico del agua sólo podría alterarse – y no necesariamente de modo letal – si hubiera cataclismos que cambiaran totalmente la morfología del territorio. Igualmente una intervención indeseada de terceros obligaría a la ejecución de costosas excavaciones, etc.
El personal de SFAD deberá recibir básicamente su entrenamiento al interior de la empresa y las jefaturas asimismo deberán contar con grados académicos de a lo menos Técnicos piscícolas.
En resumen se trata de operaciones que requieren personal muy distinto y organizado también de modo diferente. Los costos en obra de mano serán por lo mismo más onerosos en los sistemas SR, a pesar que los sistemas SFAD puedan requerir un 20% más de planta que los sistemas SR, es decir unas 20 personas.

IV .4 Medio Ambiente: La problemática del medio ambiente evaluada como costo operacional o valor de inversión en los casos en comento también generan elementos distintivos. La extracción de aguas de las napas subterráneas podría generar alteraciones de todo tipo en zonas con escases de agua donde la capacidad de la cuenca es muy limitada. Por otra parte la extracción de agua subterránea también podría afectar ecosistemas protegidos o humedales, cuando las extracciones así los apremien. En los hechos, la habilitación de muchas tierras de cultivo se efectuó históricamente por la vía de la habilitación de terrenos vegosos donde existieron ecosistemas naturales que debieron ceder esos espacios a la agricultura. A través de la Comisión Nacional de Riego, hasta hoy, la incorporación de nuevos terrenos a la producción agrícola merece no solo apoyo, sino subsidios del Estado. Por ello en esta materia se debe diferenciar en primer lugar si se trata de instalaciones en zonas con escases o no; también se debe verificar que no afecten terrenos protegidos; y sólo si se trata de terrenos que teniendo cuencas sin estrecheces, con napas abundantes y donde no se afecte por la vía de una baja en el nivel freático zonas protegidas como humedales, entonces la extracción por pozos o drenajes tendrá sentido. No se debe olvidar que la extracción será permanente, por lo que se debe acotar el área de influencia con claridad. Esto afortunadamente es conocido por cientos de profesionales en el país y tanto las autoridades que velan por el Agua, la Agricultura y el medio ambiente, disponen de experiencia para evaluarlo bien. Por otro lado las regiones donde estos proyectos son competitivos no tienen ningún apremio por agua dulce, pues se trata de regiones con una pluviometría muy favorable, donde la mayor parte del agua dulce termina en el mar sin ningún uso humano.

El sistema SR requerirá entre el 10% y el 20% de lo que requerirá extraer el sistema SFAD. Por lo que es evidente que el área de influencia es bastante menor en el caso SR. Por su parte el SFAD implica la construcción de un sistema de drenaje implica que es una obra mayor, y que para su ejecución deberá considerar muchas condiciones, como el atravieso de caminos, canales y cursos naturales, generando durante las obras un movimiento muy superior al necesario para instalar uno o dos pozos profundos.

Sin embargo a pesar que uno u otro método de extracción tienen en común ser invisibles, y no afectar relevantemente el medio ambiente a nivel local, salvo por lo señalado precedentemente, con todo, tienen diferencias que se pueden notar si se exige la huella de carbono, como se comenta más adelante.

Ambos sistemas deberán hacer disposición de riles iguales para producciones iguales. Estos riles debidamente separados de las aguas efluentes tendrán tratamientos semejante como se comentó en el punto IV 3. c) y d). Por lo que el siguiente asunto diferenciador entre ambos sistemas está en la forma en que impactaría la entrega de un caudal permanente y continuo a un curso o cuerpo de agua natural de 2.000 litros por segundo para el ejemplo de un sistema SFAD ó unos 150 litros por segundo en el ejemplo SR.
Es evidente que si el proceso de tratamiento es adecuado y excede o puede exceder el perfil químico y biológico (DBO) requerido por la norma, entonces los cuerpos o cursos de agua receptores, podrán permanecer sin daño. En algunos casos el hecho que las aguas efluentes puedan correr en cotas superiores a los ríos o esteros aledaños, podría encontrarse beneficios para la agricultura local al contar con un caudal que podría escurrir gravitacionalmente sin la necesidad de ejecutar obras de bocatoma aguas arriba de esos cursos, pues se dispondría del elemento allí. En este último caso es perfectamente

posible postular el sistema de drenaje aductor de la piscicultura a los programas y beneficios de la Comisión Nacional de riego, si como efecto de la aparición de estos caudales, en efecto se logra mejorar terrenos por una parte, y se logra generar riego para otros.

IV .5 Tecnología: En estas notas ha parecido necesario hacer un comentario aunque sea extremadamente breve acerca de los efectos que genera el escoger uno u otro modelo de desarrollo tecnológico de las pisciculturas chilenas. Y esto, debido a que podrían llegar a darse situaciones impensadas.
La procedencia de la tecnología revela que sus impulsores han desarrollado especiales métodos para resolver problemas lo suficientemente agudos como para ocuparse de ellos, al punto de producir un cambio importante. En este caso, las tecnologías de recirculación apuntan a resolver el problema de no contar con aguas apropiadas para la producción en gran escala de smolts. ¿Porqué? La respuesta es muy simple. En el hemisferio norte las aguas dulces no contaminadas están en zonas extremadamente frías. Hay además otras consideraciones, pero lo cierto es que en esos países se dio desde siempre la tendencia de llevar lo antes posible los smolts al agua de mar precisamente para desocupar su limitada capacidad de agua dulce. Hoy es sabido que la práctica de llevar al mar smolts de mayor tamaño (sobre 200 gr) mejora notablemente el posterior desempeño de esos peces. ¿Porqué en nuestro país esa práctica fue poca? Contar con aguas todo el año, a temperaturas que oscilan entre los 12ºC y 15ºC, sólo se da en Idaho y un puñado de pequeñas localidades; lugares todos donde existe una sobre demanda por esos recursos, donde un M3 con los perfiles adecuados y en las temperaturas indicadas puede llegar a costar US$5 ó US$6 millones o más.

¿Existe ese problema en nuestro país? Ciertamente que no. Si Chile es obligado a producir smolts con el mismo costo ó más que un país que no tiene aguas dulces adecuadas, pues estas se “fabricarían” con el mismo costo energético; ¿Cuál sería la ventaja de nuestro país para producir a bajo costo con ventajas comparativas, si estas no se desarrollan? Ninguna. Prácticamente cualquier lugar sería apto para producir salmones, pues los chilenos no contarían con ventaja alguna. Aún más, deberán importar esa tecnología. Por ello el desarrollo de una tecnología que se base en nuestras fortalezas es esencial para mantener las ventajas.

Comentar más sobre este asunto, como es el caso de la dependencia que se empieza a producir, del desarrollo de una tecnología orientada a trabajar con escaso recurso hídrico, es sorprendente para un país que dice tener las mayores reservas de agua dulce del mundo…

La protección de las aguas como un recurso renovable escaso y de suma importancia, es una tarea que compete a toda la comunidad y no sólo al

Estado. Las empresas salmoneras, si desarrollan tecnologías como las que se comentan en el SFAD, no sólo agregan valor a sus inversiones, sino también fundamentan sus ventajas en situaciones que otros países no podrán replicar. Si hay alguna enseñanza de sumo interés que pueden brindarnos sociedades como la europea hoy día, sin duda es, que se puede aprovechar los recursos naturales protegiendo el entorno y sin causar daño, preservándolos para futuras generaciones, en una asociación virtuosa, pues no sólo fiscalizadores estatales supervisarán las buenas prácticas de manejo, sino la comunidad, partiendo por las empresas concesionarias, las autoridades locales y los vecinos.

IV .6 Inversión: Se ha extendido como precepto reconocido y válido en la comunidad salmonera, que la inversión asociada a la producción de 1 smolt por año, equivaldría a US$ 1,3 a US$ 1,5. Esto es que para el ejemplo indicado antes, es decir para producir unos 6 millones de smolts por año, debieran invertirse del orden de US$ 8 ó US$ 9 millones. Esos valores consideran plantas de recirculación, con variadas fórmulas de diseño. También se reconoce en la industria que las pisciculturas "antiguas" para producir los mismos volúmenes tuvieron un valor de inversión cercano a la mitad o menos que esos valores.

Dada la situación que se desarrolla en estos tiempos, la posibilidad de repetir inversiones "a la antigua", se ve aventurada y con poco horizonte. Los sistemas SR despiertan la gran esperanza que se puedan constituir en una solución general que cada empresa adoptará en algún momento de su desarrollo. Sin embargo los proyectos SR (unos 15 en total en el país) aún no dan certezas generalizadas como para colocar todos los esfuerzos en esa dirección, y es hoy cuando el debate debe aclarar si es la única alternativa y si es la mejor. Fue sabido en un principio, que los operadores SR sólo consiguieron hacer pre – smolts y no verdaderos smolts, haciendo de una combinación con jaulas estuarinas por ejemplo, un ensamble confuso acerca de si eran los smolts finales provenientes de SR o derechamente de estatuarios. Los operadores tampoco han sido pródigos en informar y permitir el conocimiento público del resultado de sus operaciones, salvo 2 o 3 excepciones; lo que ha generado un importante cúmulo de dudas y parálisis para tomar las decisiones de jugarse por esta tecnología. Las empresas salmoneras operadoras – todas – conservan la duplicidad y a veces la triple opción (Recirculación + Flujo Abierto + Balsas jaulas). Por supuesto cuando se trata de estas 2 últimas, obviamente se trata de instalaciones ya utilizadas, ya pagadas, y hoy, supuestamente exentas (post cuarentena) de la posibilidad de nuevas infecciones.

Pero las decisiones acerca de que hacer para los próximos años han sido lentas no sólo por el efecto del evento ISA, y la ulterior crisis financiera, o la lenta aclaración que van dando los Reglamentos que ponen en vigencia la nueva Ley General de Pesca y Acuicultura. El asunto parece ser que todos esperan ver que pasa con la recirculación y que pasa con el control de enfermedades; en otras palabras la Bioseguridad.

Por ello indicado la decisión de inversión debe ser tomada tras una gran reflexión y acopio de información no fácil de obtener.

Un sistema SFAD debiera tener considerar – para una piscicultura capaz de producir unos 6 millones de smolts de unos 120 gr- una inversión entre US$ 0,7 y US$ 1 por smolt anual.

IV .6 Operación y valor residual: El segundo gran tema para evaluar las alternativas tecnológicas es la comparación de los costos operacionales de cada sistema.

Antes de mencionar las diferencias más relevantes en costos de operación entre SR y SFAD, se debe hacer hincapié en que las operaciones “tradicionales” de Balsas – Jaulas lacustres o pisciculturas de flujo abierto provenientes de Ríos, esteros o cursos (vertientes) superficiales, tuvieron históricamente costos operacionales muy altos, siendo derivada esa situación de sus diseños y los problemas mencionados antes. Parecía sin embargo - y casi paradojalmente - que los precios finales de sus productos eran aceptables y hasta baratos. Esto ocurría cuando las exigencias de calidad eran menores, el precio internacional del salmón estaba razonablemente bien, y el tipo de cambio era favorable. Parecía que la importancia financiera de los smolts no constituía un foco tan relevante, en comparación con los valores de alimentos y procesamiento. Esto ha cambiado para siempre.

Los sistemas SR, como se ha comentado antes aquí, y es sobradamente conocido por sus operadores, tiene costos operacionales totales bastante importantes. El ítem Energía, Mantenimiento y Repuestos, Depreciación de Equipos, Personal calificado nacional y extranjero, Asesorías tecnológicas y en algunos casos los costos financieros a los que se debe concurrir dadas las inversiones más altas, están definitivamente muy por encima de los mismos ítems que requieren los sistemas SFAD. Es obvio que sea así dado el énfasis tecnológico en los diseños como se ha explicitado. Los demás costos, como son las certificaciones, seguros, alimentos y otros, son bastante similares.

Pero los sistemas SFAD tienen un costo adicional que aún no se ha mencionado y que es relevante. Se trata del trasporte de smolts desde los lugares donde estas instalaciones son posibles con las ventajas señaladas, hasta los centros de cultivo marinos.

En efecto se ha detectado que las aguas con las propiedades físicas (Caudal, transparencia y temperatura), así como bioquímicas (Perfil, químico y ausencia de sustancias orgánicas), están preferentemente en regiones más al norte de las X y XI regiones; los lugares más aptos está en regiones como la Metropolitana, VI, VII y VIII, de modo que a medida que se está más al sur de esas regiones, las aguas prospectadas ofrecen menores ventajas (Menor temperatura, aguas blandas etc.). Asimismo los declives o pendientes que se necesitan para que los sistemas SFAD funcionen se hacen cada vez menores en la medida que se avanza al sur, tornando a los pocos lugares elegibles en la X y XI región en casi únicos.

Por esta consideración se debe incluir en los costos operacionales de SFAD su trasporte, que hoy día es una tarea bastante especializada para asegurar la óptima calidad del smolt que se entregue en el sur.

Finalmente, unas palabras acerca del valor residual de estos proyectos. ¿Qué valor tendrán las instalaciones electro mecánicas, y sus sistemas de control para movilizar, tratar y oxigenar 1,5 m3 al cabo de diez años de uso? En cambio; ¿Qué valor tendrá un derecho de aprovechamiento de aguas por 2 m3?

Conclusiones

El inversionista salmonero deberá juzgar si vale la pena estudiar la posibilidad de diseños basados en ventajas comparativas del país, versus tecnologías externas. Deberá averiguar si hay suficiente información como para tomar el camino de la recirculación o los sistemas SFAD u otros sistemas de flujo abierto, poco desarrollados. Todo esto implica que el modelo de negocio, donde los operadores tomaban decisiones de modo rápido y sin tantos estudios profesionales, para hacer o contratar pisciculturas, esta llegando a su fin.

La combinación de los sistemas propuestos seguramente será el resultado que el mercado aclarará en pocos años más. En cualquier caso parece evidente que los ganadores serán los que inviertan menos, gasten menos en la operación y obtengan las mismas producciones. Los ganadores tendrán un valor en su inversión en agua que con el tiempo sólo se acrecentará. Pero por sobre todo serán aquellos cuya tecnología no sea replicable por sus competidores en el extranjero y que jueguen al largo plazo.

Comentario Final

Ex profeso, se ha omitido hasta donde es razonable, para los efectos de este trabajo, la mención de cifras exactas de valores de costo, salvo cifras que no ofrezcan mucha discusión. El sentido del presente trabajo es contribuir al debate con una propuesta (SFAD), que existe en el país, que ha operado por muchos años. El sistema de suministro de aguas de la ex piscicultura de Aguas Claras en Malloco, R.M. fue construido en 1928, es decir con una técnica constructiva muy deficiente y a muy poca profundidad; sin embargo el drenaje ha operado sin mayores contratiempos, ni mantenciones, ni bajas importantes de caudal, hasta la fecha.

Santiago, Septiembre de 2010

International Fishmeal and Fish Oil Organisation

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21 September 2010

To:
www.worldwildlife.org/aquadialogues
www.ascworldwide.org

IFFO's comments on the Draft Salmon Aquaculture Dialogue standard

EXECUTIVE SUMMARY

1. The proposed standards are idealistic/aspirational, as opposed to good practice and are likely to result in a very limited uptake with the initiative failing to achieve its aims.

2. The Forage Fish Dependency Ratios (FFDR) calculations give a misleading yield picture and the standards fail to use FFDR to incentivise more responsible practice. In any event when calculating this ratio, fishmeal and fish oil from sustainably managed fisheries should be omitted from the calculation.

3. Environmental requirements for land-based raw materials are much weaker than those for marine-based raw materials. Sustainable marine raw materials could be forced out of formulations by much less environmentally benign land-based ingredients.

4. The need to choose between lowering dietary fish oil inclusion, or producing a healthy product high in long-chain omega-3 fatty acids will further limit uptake.

5. While recognising the IFFO Global Standard for Responsible Supply (IFFO-RS) for maintaining traceability, you recognise only Fish Source as a measure of responsible fisheries management despite IFFO-RS requiring independent third-party auditing of both the factory and the raw material, to ensure compliance with the FAO Code of Conduct for Responsible Fisheries. Hence introducing unnecessary complexity (and cost) into the value chain, particularly at the feed mills, thereby reducing likely uptake of the ASC standard.

6. It is important that there is consistency across the different species dialogues on what are acceptable marine ingredients and that the same Fish Source score is used for all. Otherwise the standards could risk encouraging the development of only large scale feed fisheries (with the resources to conduct extensive fisheries science) and large scale aquaculture enterprises (with the resources to source distant raw materials).

7. The use of by-products from species categorised as vulnerable by the IUCN Red List should not automatically result in exclusion from use as fishmeal or fish oil, but should require further assessment; otherwise anomalies will occur eg Atlantic cod.

8. Overall, we are concerned that the standards resulting from the SAD, as they stand today, will not prove to be a useful tool in bringing about measurable and achievable improvement.

GENERAL

Our first group of comments are general ones relating to the whole purpose and intention of the dialogues and are points that we have made at various opportunities during the process.

It has always been our view that the finished dialogue standards should identify good practice as demonstrated by today's better operators, and thereby discourage bad practice. Significant uptake of an ASC scheme based on this approach would bring about the greatest operational change on-farm by providing producers with a practicable target of eliminating poor practices and replacing them with good practices.

We are therefore concerned that the proposed standard is a 'platinum' one and represents 'aspirational practice', as opposed to 'good practice'. This aspirational practice has been defined by a group, some of whom are opposed to aquaculture, even when practised under the strictest controls. We fear that the resulting standards are going to prove daunting to producers and hence result in a very limited uptake. This will be particularly true in the feed area for some species of farmed fish, such as salmonids, where we believe they will be extremely difficult to adopt in practice, – partly due to value chain logistics, as referred to in the penultimate paragraph of this submission. As a consequence the resulting changes on-farm will also be very limited. We therefore feel that this Dialogue was a unique opportunity that will have been wasted, unless further major revisions of the standards take place

SPECIFIC

Our specific concerns relating to the SAD standards are as follows:

Section 4.1. We still maintain that the methods used for calculating the Forage Fish Dependency Ratios are cumbersome and do not give a true picture of the yield of marine products from whole feed fish (see Jackson in Aquaculture Europe Oct 2009). Also the levels at which the ratios are being set will not necessarily drive the most environmentally sound practices since the environmental requirements for land-based raw materials are much weaker, probably because of the focus of the participating environmental groups on the marine environment, rather than a holistic approach. Therefore sustainable marine raw materials (as defined by the MSC) could be forced out of formulations by much less environmentally benign land-based ingredients.

We are also concerned that the salmon value chain is going to have to choose between achieving the ASC standard by lowering the fish oil inclusion, or producing a healthy product high in long-chain omega 3 fatty acids. Why is a healthy salmon product, fed on a diet including fish oil derived from a sustainable fishery, considered "unacceptable"? In forcing retailers to choose between healthy aquaculture products and ASC approved aquaculture products, uptake of the programme will be further limited, since a large measure of the attraction of salmon to consumers (and authorities on healthy diets) is its health promoting properties.

Section 4.3. We understand the desire of the scheme to recognise fisheries which have been accredited to the sister organisation MSC's standard and we welcome the pragmatic approach of accepting that some interim measures are required until such time that there are sufficient volumes of "sustainable" marine products, as defined by the MSC standard. However, we are disappointed that, while recognising the IFFO Global Standard for Responsible Supply (IFFO-RS) as essential in maintaining traceability, you have insisted on recognising only Fish Source as a measure of responsible fisheries management. We have no objection to the Sustainable Fisheries Partnership and their website Fish Source; indeed we are working with them closely in a number of areas. We would remind you, however, that the IFFO-RS programme requires third party auditing of both the factory and the raw material, to ensure raw material comes from fisheries managed under the FAO Code of Conduct for Responsible Fisheries. But by insisting on a requirement for both full accreditation to IFFO RS as well as achieving a minimum score on Fish Source, you are once again introducing unnecessary complexity (and cost) into the value chain, particularly at the feed mills, thereby reducing the likelihood of significant uptake of the ASC standard.

Section 4.3.4 We are in agreement that, whilst in general the use of fisheries by-products for the production of fishmeal and fish oil is to be encouraged, care has to be taken to exclude certain fragile stocks. This clause states that no by-products from species that are categorised as vulnerable, endangered, or critically endangered according to the IUCN Red List of Threatened Species should be used for fishmeal and fish oil production. The IFFO-RS standard also makes use of the IUCN Red List in its own by-products module; however, the exclusion in the SAD standards of all by-products categorised as vulnerable could produce some strange anomalies. For instance the inclusion on the IUCN red list of Atlantic Cod as a vulnerable stock is at odds with the fact that there are a number of discrete Atlantic Cod fisheries which have obtained MSC certification. We would therefore suggest that a listing of vulnerable does not automatically result in exclusion, but that in such a case a further assessment would be required before the by-product in question could be utilised for the production of fishmeal and fish oil.

We continue to be committed to working with all stakeholders to achieve continuous improvement in both the marine ingredients industry and the aquaculture industry, and we remain open to any form of constructive collaboration. However, we are concerned that the standards resulting from the SAD, as they stand today, will not prove to be a useful tool in bringing about measurable and achievable improvement.

We will be pleased to clarify the above comments should you so wish.

Yours sincerely

Jonathan Shepherd
Director General

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

*Name: Anne Hilde Midttveit/ Eva Haugen / Kari Lenvik
*Organization/Company: Lerøy Seafood Group ASA / SalMar ASA and Sinkaberg Hansen AS, representing 254. 000 tons of the Norwegian production of salmon.
*E-mail address:

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1	National is ok, but it is a great challenge to keep track of and to comply with all international regulations as the criterion requires.	The word international must be removed.
	1.1.2	National is ok, but it is a great challenge to keep track of and to document compliance with tax regulations international as the indicator requires.	The word international must be removed.
	1.1.3	National is ok, but it is a great challenge to keep track of and to document compliance with all international labor laws and regulations	The word international must be removed.
	1.1.5	This is it a type of documentation that one not expect to find at the farming sites.	The indicator must be audited at the main office/customer contracts
Principle 2	2.1.1	Important that both methods can be accepted.	Should take in as well "Measured at the peak production during each production cycle".
	2.5.3	Legal hunting should be allowed. This is	Number of marine mammals and birds killed

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		particularly important in connection with the need to protect the fish for animal welfare reasons, but also in the case of a population that, according to authorities' assessments can or should be regulated in an area.	through the use of lethal action[8]. Exceptions can be made if this is necessary for animal welfare reasons, or if there is a population that, according to government regulations can or should be regulated in an area.
Principle 3	3.1.1	Principle 3 concerning diseases is in general out of the scope of this standard as economical sustainability is nor included in the scope (yet) In the "Rationale" there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and indicators should specifically address that risk. As we know the situation today, it is mainly salmon lice that will be of concern in relation to wild fish, and therefore should be the disease of concern in area-based scheme. We do not have sufficient knowledge about environmental impacts of other diseases to day, and these should not be included. We therefore suggest changing the first sentence. For comments on Appendix II, please see our general comments.	Participation in an area-based scheme for managing sea lice.
	3.1.2	Principle 3 concerning diseases in general is out of the scope of this standard as economical sustainability is nor included in	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		the scope (yet) In the ”Rationale” there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and indicators should specifically address that risk. The indicator will require extensive external resources and will be very difficult for small farmers to achieve. For comments on Appendix II, please see our general comments.	
	3.1.3	Farmers meeting the other parts of the standard will generally constitute a very small risk in relation to this point. We also find it impossible to define an acceptable and science based distance to wild salmon that may be used here. For comments on Appendix II, please see our general comments. and our comments to indicator 3.1.7	The indicator must be removed.
	3.1.4	It is in principle difficult to relate to other or global maximum allowed lice levels than those specified by local or national regulations, and at the same time be sure that both the impact on wild fish and resistance problems are adequately addressed in the various areas. The intentions of this paragraph are met through	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		compliance with regulations and more of the other points in the standard, including the requirement for participation in an area based scheme.	
	3.1.5	The last part of this indicator will be very extensive and have little practical relevance to follow-up for the farming site. Timing of out migration will in practice not change much from year to year. We suggest changing the indicator.	Timing of wild salmonid outmigration and juvenile periods is established.
	3.1.6	The requirement of this paragraph is too comprehensive for a site. R & D activity must be maintained in another way than through this standard.	The indicator must be removed.
	3.1.7	In general the adult female lice are the problem, because they produce larvae that can infect migrating smolts. The requirement should therefore include only adult female lice. It is also important that the requirement for sea lice level not being too low all year round, to avoid many treatments that may give resistance. The requirement should not be as strictly all through the year. It is important to work for switching the strategy from mainly using chemicals to mainly using biological control methods such as the wrasse (labridae). Also regarding optimal use of wrasse, it is important that the standard focuses on adult female lice and not on the total number of	Maximum 0,5 mature female sea lice per fish during outmigration of wild juvenils. Maximum 1 mature female sea lice per fish the rest of the year.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		lice. In autumn and winter, the adult female lice level should be higher to ensure the efficiency of wrasse and to avoid the standard driving forward resistance. We therefore propose to change the standard.	
	3.1.8	Level will vary from country to country. We can not have a global standard here. We lack knowledge of acceptable numbers and the effect of various levels on different recipients.	The indicator must be removed.
	3.1.9	This indicator will be impossible to audit. Conformance far back in time will be difficult to verify and very time consuming to audit.	The indicator must be removed.
	3.2.1	Based on existing knowledge, we agree with the part of the steering committee who felt that it should focus more on the "establishment" than the "impact", and therefore proposes to modify paragraph A) of the indicator.	A) There is no evidence of establishment
	3.4.2	The point is incomplete because it does not establish a period of time for which it shall apply. How to deal with this if the standard would include an entire generation and an audit is carried out before harvesting? For how long will possibly a license be revoked after an escape? Regarding note 16, the second sentence may be misinterpreted. We suggest that this sentence is removed. The first sentence is acceptable and should	The indicator must be defined in more detail. Note 16 must be changed to: The farmer must demonstrate that there was no reasonable way to predict the events that caused the episode.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		be kept.	
Principle 4			
	4.7.1	The importance of Cu as having environmentally harmful effects is reduced in recent years. In 2009, Cu in Norway was taken out of the government's list of priority substances with environmentally harmful effects, partly because one has found that Cu does not accumulate in the food chain (ref: KLIF). The toxicity of Cu in seawater is low. Although the continuous ongoing research to find satisfactory alternatives to the use of Cu in antifouling, the farmers still have to use CU as an antifouling agent in some areas. This is done to achieve clean nets, good fish welfare, less risk of disease and optimum conditions when using wrasse in the fight against lice. It is also important to ensure clean nets to reduce the risk of escapes. We therefore propose to remove this indicator since keeping it could lead to far greater negative environmental effects than flushing of Cu-impregnated nets with high pressure.	The indicator must be removed.
	4.7.3	A study of the bottom sediment of the fjords and along the coast at various places in Norway from 1997, showed highly variable values of Cu concentration in the sediment. The reason is probably that there are many other activities at or by the sea that has	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		given or gives emission of Cu (shipyards, marinas, mining). In addition, there are high levels of Cu in the soil in many areas. Because Cu also is an essential mineral in nutrition context, some will also come through feed. With the inquiry referred to and the knowledge of risks related to Cu, the proposed limit for Cu seems to be very low.	
	4.7.5	It should be sufficient that the anti fouling agent is approved in the country where it is used.	Evidence that the type of biocides used in net antifouling are approved according to national legislation
Principle 5	5.1.2	Experience in farming shows that it is sufficient with visits from fish health personnel 6 times a year at a site unless special circumstances at the site makes it necessary that such personnel will be summoned extra. Although note 35 protects Norwegian conditions, this should also appear in the text.	Site visits by a designated veterinarian or equivalent[35] at least every other month.
	5.1.5	We propose to change the indicator. We also propose to change the standard to "Yes".	Indicator: The company must have a system to remove dead fish as a routine, and to deal with dead fish in a responsible manner. Standard: Yes
	5.1.6	Autopsies of 100% of all dead fish are not possible in practice, but the company must have a system for autopsy of fish in all occurrences of increased mortality.	Dead fish must be registered and autopsy be carried out in all cases with increased mortality.
	5.1.7	It should be clear that the entire locality is concerned, and not individual cages. Single cages will under special circumstances have increased mortality, and may then exclude the entire site. In order to	Maximum mortality rate of farmed fish on a site during the production cycles.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		certify the time frame can not exceed one production cycle.	
	5.1.8	It should be clear that the entire locality is concerned, and not individual cages. In order to certify, the time frame can not be longer than one production cycle.	Maximum unexplained mortality rate on a site during the production cycles.
	5.2.2	The purpose with this indicator is covered by 5.2.1.	The indicator must be removed.
	5.3.1	This indicator is impossible in practice. National regulations should be followed.	The indicator must be removed.
	5.4.3	Harvesting will not always be possible or advisable. We propose to change the indicator.	When bio-assay tests determine resistance is forming, use of an alternative, permitted treatment
	5.5.3	It must be noted that this requirement should only apply to diseased fish. Furthermore, it must be possible to have exemptions on certain parts of the trip, (determined safe places for open wells/ water exchange) These exemptions must be determined in collaboration with and assessed by certified fish health personnel.	

Draft SAD Standards – Combined Response from;

Leroy Seafood Group ASA
SalMar ASA
Sinkaberg Hansen AS
Scottish Sea Farms Ltd. (SSF)

Combined total production of farmed salmon = 285,000ts which represents 19% of global production.

Introduction

As a group of salmon producers, we consider ourselves amongst the global leaders in sustainable production of farmed salmon and therefore should be capable of achieving compliance with the majority of standards in the SAD draft standards, however there are a number of areas where we have significant problems to comply.

The Scottish and Norwegian Salmon Industries are the most highly regulated in the world, and are controlled by complex and rigorous regulatory regimes.

In Scotland these include;

- SEPA (discharges & environment)
- Marine Scotland(moorings, fish health,environment, predator control, planning)
- SNH(not a regulator, but are consulted on applications).
- Local authorities(planning)

In Norway these include;

- Norwegian Fishery Directorate
- Norwegian Food Safety Authority
- Norwegian Coastal Authority
- Norwegian Labour Inspection
- Climate and Pollution Agency
- Local Authority Regulations.

The group operates under a comprehensive suite of standards which includes for SSF in Scotland, environmental management (ISO 14001), GlobalGAP, Industry COGP, and Freedom Food , and for Norway includes GlobalGAP and customer standards, and demonstrates the groups commitment to achieving the highest standards of sustainable production.

SAD identify seven areas of key potential negative impact, feed sustainability, escapes, nutrient loading and carrying capacity, benthic impacts and siting, disease and parasite transfer, chemical inputs and social impacts. We are confident that all these impacts are minimized or eliminated by our operational management, government regulation and industry standards.

Leroy and SSF have participated in the Dialogue Meetings and consistently voiced opinions on the topics of the day and sought to maintain a consistent approach to issues which were raised. We have, since publication, fully read the draft standards and do not believe they address our concerns on some substantive issues. We wish through this consultation to be as constructive as possible, but have to state at this point that there are a number of significant policies proposed which we believe present serious difficulties.(4 for Scotland and 3 for Norway). In other words, should these proposals be adopted, the Scottish and Norwegian farmed salmon industries would be unable to participate in your scheme.

Within the draft SAD standard, there are a number of proposals that contravene both national and European legislation, which directly impact on the production of farmed salmon in Scotland and Norway. The industries in Scotland and Norway will operate within the law and therefore, on these specific points, the draft standard will have to be amended if producers are to remain legally compliant.

The draft SAD does not directly address salmon welfare, which is a serious weakness when considering standards for controlling environmental impacts, since poor welfare could lead to disease and consequent impact on wild populations.

COMMENTS ON THE DRAFT CRITERIA FOR FARMED SALMON ON BEHALF OF THE LOCH LOMOND ANGLING IMPROVEMENT ASSOCIATION

September 2010

The LLAIA welcomes the opportunity to comment on the final draft criteria produced by the Salmon Aquaculture Dialogue.

GENERAL COMMENTS

We believe that the setting of a Standard for sustainable salmon farming offers the opportunity to achieve industry buy-in to continually improved performance. We have noted with some dismay that governments have tended to regard economic sustainability as a greater priority than environmental sustainability – the Standard offers an opportunity to bring better balance to this.

However, it is **essential** that the bar is set high enough to offer a challenge to operators, even those who appear to be leading the field in aiming for sustainable practice; otherwise, it will not succeed in its avowed aim of driving up standards. In particular, we are keen to see the Standard use all opportunities to make closed containment of farmed salmon an attractive option. From the Scottish perspective, the draft Standard's proposal that smolts raised in open net pens in wild salmonid systems are ineligible for certification is a very welcome first move in this direction. However, there may well be further scope for including further incentives to move to closed systems within the Criteria relating to benthic impact.

It is also crucial that the drive to improved standards is an ongoing process, rather than a static one. Our comments are based on the premise that the intention is to review the Standard regularly on a 2 – 3 year basis, so that improvements in salmon husbandry, and lessons learned from increased monitoring, can be incorporated in succeeding versions. We recommend that the Standard makes more specific reference to the inbuilt ethos of continuous improvement.

We also believe that area management can only proceed successfully on the basis of 5- or 10-year plans, since it is very difficult to turn situations around quickly in the natural environment. A Standard which is unrealistic risks losing the benefits which a pragmatic and achievable, though demanding, Standard could undoubtedly bring.

We also make a general observation that there are certain points within the Criteria where the term 'research' is used rather loosely, and a better term would be 'monitoring'. Research provides the tools to monitor and assess.

We note that it is suggested that areas of wild salmonids are defined as areas that are within a certain distance of a wild salmonid migration route (or for coastal trout, an equivalent), and that the appropriate distance is still under discussion. Since it is our understanding that the Standard is designed (a) to apply in all countries where salmon is farmed commercially and (b) to offer protection to populations of native salmonids, then we would support the definition offered, although it is based on experience with Pacific salmon populations.

PRINCIPLE 5

We shall restrict our comments on Principle 5 to the following:

We support the criteria suggested for Principle 5, and the only detailed comment we would offer is on 5.5.3, where we would suggest that 100% of fish should be transported to slaughter facilities in a closed wellboat or a wellboat with discharge treatment and disinfection, where such transport involves moving fish between one Management Area and another, or across Management Areas.

We support the solution offered in the rationale for 5.5.2 – namely that the Scottish system of sampling within a dispersal area is adopted.

PRINCIPLE 3

We note that the primary aim of Principle 3, in combination with Principle 5, is to ensure salmon farms do not harm the health of wild fish populations, and are fully supportive of this aim. However, although the Criteria cover impacts of sea lice in some detail, other aspects of impacts on the health of wild salmonids – for example, via the amplification of pathogens – seem to be underplayed. We fully realise that baseline data on incidence of disease (particularly incidence of disease in non-pathogenic form) among wild populations is patchy, and possibly lacking in consistency. Monitoring of the health status of wild salmonids is expensive, which accounts for the lack of consistent baseline data. The Standard does not appear to fully address the question of how far salmon farm operators should be asked to fund such monitoring.

We would suggest that monitoring should focus on the best available sentinel species – in the case of the UK, Ireland, this would be sea trout, and in the case of Norway, sea trout and Arctic char, since they remain in contact with the inshore marine environment for a longer period than salmon.

Criterion 3.1 Introduced or amplified parasites and pathogens

3.1.1 Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport.

Comment: It is crucial that there is a tighter definition of 'effective'. The draft criteria invite comment on the best way to delineate a management area; we believe that it must consist of the biological area within which viable stages of sea lice larvae originating from within salmon farm cages can be transported and dispersed.

It would appear (from Appendix II) that the schemes envisaged relate to area-based management schemes involving only salmon farm operators, similar to the 'farm management agreements' in Scotland. The experience in Scotland is that Area Management Groups, which involve both salmon farm operators and representatives of wild fish interests, do not tend to operate in tandem with Farm Management Agreements. In practice, this has been an 'either/or' situation. It is important that, as well as participating in an intra-industry area based scheme, farms seeking accreditation should participate in AMAs on the multi-stakeholder model.

Similarly, 'open communication' must prevail not only among salmon farm operators, but on a wider, multi-stakeholder basis?

The key to successful area-based management is that, for a particular area of coastal waters, salmon must be farmed on a single-generation basis, with an inbuilt requirement for synchronised lice treatment, and synchronised fallowing. The optimum fallow period will vary from one area to another; there is no 'magic number'. A sensible requirement can only be that the entire management area is fallowed at a minimum for sufficient time to break the sea lice cycle.

3.1.2 An assessment of key regional cumulative impacts of the farm and its neighbours, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.

Comment: How would one define "appropriate" infection pressure on wild populations? We are unclear as to what this means, since sea lice are widely dispersed in the natural marine environment. A better measure would be to look at sea trout as an indicator – measurements could include: percentage of fish which return prematurely to fresh water and a profile of lice burdens on such fish – both in terms of number and developmental stage; condition & growth rate of fish. The crux of the problem for wild salmonids is the situation where juvenile fish encounter large numbers of larval lice as soon as they enter the sea. The significant measurement is thus the level of juvenile lice present in areas adjacent to where juvenile fish enter the sea. This can then be linked to numbers of adult female lice on the farm. These measurements should be the basis for the liaison with NGOs mentioned in 3.1.3

3.1.3 A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.
Comment: Such a commitment must be demonstrated by having historical evidence of such collaboration, over a period of at least one production-cycle, and the data should be publicly available, in the interests of transparency and successful multi-stakeholder co-operation.

We fully support the concept of co-operation, but suggest that this should relate to a requirement for monitoring, as opposed to research. Research could establish the parameters of what should be monitored. Since monitoring is likely to be less costly than research, salmon farming companies may be more willing to sign up to this.

We note that in the rationale for these criteria, the observation is made that: "The SAD expects that researchers will need to become more consistent in their methodology for testing for sea lice in the wild." This also implies transparency in regard to data-sharing.

We would suggest that, once such monitoring is established, it should be used to set targets in terms of lice pressure caused by farms, and that operators should have to hit these targets according to a mutually-accepted pattern, such as in three years out of five, or six years out of ten. This would allow operators to learn from experience, and to aim for an improving trend.

3.1.4 Maximum average sea lice levels on all farms in the area-based management scheme.

Comment: We support this, in the context of our comments on 3.1.7

3.1.5 Timing of wild salmonid outmigration and juvenile periods is well established and monitored.

Comment: For such criteria, evidence of such monitoring should be a precondition for entering the accreditation process, not a criterion for certification. (this appears to be covered in 3.1.9)

3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)

Comment : We do not agree with the suggestion that lice levels on wild juveniles should be measured during outmigration, for the following reasons: (a) it will be exceptionally difficult to catch a sufficient number of wild fish at this stage, particularly in the case of salmon (b) there is no scientific basis for interpreting such numbers. We prefer the suggestion which we made above: the use of an indicator species such as sea trout, and monitoring according to a set protocol, for example sampling of prematurely-returning fish.

3.1.7 Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids). Suggested levels: Maximum 0.5 mature sea lice per fish or 3 total sea lice.

Comment: The target must clearly be zero for the spring months and trigger levels sufficient to ensure that progress is made towards achieving this target at least 3 years out of every 5. The absolute maximum trigger level should be 0.5 but levels of closer to 0.2 should, where possible, be agreed locally. We suggest that the standard should allow for the target being met during three years out of five, in order to be achievable. It is essential that there is a link between the critical period for wild salmonids and the rest of the year – during the latter

period, levels of 1 or 2 adult female lice per farmed fish may be quite acceptable, in certain areas.

We are convinced that there is a requirement for clear targets in the relevant local geographic zone, and that these targets will vary from one zone to another, even within a single national jurisdiction. It is important to find a formula which is applicable to experience in areas of Atlantic salmon and Pacific salmon, since the size of migrating smolts differs so greatly. The only way to do this is to incorporate a local/regional dimension.

In order to cater for the need to look at optimised trigger levels locally, we suggest that the following wording could be added to any trigger level cited: "or a locally/regionally -agreed maximum, which ever is the lower." Although not all such locally/regionally-agreed trigger levels will have the force of law, it is our perception that they are usually incorporated in some sort of Code of Practice or national Pest Control Strategy.

3.1.8 In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.
Comment: we are not convinced that there should be a separate figure for trout, since Atlantic salmon and sea trout will tend to occur in the same rivers and inshore marine environments. We believe that the trigger level should be based on the requirements of sea trout, or other locally-relevant indicator species, since these levels will also offer maximum protection to wild salmon.

3.1.9 Period of demonstrated compliance with standards in 3.1 prior to initial certification.
Comment: We suggest AT LEAST one full production-cycle, since lice impacts will not be evident until second year of production. Possibly much can be learned from the compliance-demonstration period required for organic certification.

***We note that the rationale for criteria up to 3.1.9 includes the following:
"The impact assessment intends to ensure a credible third party has analyzed the key cumulative impacts of the farm and its neighbours." We suggest that in this, and the following, paragraph the words 'and impartial' are added to 'credible' .
We agree with the components of the EIA as described in Appendix III.***

The SC is considering how to set global maximum sea lice levels that are meaningful in different regions and jurisdictions. The following concepts are guiding the deliberation.

§ There is a trade-off between pressing for very low sea lice levels and the danger of over-treatment and development of resistance
We believe that the approach to trigger levels outlined in our comment on 3.1.7 should help address this dilemma.

§ Juvenile outmigration is a particularly sensitive moment for wild salmon populations, and sea lice levels during that period should reflect a precautionary low level
Our comment on 3.1.7 addresses this point, and the next.
§ Coastal trout are susceptible to sea lice because they potentially remain in contact with sea lice from farms throughout the year (***we would suggest amending this to read ".. potentially remain in contact with sea lice from farms for an extended period")***
§ The transmission of sea lice from farmed fish to wild populations, and visa versa, is still poorly understood
The emphasis which the criteria place on monitoring and data-sharing should address this issue.
§ Maximum farm level limits should be an average of sea lice levels on all farms in the area-based plan, since that is the infection pressure that wild populations will experience
We suggest that management areas are delineated to take into account the area over which viable stages of lice larvae originating within farm cages can be dispersed.

Given these concepts, the SC is considering the following, as detailed in the indicators above:

§ A global sea lice level for all farms seeking certification that may be as low as 0.5 motile female sea lice per fish
This does not tally with the suggestion made under 3.1.7? Is the intention here to refer to 0.5 adult (as opposed to motile) female lice per fish?

§ A sea lice level during juvenile outmigration that is 0.5 motile female sea lice or lower
See our comments on 3.1.7

§ A feedback loop from testing of sea lice on wild juveniles to ensure the farm level limits are appropriate

See our comments on use of appropriate indicator species, and protocols for monitoring impacts on these

§ A year-round sea lice level for areas of coastal trout that is yet to be determined

See comment on 3.1.7

We support the suggestion of prohibiting the certification of farms sited in areas that pose the greatest risk to wild salmonids, such as areas where juveniles are most vulnerable, or areas in proximity to stocks of special concern (on national at risk lists or the IUCN Red List of Threatened Species).

EU Directives, such as the Fish Health Directive, Natura 2000, the Dangerous Substances Directive, various Directives relating to health of shellfish etc, will also contain useful guidance as to at-risk sites.

3.1.9 The SC seeks input on the idea of a demonstration period to ensure that a farm is performing and fully implementing area-based management, wild juvenile monitoring and other aspects of 3.1 prior to certification. As is the case with all standards in this document, the standards in 3.1 require demonstrated compliance with the performance measures on an annual basis. The SC is considering for what length of time prior to certification the farm would need to comply with these standards. One option would be an entire production cycle.

We support this option.

Criterion 3.2 Introduction of non-native species

We feel that, in the European context, any provision for farming on non-native species will encounter huge problems in term of Natura 2000. This criterion needs to make reference to a requirement for any non-native species to be sterile.

Although the rationale for this criterion makes reference to the FAO guideline that permits the culture of non-native species only when they pose an acceptable level of risk to biodiversity, we feel that here is NO 'acceptable' level of risk in this context.

We support the Standard's stance on the use of cleaner fish for sea lice control. We also believe that there is scope within a Standard focused on sustainable practice to ensure that cleaner fish are not harvested from unmonitored or unsustainably-exploited native species of wrasse for use in salmon cages, particularly in view of the fact that it is now possible to farm disease free wrasse for this purpose.

Criterion 3.3 Introduction of transgenic species
We support the ban on use of transgenic fish under this standard because of concerns about their unknown impact on wild populations.

Criterion 3.4 Escapes
We are concerned that the suggested criteria in regard to permissible levels of escapes focus on prevention of large-scale escape incidents. Science has now shown very clearly the potential risk from wild / farmed interbreeding – and it is clear that regular small-scale escapes within the same salmonid system may present a larger risk that intermittent large-scale escapes. We therefore object to the arbitrary level of '200 or more fish' cited in 3.4.2. We are also aware that recommendations from the on going, EU funded, Prevent Escape Project may provide a more quantitative approach to measuring losses both in terms of direct escapes and low grade losses over time due to grading, fish transfer, smolt stocking etc.

It is now up to the regulators and wild fish interests to carry out an objective assessment of wild salmon stocks to quantify where and when these impacts have occurred. The stock-specific genetic markers from the SALSEA Merge project will greatly facilitate such a survey. This will help inform revisions of this part of the Standard.

We also believe that the definition of escape incidents 'out of the farm's control' leaves loopholes for bad practice. Examination of the causes to which escapes from Scottish fish farms over the past seven years are attributed shows that, with the exception of freak weather events,

everything else SHOULD be 'within the farm's control', with careful attention to siting, predator management, staff training, correct specification, maintenance and deployment of equipment, etc.

It is important that the Standard does not lose sight of the need to keep escapes at a low level for purposes of lice and disease control, in addition to risks of genetic introgression.

The SC is considering adding an additional standard to further address the issue interbreeding and welcomes input on whether such a standard is needed or what it might look like.

We would make the observation that relatively little work has been done in the field on the extent to which genetic introgression has taken place. It is important that there is sufficiently strong impetus for ongoing monitoring of this, so that the Standard's provisions on escape prevention could be tightened up during successive reviews, if necessary.

SMOLT PRODUCTION FACILITIES

We wholeheartedly support the proposal that the Standard allow only closed or semi-closed smolt systems to be certified in areas of wild salmonids. Our opposition to certification of fish raised in smolt pens within salmonid systems is based on:

- Risk of dilution of the native gene-pool by hybridisation with escaped fish; recent work has shown that precocious parr play a very large role in successful spawnings. This means that there is a high risk that farm escapees could hybridise with native fish without ever having left fresh water. [1]
- The risk that availability of uneaten feed from the pens will disrupt the migratory behaviour of native anadromous fish
- The risk of spread of disease and freshwater parasites

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[1] Comparison, using minisatellite DNA profiling, of secondary male contribution in the fertilisation of wild and ranched Atlantic salmon (*Salmo salar*) ova. C. E. Thompson, W. R. Poole, M. A. Matthews, and A. Ferguson.
Can. J. Fish. Aquat. Sci. 55(9): 2011–2018 (1998) | doi:10.1139/cjfas-55-9-2011 | © 1998 NRC Canada

We have considered whether it would be reasonable to include a 'phase-in' period for farms which use smolts reared on open net pens in salmonid systems. However, since certification will be offered on a farm-specific basis, and since over 50% of smolts raised in Scotland are currently raised within closed/semi-closed systems[2], we do not believe that it is too onerous to ban all net-pen-raised smolts from the start.

Contact person: Michael Brady
Email:
Mobile: 00447703118033

[2] Scottish Fish Farms Annual Production Survey statistics 2008 (most recent available): the Scottish Government

	No of sites	Capacity (000s cubic metres)	Type of system	No of smolts produced (ooos)
Cages	53	385	Cages	17,065
Tanks & raceways	77	64	All others	19,385

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Dawn Purchase
*Organization/Company: Marine Conservation Society, UK.
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	I feel it is unnecessary to have a standard extend to this level, I suggest a simple list of countries that the producer cannot export to, with a list of the reasons why, would suffice.	
	2	Please refer to the use of SEPA' s AUTODEPOMOD modeling system to define AZE distance.	
Principle 2	2. 1. 2	No need to be prescriptive here, I would suggest the standards specifies that a Marine Biotic Index be carried out to evaluate and monitor species diversity and a list of required indicator scores relating to each of the tests be given.	
	2.4.1		Farms should only operate or develop in areas that have been fully mapped, as part of a wider planning process, to identify both areas of sensitive habitat and sensitive species. The farms should then demonstrate that their operations have no adverse impact on either

			habitat or species. Please see Delivering Planning Reform document and reference to SNH nature sensitivity maps within it. http://www.scotland.gov.uk/Resource/Doc/304025/0095384.pdf
	2.5.1	What about the use of ADD's that do not adversely affect cetaceans? These are being developed in Scotland. It seems restrictive and counter productive to ban the use of them completely when the concern regarding their use is limited to cetacean disruption and seal habituation, both of which will be addressed with these new devices.	
	2.5.3	See Marine (Scotland) Act 2010 for guidance here.	
	2.6.1	Good idea, impossible to implement. What added value will it bring to the standard that is not covered elsewhere?	
Principle 3	3.1	I would like to see this standard encourage the use of non-chemical based sea lice control measures such as wrasse, bio-emitters, strategic siting and emerging technologies. I am not sure how this can be incorporated into the standard – perhaps something included stating that sea lice control should not lead to increased chemical resistance and loss of efficacy.	
	3.4	Key aspect missing here is staff training, a large percentage of escapes occur due to human error. It is essential that staff are trained in escape prevention and post-escape remediation.	
	3.4.1. & 3.4.2	There is a loophole here and I suggest that these are combined a reworded. What about a loss of up to 199 fish, which can happen on a regular basis and are due to know cause of escape? These kind of escapes are permitted as the standard current stands,	

Principle 4	4.3.1	You are promoting the use of MSC certified meal **or** oil here but make no provision for the reminder of the ingredients not required to be MSC certified. In theory a SAD certified producer could have a feed of 90% MSC certified fishmeal but no sustainability requirements for fish oil that we know has a larger wild capture fishery burden. Wording should be fishmeal **and** fish oil not **or.** It is important to add an indicator for the remainder of the fishmeal/fish oil not covered by MSC, such as IFFO RS certified. We would suggest that fishmeal and fish oil come from BOTH MSC certifies fisheries via IFFO RS certified producers as the IFFO RS scheme covers production standards and will be developed to cover pollution and chain of custody.	
	4	MCS would support the exclusion of MSC certified reduction fisheries being excluded from the FFDR calculations only provided that such MSC certified fisheries were assessed using the Low Trophic Assessment methodology currently underdevelopment within the MSC.	
	4.3.2	Whatever score you set for fisheries in relation to Fishsource you will still encounter problems of the practical application of it. How will a fishmeal and fish oil manufacturer segregate wild capture feed fisheries at the production plant based on their Fishsource score? Who will audit it?	
	4.3.2. & 4.3.3	How do these two relate? Does a fishery have to have a sustainability score via Fishsource but be traceable via IFFO RS? IFFO RS will not be able to confirm traceability of a Fishsource scored fisheries unless it is also IFFO certified.	

	4.3.4	How will this be audited? How will by-products from these species be identified, segregated and excluded from the diet. IFFO RS is looking to include this requirement so would suggest that you revert to the IFFO standard to address this issue when it is complete. MCS supports the maximum use of by-products and trimmings. The use of IFFO RS certified trimmings should be encouraged and supported as these will preclude IUCN Critically Endangered and Endangered species and will assess the Vulnerable IUCN listed species before inclusion.	
	4.4.1	The same level of sustainability should be requested for soya and palm oil that is required for marine materials – ISEAL compliant within 5 years. There should also be a requirement to ensure all raw terrestrial ingredients are full traceable.	
	4.7.1	There is no need to use copper based antifoulants on nets, environmental best practice would be to use net cleaning or non-toxic antifoulants.	% of nets that are treated with copper based antifoulants = 0
Principle 5	5.1.5		% of dead fish removed and disposed of **on a daily basis**
	5.1.7	If an event occurs that is outwith the control of the farmer and not caused by the presence of the farm itself then it is unfair to penalise a certified producer for experiencing such an event. (e.g jellyfish and algal bloom caused mortality) Allowances within the standard should be made to accommodate this.	
	5.2.2.	Suggest referring to Scottish Environment Protection Agency (SEPA) guidance manual for fish farms and speaking to Douglas Sinclair at SEPA	
	5.4.3	The SAD needs to act as a driver away from the	

		chemical arms race that is sea lice treatments. As this is written it allows the use of another sea lice treatment chemical when resistance is built up to another. It should be encouraging the development and use of non-chemical sea lice treatments such as strategic siting, bioemitters, cleaner wrasse and pheromone use.	
	5.5.3	How are harvest barges included here?	100%
Principle 6			
Principle 7			
General comments		It is essential that cross cutting issues from each of the dialogues are normalized and checked for consistency. It will only serve to weaken the whole ASC process if the same issues are dealt with in different ways across the whole of the dialogue standard development process.	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3	3.1.1S	If it is decided not to carry this standard forward any subsequent standard should ensure that the punitive measures for non-conformance of this principle are robust and would result in loss of certification of the production cycle.	

Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments		MCS comments in relation to those areas of cross over from on-growing to smolt production apply.	

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Sharon DeDominicis
*Organization/Company: Marine Harvest Canada
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's
e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1- Comply with all applicable international and national laws and local regulations	1.1.1 Presence of documents demonstrating compliance with local and national authorities on land and water use	Acceptable.	
	1.1.2 Presence of documents demonstrating compliance with all tax laws	Acceptable.	
	1.1.3 Presence of documents demonstrating compliance with all labor laws and regulations	Acceptable.	
	1.1.4 Presence of documents demonstrating compliance with regulations and permits concerning water quality impacts	Acceptable.	
	1.1.5 Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months	If would be very difficult to demonstrate compliance with importing regulations in all potential export countries as this is far too open-ended. For example, although Marine Harvest Canada has a lot of laboratory testing documentation to ensure chemo-therapeutant residues are in line with the regulation, the MRLs in other countries (and Canada as well) do change on an ongoing basis. Import regulations do not cover only chemo-therapeutants, and it is very difficult to garner information on every potential country and their different regulations for pesticides,	Ensure the standard's scope does not expand beyond target markets. Consideration needs to be given to what documentation (i.e. laboratory testing reports submitted by Marine Harvest Canada to CFIA) is already generated and what would constitute demonstration of compliance.
1.1.5: The SC is discussing ways to clarify and ensure auditability of 1.1.5. Concerns have been raised that it may be difficult, especially for smaller scale producers, to collect the needed data from their exporters and to prove compliance with all importing regulations in all potential countries. One option may be to focus the standard to relate specifically to importing laws related to chemical use, as that issue is a primary driver of the development of this standard. Another option may be to			

require farms to proactively develop a list of countries where their product cannot be legally exported due to import restrictions. Some SC members are concerned that the standard as written inappropriately extends the scope to include a future value chain over which the producer may not have control.		additives, microbiological regulations, as well. While Marine Harvest Canada sends copies of laboratory testing to the Canadian Food Inspection Agency (for audit purposes, these reports could be used as evidence), MHC is only notified of spot checks on shipments by FDA –product that passes inspection is released, but no report is sent to Marine Harvest Canada.	
Principle 2 - Conserve natural habitat, local biodiversity and ecosystem function		Benthic impacts do not take into account hard bottom sites. On these sites (approx. 25% of all farm sites in BC) grab benthic samples cannot be taken. Recognizing the need to measure impact on hard bottoms, regulations utilizing video footage of benthic fauna have been drafted.	
	2.1.1 Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)2	In Brief – Background reference conditions in BC often naturally exhibit negative redox result; therefore, this standard is unattainable. Suggest that where additional environmental data is collected, it is used to help interpret status of benthos. (TVS, SGS, visual). <u>Background</u> If Marine Harvest Canada had to pick a redox potential threshold, we would want to link it to the legal sulfide threshold. In BC, producers are currently regulated at 6,000 uM sulfide 30 meters from the cage edge, that roughly corresponds with -200 to -300 mV. DFO may go with a stricter threshold of 4,500 uM sulfide 30 meters from the cage array. The corresponding redox potential could be about -200 mV. For certification purposes, MHC would prefer sulfide concentrations, with redox in a supportive role. If we failed a redox threshold, we would like the opportunity to look at the sulfide threshold to determine if it is in fact an environmental issue. In this manner, we would be both compliant with the certification and the legal requirements in BC. If you wanted a third indicator, we would look at TVS; however, that is difficult to solely attribute to the farm, as organics have other sources. It’s important to understand that MHC originally agreed to	**Where government regulation exists, demonstration of adherence to this local regulation should be used as the basis for the indicator and standard.**

		redox as a chemical indicator *with* the proviso that other metrics (free sediment sulfide concentration, possibly total volatile solids) be used in conjunction with redox potential to determine benthic health. Other jurisdictions may be comfortable with redox potential only, MHC is not. The industry is not regulated on redox potential in British Columbia as it is considered to be a less reliable indicator compared to sulfide. Tens of thousands of data points in BC demonstrate that sediment sulfide is a more sensitive indicator of benthic health in BC – although redox potential is a decent confirmatory endpoint. In other words, redox potential is used in BC as a secondary check to confirm sulfide concentrations. Changes in infauna began at 0.0 mV and ca. 200 µM S=. Proliferation of opportunists begins at between 0.0 and –25 mV and total abundance remains high in some samples to at least –200 mV. The variance in the number of taxa begins to increase at 0.0 mV and 200 µM S=, but many samples contain 40 to 50 taxa at redox potentials as low as -160 mV and 1,600 µM. Shannon's index is not necessarily persistently low until redox potentials reach –187 mV. Our sites are commonly < -160mV at cage edge (often <-350 mV). **Reference station samples often display negative redox potentials; consequently, BC would find complying with redox thresholds challenging (i.e. negative redox potential occurs naturally)**.	
	2.1.2 AZTI Marine Biotic Index (AMBI3) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	Marine Harvest Canada doesn't have any experience with AMBI, but notes the following concerns about this and other indices: "…conventional indices tend to be somewhat ad hoc since the process of building such indices is often highly arbitrary. For example, a formula is usually chosen for combining metrics to produce the index. It is hard to quantify how much information is double-counted from metrics providing overlapping information, and thus the weighting scheme used in a typical formula can be viewed as somewhat arbitrarily chosen. Another disadvantage stems from the practice of comparing indices of test sites to so-	**Where government regulation exists, demonstration of adherence to this local regulation should be used as the basis for the indicator and standard.** Revisions to existing indicator need to utilize AMBI and macrofaunal taxa testing as a secondary step only if sediment physiochemistry reveals there is an environmental concern. Sediment chemistry works in countries where the surrogates have been adequately linked to the
	2.1.3 Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1		
Concerns have been raised that access to AMBI analysis and the practicality of implementation of AMBI may vary across producing regions. Because of this, the SC is considering identifying other relevant tests and their equivalent thresholds to ascertain benthic biodiversity impacts. Other tests, such as the Shannon-Weiner index or Hurlbert's index, might be considered and the SC welcomes comments on these or			

other options.	called pristine sites as a control condition, where these control sites are assumed to be absolute and invariant. However, truly pristine sites virtually no longer exist, and the best available site is sometimes substituted, but these \best" sites themselves vary in quality. The conventional indices, however, do not take this variation into account."(Wu M. 2009 "A Latent Health Factor Model for Estimating Estuarine Ecosystem Health") Marine Harvest Canada agrees that traditional biological endpoints, including abundance, species richness, biomass and Shannon's diversity index are generally considered to be the best indicators of biological health. *However, in BC we would want this to be a second tier survey if the sediment chemistry (sulfide/redox/TVS) indicated that something was wrong.* This is due to the following considerations: 1. There is a serious lack of taxonomists in Canada . This affects the time to process samples. It can take up to 6 months to complete taxonomy for a single farm. This is not practicable for certification process, as the farm will be stocked before results are known. It's critical to understand that this professional gap is not currently being addressed in BC. 2. The professional taxonomists in BC state that about 95% of the sample processing time occurs during the sample sorting (picking organisms out of the sediment matrix). This is a necessary part of the sample QA/QC. There is no easy way to simplify and speed up the process. 3. Commonly, the next thought for managers is to explore the indicator taxa concept. Unfortunately, the diversity of BC negates this possibility as the 'sentinel' species would have to be an organism that is always present with or without a salmon farm nearby. It would have to be a sessile taxon that lives for multiple years (through several cycle of fish production). For that to occur we would need to have salmon farms sited in the same ecological	conditions of the benthic fauna. BC has substantial data validating chemical surrogates. Consideration needs to be given for the fact that BC producers pay a waste fee via FAWCR regulations and compensate for habitat –no other salmon farming jurisdiction does this monetary and habitat compensation.

	niche throughout each operating area. The only known organism that is always present at salmon farms in BC is salmon (and humans). 4. The BC coastline is very large, complex and diverse (several biozones) – with relatively little anthropogenic activity. Typical reference station grabs in Canada may contain 90-160 different species. At the net pen edge typical diversity can be 40-80 species. Note that there are hundreds and hundreds of species in the benthos. This is very complex. 5. High diversity means statistical comparisons are very difficult (meaningless) without a large sample size. Add on seasonal variation, variation in production cycles, and variation in fallow time. This means lots of samples, which in turn means more time for the taxonomists, which isn't practical for a certification framework. 6. Because of the complexity of BC, the provincial and federal governments spent millions of dollars and nearly a decade linking chemical surrogates to taxonomic information. This was a conscience decision taken by our scientists and regulators to develop a rapid and scientifically robust methodology to manage the benthos. 7. Shannon's Diversity Index has been linked to farm impacts and chemical surrogates (sulfide, redox, TVS). According to Brooks (2001 – Focused Study) - benthic taxa are extremely sensitive to disturbance, about one half of the taxa disappear at 55µM sulfide. (Consider that reference station sulfide levels are often 100 uM or higher.) From this we can see that sulfide is a very sensitive indicator of disturbance. 8. Farms have a pulse effect on the sea floor. The substrate recovers chemically, then biologically. Biological recovery follows the natural spawning cycles of the organisms. Farm cycles are not synchronized with natural benthic taxa spawning; therefore a site could be ready for recruitment by	

		taxa, but not recruited until the organisms nearby reproduce, each according to their individual life history strategies. 9. What is the biological endpoint we are trying to achieve with the monitoring and the management of the taxa? We know that taxa beneath farms are opportunistic – and that farms recover quickly. Is the concern spatial, temporal or something else?	
	2.2.1 Weekly average percent saturation6 of dissolved oxygen (DO)7 on farm	Agree to monitor but do not agree to a minimum DO threshold as BC is prone to long periods (Aug-Oct) when DO is naturally very low due to upwellings and high ocean nutrients. Marine Harvest Canada could agree to making sure that the DO draw down outside the cages in the general bay areas has not been significantly affected by the operation.	Change to a regional standard based on local conditions. Changes need to ensure 1) DO is monitored on a regular, consistent basis 2) Changes in DO that can be attributed to the operation and that may impact the health of other species/environment are used as a standard for compliance.
	2.2.2 Maximum percentage of weekly samples from 2.2.1 that fall under 1.85 mg/liter DO	Acceptable.	
	2.3.1 Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I subsection 2)	Acceptable. Marine Harvest Canada already has SOPs in place to reject any feed with > 1% fines. Thus, this is part of quality control procedures at feed plants. As well, at Marine Harvest a point of entry to pen analysis is done if feed dust is noticeable.	Data is available from feed manufacturers as product leaves the production plant. On farm site analysis is only undertaken with dust becomes an issue (higher levels of dust are visually apparent). It would be possible to phase in a standard procedure that examines a pooled sample from each delivery.
	2.4.1 Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have	Salmon producing companies need to be compliant with monitoring of critical habitat etc. as identified by the regulatory agencies of each country. Each country has clear siting rules to avoid such habitats/taxa – that need to be respected. How much evidence is required for "clear, substantive documentation" is subjective.	Sensitivity needs to be informed by regulatory science and determined by government regulators.
	2.5.1 Number of days where acoustic deterrent devices were used	Acceptable. Acoustic deterrent devices are not allowed in Canada.	
	2.5.3 Number of marine mammals and birds killed through the use of lethal action	No birds are killed due to lethal action. Entanglement does occur on rare occasion. In all other cases, lethal action is only used as a last resort if all other deterring methods have been used and have failed. Lethal action requires approval by the federal government and the issuance of a permit. If lethal action is required and a permit is issued, Marine Harvest Canada hires third-party contractors –company staff	Indicator and standard need to 1) demonstrate that a farm site consistently applies husbandry practices (clean site, inaccessible feed, appropriate netting etc.) to minimize interaction with and to deter predators and 2) ensure that local laws regarding lethal action are explicitly followed.
The SC is still considering whether there are additional exceptional circumstances that would allow for killing of either marine mammals or birds.			

	2.5.3 Number of marine mammals and birds killed through the use of lethal action	do not participate in the animal's killing or removal. As most farm sites are in remote locations, safety considerations for staff are paramount in considering the necessity of lethal action. For example, if a bear becomes habitualized to a site and constitute a danger to farm staff.	Setting the standard at "0" with no provision for staff safety etc. may be punitive to farm sites which have exemplary records otherwise. Staff endangerment needs to be taken into consideration.
The SC is still considering whether there are additional exceptional circumstances that would allow for killing of either marine mammals or birds.			
	2.6.1 Presence or absence of selected sensitive or sentinel species	A practical option is to monitor the benthos in nearby reference stations to track potential far-field changes. Sentinel species would need to be identified for each ecological niche. This is very ambitious and requires input from a team of ecological experts. If this will be required, recommend adding it in to future versions of the certification as more information becomes available.	Requires regional definition as research is not currently available which would allow for meaningful determination of sentinel species and what would constitute a negative impact on this(ese) species. Till this research is available, this indicator and standard needs to be removed from the standards.
In practice, the SC has found it very challenging to develop standards that accomplish the intended goal of this criterion. Indicator 2.6.1 attempts to provide an additional layer of security by identifying a sentinel species that would be a reference point for the overall health of the ecosystem. In principle, there is agreement that it's a good idea. In practice, it is very difficult to identify an appropriate sentinel species in all salmon-producing regions. In addition, there are concerns that this standard may hold farms accountable for population declines that have nothing to do with the farm. Finally, it would likely require data gathering that would exceed a single farm's ability. It requires further discussion to determine if it's viable. One option would be to identify within the SAD a select group of regional sentinel species for farms to include in the risk assessments that are being developed under standard 2.4.1. The SC recognizes a need to further explore this option and brainstorm additional options for how to address this issue within the standards. Suggestions for how to do so are appreciated.		Sentinel species need to be appropriately identified and need to be always present in the habitat (ubiquitous in a range of habitats throughout the year) and sessile species. The pathway of disturbance needs to be identified and an indicator identified through research. If the purpose is to measure far-field effects, it needs to be noted that these are not currently monitored and that no baseline exists for farm sites.	
Principle 3 - Protect the health and genetic integrity of wild populations	3.1.1 Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport. Detailed requirements are in Appendix II.	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). Scope of 3.1.1. is too large –needs to be broken into eight different indicators. Coordinated application of treatments with different companies within the same 'area' is not occurring. There are no official management zones and government has not supported establishment of management zones. British Columbia only has access to one sea lice treatment, SLICE. Therefore, rotation of treatments is currently	Remove indicator and standard as they cannot be applied to British Columbia until the BC Province, MOE, DFO, CFIA, PMRA and VDD work together to: 1) Support and complete oceanography work to define management zones and then facilitate the movement of sites to establish single year class zones without any loss of production volume. 2) Streamline and facilitate the access to additional sea lice treatment use within BC.

		impossible.	
	3.1.2 An assessment of key regional cumulative impacts of the farm and its neighbors, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). In the Broughton Archipelago, even though $10 million have been spent to address this concern, we are still not there. Marine Harvest Canada doesn't think it is possible to address this standard as it currently written.	Remove this indicator and standard until a cost effective method to assess this is developed.
	3.1.3 A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.	While Marine Harvest Canada already has a comprehensive commitment to wild stock and farm impact research, industry regulators – DFO, province – need to establish regulatory requirements to address this concern. In this way, consistent, measureable parameters would be available for measurement within the standard. Once again, the Broughton Archipelago is the most studied area (with over $10 million invested) and yet the research is not complete. A minimum of five more years of collaborative research is required to better understand just this one operating area.	Remove this indicator and standard until regulatory measures are established.
	3.1.4 Maximum average sea lice levels on all farms in the area-based management scheme.	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). This maximum would have to be established for each 'area-based management' area. Even within BC, different levels would need to be set due to differences in historical sea lice levels and wild salmonid populations. This certainly can never be a world-wide level.	Either remove indicator and standard or allow each management area to agree on the maximum for the area.
Areas of wild salmonids are defined as areas that are within a certain distance of a wild salmonid migration route (or for coastal trout, an equivalent). The appropriate distance is still under discussion. One option is a distance such as 75 kilometers (as suggested by Krkosek et al in the Proceedings of the Royal Society in 2005), which would imply that much of the salmon production in the northern hemisphere is covered in this definition.		BC's extensive coastline, 850 major rivers and creeks (plus 1000s of other creeks and streams along the coast), and 9700 distinct salmon stocks representing 9 salmonid species, make it impossible to situate farm sites away from salmonid migration routes.	
	3.1.5 Timing of wild salmonid outmigration and juvenile periods is well established and monitored.	Once again, BC's extensive coastline, 850 major rivers and creeks (plus 1000s of other creeks and streams along the coast), and 9700 distinct salmon stocks representing 9	This is outside the responsibility of salmon producers, the indicator and standard need to be removed until such a time as research into wild salmonid outmigration

		salmonid species, make it impossible to situate farm sites away from salmonid migration routes. While Marine Harvest agrees that it is important to understand and monitor salmonid outmigration, the mandate and responsibility for doing this rests with government – in Canada, the responsible department is Fisheries and Oceans Canada (DFO). The scope of this standard is much larger than aquaculture.	is done by government and any negative impacts from farming operations can be linked and meaningfully measured/monitored.
	3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). While Marine Harvest agrees that these studies are important, the mandate and responsibility rests with Fisheries and Oceans Canada (DFO) and industry regulators. Collaborative research in the Broughton Archipelago has cost over $10 million to date with a minimum of 5 more years of research still needed. Additionally, the Broughton Area-Management Plan (BAMP) costs over $250,000 per year and is still in the initial stages.	As this is outside the responsibility of salmon producers, the indictor and standard need to be removed until such a time as research into wild salmonid outmigration is done by government and any negative impacts from sea lice on farmed salmon can be linked and meaningfully measured/monitored.
	3.1.7 Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids).	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). There is no data to support the standard. In any event, any threshold levels need to be area/country and juvenile species specific. In BC, given the lack of treatment options and large numbers of wild salmonids, frequent treatments to maintain a low threshold may prove to be an unsafe approach. While Marine Harvest agrees to the concept of area-based management, this has not been established in BC and cannot be established by Marine Harvest Canada in isolation.	The established standard needs to be specific to country, area and wild fish species.
	3.1.8 In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area). While there are no native *Salmo* species in BC, the above	As above.

		comments for other salmon species apply.	
3.1.4, 3.1.7, 3.1.8: The SC is considering how to set global maximum sea lice levels that are meaningful in different regions and jurisdictions. The following concepts are guiding the deliberation. • There is a trade-off between pressing for very low sea lice levels and the danger of over-treatment and development of resistance • Juvenile outmigration is a particularly sensitive moment for wild salmon populations, and sea lice levels during that period should reflect a precautionary low level • Coastal trout are susceptible to sea lice because they potentially remain in contact with sea lice from farms throughout the year • The transmission of sea lice from farmed fish to wild populations, and visa versa, is still poorly understood • Maximum farm level limits should be an average of sea lice levels on all farms in the area-based plan, since that is the infection pressure that wild populations will experience Given these concepts, the SC is considering the following, as detailed in the indicators above: • A global sea lice level for all farms seeking certification that may be as low as 0.5 motile female sea lice per fish • A sea lice level during juvenile outmigration that is 0.5 motile female sea lice or lower A feedback loop from testing of sea lice on wild juveniles to ensure the farm level limits are appropriate • A year-round sea lice level for areas of coastal trout that is yet to be determined The suggested levels reflect experience and regulation in Norway and other countries. There is concern that setting global sea lice levels is a blunt instrument for this standard because it doesn't adequately take into account the regional and ecosystem difference of the areas where salmon are farmed. The SC welcomes feedback on how to combine the simplicity and consistency of a global standard with the varied ecosystem realities of different salmon-growing regions.		Setting global maximum sea lice levels would be difficult as species and potential for impact differ from one salmon farming jurisdiction to another. For instance, in BC the species named *Lep. salmonis* has been shown to be genetically different from the species of the same name in the Atlantic Ocean. The BC *L. salmonis* is not as aggressive and does not cause the health concerns seen in salmon farming jurisdictions that border the Atlantic Ocean. To set global limits would adversely impact one or more salmon farming countries.	To ensure they are meaningful and are not punitive, maximum sea lice thresholds need to be specific to the species and conditions of individual salmon farming jurisdictions.
	3.2.1 If a non-indigenous species is being farmed, evidence and documentation that the species is already widely used in commercial production locally by the standards release date; AND, one of the following is met: A) There is no evidence of establishment or impact in	Acceptable, other than "no evidence of establishment" needs to be clarified to "no evidence of establishment of a sustained population"	

	adjacent ecosystems B) The species has been approved for aquaculture use by a process based on ICES code of practice on the introductions and transfers of marine organisms or comparable protocol		
3.3. Use of transgenic salmon by the farm		Acceptable.	
	3.4.1 Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes	Counting equipment is not that accurate and standard does not take into account cumulative error.	Remove the indicator and standard or increase the % allowable as counting equipment is not that accurate.
	3.4.2 Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	"Clearly documented as being out of the farm's control" needs to be clarified.	**Where government regulation exists, demonstration of adherence to this local regulation should be used as the basis for the indicator and standard.**
	3.4.3 Evidence of compliance with national regulations and technical standards aimed at reducing the risk of escapees	Acceptable.	
	3.4.4 Evidence of escape prevention planning, including net strength testing, net traceability, system robustness, predator management, record keeping and reporting of risk events (e.g., holes, infrastructure issues, handling errors, reporting and follow up of escape events)	Acceptable.	
Principle 4 - Use resources in an environmentally efficient and responsible manner	4.2.1 Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1)	OK, basic assumption of 24% fishmeal and 1.2 economic conversion ratio (ECR) gives suggest limit value 1.3.	
	4.2.2 Fish oil Forage Fish Dependency Ratio (FFDRo) for grow-out (calculated using formulas in Appendix IV, subsection 1)	At 5% yield, difficult to attain as individual standard. Limits fish oil use ~12%. This is closer to an average low yield, not average yield.	Assume 6.5 – 8 % yield as average.
	4.2.3 Fish Protein Index (FPI) for grow-out (calculated using formulas in Appendix IV, subsection 2)	If same ECR assumed as 4.2.1. Current value of 0.8 equates to 27% fishmeal and future limit to 22% fishmeal.	Standards 4.2.1 and 4.2.3 effectively limit use of the same raw material. A chose of one or the other needs to be made. Alternatively, adopt a Fish In Fish Out (FIFO) calculation to cover both meal and oil.
Another question relates to the effect that reducing the use of forage fish in salmon aquaculture is likely to have. SC members recognize the importance of forage fish being available for direct human consumption. Some SC members seek to restrict certified farms' use of marine ingredients through FFDR in order to help reduce pressure on forage fisheries and provide greater opportunity for human consumption. Other SC members anticipate that unilateral action by aquaculture to reduce forage fish use won't promote human consumption, given the demand for fishmeal and oil from other, less efficient users of the resource (e.g., pig and poultry production).		Need to settle on single level of accreditation. Do not allow multiple levels. Either have approved fisheries or approved FFDR or FIFO values that have to be achieved.	

	4.3.2 Prior to achieving 4.3.1, the FishSource score for the fishery(ies) from which a minimum of 80%19 of the fishmeal or fish oil is derived. (See Appendix IV, subsection 3 for explanation of FishSource scoring.)	There are too many certification standards being developed at present.	Operate and measure to a single certification system at any time but be free to change as better systems are developed.
	4.3.4 Feed containing fishmeal and/or fish oil originating from by-products or trimmings from fish species which are categorized as vulnerable, endangered or critically endangered, according to the IUCN Red List of Threatened Species.	This likely will be difficult to monitor as trimmings and offal by-products are never segregated. The user in this case has no control over the fishery in question.	This indicator and standard needs further consideration.
	4.4.1 Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with recognized crop moratoriums and local laws	Acceptable.	
	4.4.2 Documentation of use of transgenic plant raw material, or raw materials derived from genetically modified plants, in the feed	It isn't possible to source GM free (<1%) materials in the Americas. Is the requirement to document its use or to limit its use?	
	4.5.1 Presence and evidence of a functioning policy for proper and responsible treatment of non-biological waste from production (e.g., disposal and recycling)	Acceptable. Marine Harvest Canada has a recycling SOP.	
	4.5.2 Evidence that non-biological waste (including net pens) from grow-out site is either disposed of properly or recycled	Under development. Some areas have logistical challenges finding depots to receive recyclable material (i.e. remote locations).	
	4.6.1 Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	For Marine Harvest Canada, this information is sometimes recorded for individual farms and other times recorded for a group of farms in an area.	
	4.6.2 Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment	Acceptable.	
	4.6.3 Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology	This indicator and standard needs to be addressed by feed manufacturers.	
	4.7.1 Percentage of copper-treated nets that are cleaned and treated in situ in the marine environment	Acceptable. All Marine Harvest Canada nets are washed on land at approved facilities that have strict effluent criteria.	
	4.7.2 Percentage of nets cleaned on land that are cleaned at sites with effluent treatment		
	4.7.3 Copper concentration in the sediment outside of the Allowable Zone of Effect (AZE) at marine grow-out sites	Generally, the ambient level in BC is >34 mg Cu/kg. 34-60mg Cu/kg is commonly seen at reference sites.	Indicator and standard need to reflect different geology in various salmon farming jurisdictions. If changes in bioavailable Cu level can be meaningfully linked to environmental impact, this would be the best measure.
	4.7.4 If the copper level in the sediment is greater than the allowed level in 4.7.3, presence and evidence of a risk assessment conducted by a qualified third party	It's essential to understand that the concentration of a metal is NOT a good predictor of its environmental impact. Metals must be 'seen' by organisms to be toxic. Copper needs to be	

	demonstrating that the copper concentration in the sediment does not represent an environmental hazard	in a dissolved form to interact with the surface or interior of cells. Government scientists have been discussing the research required to link the detected sediment concentration with bioavailability and ecotoxicity.	
	4.7.5 Evidence that the type of biocides used in net antifouling are approved according to legislation in the European Union or United States	Acceptable. No biocides are used on Marine Harvest Canada's nets.	
Principle 5 - Manage disease and parasites in an environmentally responsible manner	5.1.1. Evidence of a fish health management plan for the identification and monitoring of fish diseases and parasites	Acceptable, a fish health management plan is a regulatory requirement in BC.	
	5.1.2 Site visits by a designated veterinarian at least four times a year, and by a fish health professional at least once a month	Fish health professional needs to be defined. Will result in increased cost due site visit frequency – would not be able to attain with current production and staffing.	Reduce visit requirements. Clearly define what is meant by fish health professional.
	5.1.3 Percentage of fish that are vaccinated for selected diseases that are known to present a significant risk in the region and for which an effective vaccine exists	Acceptable, though "effective vaccine" and "selected diseases" require definition.	"Effective vaccine" requires definition as every vaccine company will say their vaccine is 'effective' but that may not be true based on production results. "Selected diseases" requires definition as well.
	5.1.4 Percentage of smolt groups tested for select diseases of regional concern prior to entering grow-out phase on farm	What is the sample size requirement for each group? Group needs to be defined – if fish are part of the same population but ship out on different days are they two different groups. Would it be possible to do screening that would allow an entire hatchery or fish on same water source to be defined as a group? How are "select diseases of regional concern" determined/defined?	Define what sample size is required per 'group'. "Group" and "select diseases of regional concern" need to be defined.
	5.1.5 Percentage of dead fish removed and disposed of	Acceptable.	
	5.1.6 Percentage of dead fish that are recorded and receive a post-mortem analysis	Not all dead fish are sufficient quality (due to water environment, water temperature) to ascertain cause of death. The 100% standard is not practical.	Revise indicator and standard to reflect that there will always be some mortality which is too old to perform a post-mortem, therefore can never be 100%, unless saying 'old' based on gross external signs is sufficient.
	5.1.7 Maximum mortality rate of farmed fish during the previous two production cycles	Standard does not take into account unexpected environmental circumstances that may cause large mortalities e.g. plankton or water quality mortality.	Mortality standard could be specific to disease.
	5.1.8 Maximum unexplained mortality rate from the previous two production cycles	What is meant by "unexplained"? Old mortalities cannot be categorized.	Define "unexplained mortality" needs to be defined.
	5.1.9 A farm-specific mortalities reduction program that includes defined annual targets for reductions in mortalities and reductions in unexplained mortalities	Acceptable, but what happens if plans do not result in reduced mortality?	
	5.2.1 On-farm documentation that includes, at a minimum,	What is meant by chemicals and by "proof of proper	Define "chemicals" and "proof of proper dosing".

	detailed information on all chemicals and therapeutants used during the most recent production cycle, the amounts used (including grams per ton of fish produced), the dates used, which group of fish were treated and against which diseases, proof of proper dosing, and all disease and pathogens detected on the site	dosing"?	
	5.2.2 Allowance for concentrations of selected chemicals and therapeutants in the benthos	This is primary research and should be approached as such. Recommend adding to roster once research has been completed. Divide into 2 categories: 1. Identify specific taxa of concern based upon bioassay work completed by pharmaceutical company. Select indicator taxa (example, commercial species, species at risk). 2. Baseline monitoring of taxa and/or sediments to determine fate of chemical in environment (spatial, temporal and toxicity).	Remove indicator and standard until there is defined methodology for measurement and adequate research to understanding the results and possible impacts.
	5.3.1 Allowance for use of therapeutic treatments that include antibiotics or chemicals that are banned in any of the primary salmon producing countries	Acceptable.	
	5.3.2 Percentage of medication events that are prescribed by a veterinarian	Acceptable.	Need to ensure medication events are specific to events which are treatment with products with DIN
	5.3.3 Compliance with all withholding periods after treatments	Acceptable.	
	5.3.4 Allowance for prophylactic use of antimicrobial treatments	Acceptable.	Definition of prophylactic use needed. We treat proactively for sea lice in the winter – some could argue this is prophylactic use.
	5.4.1 Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Area-based management conflicts with farm by farm certification (especially where two or more companies are in an operating area).	
	5.4.2 Bio-assay analysis to determine resistance when two applications of a treatment have not produced the expected effect	The wording of the indicator raises the concern that bioassay tests will be used in a way that they are not meant to be used. If so, there will be erroneous results and interpretations. It is important to note the following about bio-assays: • Other sources of treatment failure need to be assessed and ruled out • This assay is only one tool • As it is in vitro rather than in vivo, results need to be	Revise the indicator and standard.
	5.4.3 When bio-assay tests determine resistance is forming, use of an alternative, permitted treatment, or an immediate harvest of all fish on the site		

		put into context by: establishing baseline, determining regional specific tolerances • This is an labour intensive test, results are not as quick as culture sensitivity • Protocols need to be standardized	
	5.4.4 Use of antibiotics listed as critically important for human medicine by the World Health Organization	There are two important points regarding this indicator: • there is no evidence of resistant pathogens being transferred from salmon to humans (therefore, there is virtually no risk associated with using antibiotics listed as important to human medicine by WHO for disease treatment in salmon) • there are few antibiotics available for use in fish culture and the loss of even one could result in serious health and welfare concerns for salmon populations	
	5.5.1 Percentage of cages or pens that are single-year class	Acceptable.	
	5.5.2 Percentage of fish transferred live from one sea-based farm site to another, unless explicitly accepted by the designated veterinarian not to increase disease spreading risk	Acceptable.	
	5.5.3 Percentage of fish transported to slaughter in a closed wellboat or a wellboat with discharge treatment and disinfection	Currently, there are no wellboats anywhere with discharge treatment and disinfection.	Remove or revise indicator and standard to reflect current technologies.
	5.5.4 If exotic diseases and /or parasites are detected on the farm or in the hatchery, evidence of additional biosecurity measures that include restrictions on movement and evidence of strong disease management practices, including culling	In Canada, the CFIA (Canadian Food Inspection Agency) has specific requirements and regulations established through the NAAHP, National Aquatic Animal Health Program. This program over rides any certification standard.	Remove the indicator and standard or changing it to state that farm site must comply with governmental regulation.
	5.5.5 Re-occurrence of a specific disease over more than one generation	As farms operate in an open environment with wild fish in the area, farmed salmon face the same risk of disease introduction year after year irrespective of management practices.	Remove the indicator and standard.
5.5.5 How can this standard be written in a way that addresses its core intent, which is not wanting to certify farms that have repeated outbreaks of diseases that pose a threat to wild populations and ecosystems?			The best way for the standard to address this concern is by ensuring that those management practices that restrict or eliminate the opportunity for repeated disease outbreaks are incorporated into the fish health management plan or are addressed individually as standards.
Principle 6 - Develop			

and operate farms in a socially responsible manner			
	6.1.1 Evidence that workers have access to trade unions (if they exist) and union representative(s) chosen by themselves without managerial interference	Acceptable, all standards are covered by the Canadian law and labour codes.	
	6.1.2 Evidence that workers are free to form organizations, including unions, to advocate for and protect their rights		
	6.1.3 Evidence that workers are free and able to bargain collectively for their rights		
6.2.1	Number of incidences of child labor		
	6.2.2 Percentage of young workers49 that are protected		
	6.3.1 Number of incidences of forced, bonded or compulsory labor		
	6.4.1 Evidence of comprehensive and proactive anti-discrimination policies and practices		
	6.4.2 Number of incidences of discrimination		
	6.5.1 Percentage of workers trained in health and safety practices, procedures and policies on a yearly basis		
	6.5.2 Evidence that workers use Personal Protective Equipment (PPE) effectively		
	6.5.3 Presence of a health and safety risk assessment and evidence of preventive actions taken		
	6.5.4 Evidence that all health and safety related accidents and violations are recorded and corrective actions are taken when necessary		
	6.5.5 Evidence of employer responsibility and/or proof of insurance (accident or injury) for worker costs in a job-related accident or injury when not covered under national law		
	6.5.6 Evidence that all diving operations are conducted by divers who are certified for the task		
	6.6.1 The percentage of workers whose basic wage (before overtime and bonuses) is below the minimum wage		
	6.6.2 Evidence that the employer is working towards the payment of basic needs wage		
	6.6.3 Evidence of transparency in wage-setting		
	6.7.1 Percentage of workers who have contracts		
	6.7.2 Evidence of a policy to ensure social compliance of its		

	suppliers and contractors		
	6.8.1 Evidence of worker access to effective, fair and confidential grievance procedures		
	6.8.2 Percentage of grievances handled that are addressed		
	6.8.3 Percentage of grievances that are resolved		
	6.9.1 Incidences of excessive or abusive disciplinary actions		
	6.9.2 Evidence of a functioning disciplinary action policy whose aim is to improve the worker		
	6.10.1 Incidences, violations or abuse of working hours and overtime laws		
	6.10.2 Overtime is limited, voluntary, paid at a premium rate and restricted to exceptional circumstances		
	6.11.1 Evidence that the company encourages and sometimes supports education initiatives for all workers (e.g., courses, certificates and degrees)		
Principle 7 - Be a good neighbor and conscientious citizen	7.1.1 Evidence of regular and meaningful consultation and engagement with community representatives and organizations	Additional clarification required: 1. To what level of inclusion? 2. All/some/one resource user? What is the scope? 3. Frequency of meetings and format?	
	7.1.2 Presence and evidence of an effective policy and mechanism for the presentation, treatment and resolution of complaints by community stakeholders and organizations	While Marine Harvest Canada's philosophy is to achieve 7.1.2 and 7.1.3, this level of community engagement is not realistic (all complaints cannot be resolved) and cannot be done on a farm-by-farm basis. MHC does have policy in place to engage community and stakeholders; however, engagement is a gradual, ongoing process making measurement of its effectiveness difficult.	
	7.1.3 Evidence of effective complaints management and resolution	Marine Harvest Canada listens to, responds to and corrects complaint submissions through a structured process.	
	7.1.4 Evidence of third party assessment of health effects on community	"Health effects on a community" needs to be defined.	Revise or remove the indicator and standard.
	7.2.1 Evidence of acknowledgement of indigenous groups' rights and titles (where applicable)	First Nations rights and titles is the legal responsibility of government and needs to be decided in a court of law.	
	7.2.2 Evidence of established agreements or an ongoing process to establish agreements with relevant communities in the traditional territories	Marine Harvest Canada has formal and draft agreements with 12 out of 20 First Nations with territorial rights in our areas of operation.	
	7.2.3 Evidence of successful consultation with aboriginal people and support from governance structures in the locality prior to site license approval	This standard would disallow all tenures disputed by First Nations. Where First Nations are fundamentally opposed to salmon farming, they will not enter into consultation.	Revise or remove the indicator and standard.
	7.3.1 Changes undertaken restricting access to vital	Consultation is required for all site changes. This process	

	community resources73 without community approval	includes federal and provincial government reviews as well as consultation with First Nations, Transportation Canada, Environment Canada, Regional districts, community and other stakeholders.	
	7.3.2 Evidence of assessments of company's impact on access to resources	Community inventory of resources is not always available.	

General comments

1. Where government regulation exists, demonstration of adherence to this local regulation should be used as the basis for the indicator and standard.
2. As this is a farm site specific certification, remove indicators and standards that require area-based management
3. Achieving 100% for each of these indicators and standards is unrealistic. As currently written, no conventional BC farm will be able to meet the standards and so they become effectively irrelevant.
4. The details of the appendix are new; who wrote them?
5. The smolt section is new and incomplete; should not be included at this point.
6. The standards are too incomplete to assess (e.g. 4.5 "proper disposal" is undefined). Standards have "may" and "could" language that makes it clear that parameters are unstable and remain in flux.
7. The requirement for cooperation with an NGO partner is over prescriptive.
8. As noted, a number of the standards require additional research to understand negative effects and substantiate limit/levels at which these negative impacts occur. While Marine Harvest recognizes that more can and needs to be done to fully understand the environmental impacts of all human activity on the environment and wild populations, it is not the mandate of private companies to do this work. Yes, private companies can support it, but this research must be driven by governmental agencies. Aquaculture is not the only input.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 5	5.1.1.	Five site visits by a vet every three months or four times a year is excessive.	
	5.1.2	Additional clarification needed on what a fish health professional is.	
	5.1.4	Additional clarification needed: to test for carrier state would be too costly and time consuming to meet current production goals.	
	5.1.7	Percent mortality needs to be generous in smolt production as catastrophic mechanical failure can occur as well as natural disasters causing prolonged power outage, washed out /damaged infrastructure so services cannot reach facilities for help. It would be unfair to lose certification if some of these events happened.	

	5.2.1	Grams of chemicals and therapeutants used per ton produced can only be calculated on a year class basis at the end of the production year	
	5.3.4		
	5.4.1	There is an inherent conflict with having a farm level standard that is dependent upon the good management and husbandry practices of other farms within an area (and not necessarily from the same company).	
General comments -Other salmonid species are not necessarily the best indicator of ecosystem health. Many other species carry similar risk/disease problems and may be better suited for comparisons of ecosystem health. - There is an inherent conflict with having a farm level standard that is dependent upon the good management and husbandry practices of other farms within an area (and not necessarily from the same company).			

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Petter Arnesen
*Organization/Company: Marine Harvest Group
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	*2.5.3*	It is unacceptable that farmers are left without any tools to defend their stock. Sea mammals and birds may under certain circumstances represent a risk for health & welfare of the farmed animal and a potential food safety risk. Attacks from predators such as seals may also result in escapes	Lethal action must be allowed as a last resort as long as the animal being killed is not an officially recognised endangered species. Several countries, e.g. Scotland, have very strict legislation on this issue and the SAD should therefore implement relevant elements from such legislation when setting the standard. Should include that the killing is registered and where required, authorization from relevant authorities are given.
	2.1.1 – 2.1.3	Some of the suggested indicators require methodology that is not commonly used today and likely to have a very high cost The objectives of the standards can in most cases be met also through other methods than those suggested. There may also regional differences and natural variation	The suggested standards should be reworded in order to harmonise with and allow for the use of other methodologies regarded to be best practice currently in use in salmon production countries. Regional differences, e.g. with regards to DO should also be accounted for. The MOM system in Norway, the SEPA

		that should be taken into account	regulations in Scotland and the new regulations in Chile should be evaluated for relevant input to the standard. Duplications and unnecessary increase in monitoring cost must be avoided
	2.4.1	Will require knowledge and documentation on proximity to sensitive or protected habitats and species and thus to some extent goes beyond what is regarded today as the responsibility of a farm. Input/resources from authorities and research institutions will be necessary. Costs are likely to be significant	In order for the standard to be meaningful it will be necessary to 1) establish agreements with research institutions and authorities, 2) agree on what constitutes sensitive species, 3) establish current status of chosen species, 4) set up programme to minimize negative farm impacts.
	2.6.1	Will be very challenging and in practice impossible to define and follow.	The standard should be removed
Principle 3	3.1.5-3.1.9	Will require participation in area-based schemes for managing disease and resistance to treatments; assessment of cumulative impacts of the farm and its neighbours, including analysis of the infection pressure risk on wild populations (e.g. from sea lice); commitment to research on impacts on wild populations in order to understand link between sea lice levels on farms and in the wild; setting maximum average sea lice levels on all farms in the area- based management scheme	Due to cost (e.g. for sea lice monitoring) and the need for resources not possessed by farmers, new regulations, etc., achieving the suggested standards will require significant contribution from authorities and research institutions
	3.4.1	We agree with the principle of knowing the number of fish that are lost (objective of standard is to reduce number of unreported escapes), but the suggested error margin is too small. Raising to +/- 3% would probably be manageable	The error margin should be raised to +/- 3%

Principle 4	*4.2.2*	The standard should focus on the need to secure the sustainability of marine feed ingredients such as fish meal and fish oil and accept that market dynamics decide whether it ends up in feed for salmon or other species. We support initiatives to use more of the forage fish directly for human use, but we also know that this transition is likely to take a long time. At the moment around 3 % of Peruvian anchovy (the biggest forage fishery) goes directly for human food. In the meanwhile sustainably sourced marine raw materials should be used in the most efficient way, and as far as we know there are no other farmed animals that use it as efficiently as salmon.	Sustainably sourced fishmeal and fish oil should be deducted from the calculation of FFDR. Also marine ingredients derived from trimmings and legally caught by-catch should be deducted
	4.7.1	We agree with the principle of reducing copper effluents to the environment, but due to the lack of good alternatives for antifouling treatments a sufficient transition period must be allowed for. Setting a limit for copper concentration outside of the allowable zone of effect (AZE) must also account for background levels (4.7.3). The impact of a set limit is not sufficiently understood and we understand that scientists are currently debating the effects of Cu on the benthos	The standard states that if background levels are higher than the standard threshold a risk assessment must be conducted to determine whether the Cu presents a threat and the producer qualifies for certification. This should apply not only when background levels exceed the limit, but also with high background levels (e.g. background levels >25% of max limit)
Principle 5	5.1.1	Exceptional mortality events that are beyond the control of the farm occur from time to time	The maximum mortality rate during the two previous production cycles must allow for one or more exceptional mortality events over a period of years if the mortalities are caused by specific incidences (e.g. algal blooms) extraordinary environmental events or atypical disease that are documented to be out of the control of the farmer

	5.1.2	This is mainly a resource/cost issue and the benefits of more frequent site visits by fish health personnel must be evaluated	A total number of visits by fish health professionals (veterinarian or certified fish health biologist) set to four times per year should be sufficient
	5.2.2	There is a general lack of scientific knowledge in this area	If kept this standard should only require sampling sediments for substances where well documented sampling procedures and analytical methods exist
	5.3.1	The main concerns around this indicator are related to food safety and therefore do not belong in the SAD standard. It contains a number of concerns that must be solved via political channels. Most of the current issues relate to the US, a country that is not normally regarded as a "primary salmon producing country". Therefore relatively few drugs have been sought approved for registration by the US FDA. The word "banned" in this context needs to be defined. In footnote 41, "banned" is said to be "proactively prohibited by a government entity because of concerns around the substance" Who is going to decide which drugs falls into this category? Does it mean any drug that has not been through an approval process? Or does it only apply to drugs that have been sought approved but rejected due to concerns related to health, safety or environmental issues or drugs that are not registered due to the same concerns? As long as there is room for interpretation of what the indicator defines it is likely to create significant confusion.	The standard should be removed. Alternatively a "SAD list" of "banned" substances could be compiled
	5.4.3	In some regions there may be a lack of alternative treatments (as currently in BC).	

	5.5.3	We agree with the objective of stopping the spreading of disease via wellboat traffic. However, there is not sufficient capacity of closed wellboats in the industry today and the objective of the standard can be met also through other measures. E.g. through restricting the navigation tracks of boats carrying fish with disease and use of dead-haul	It is unrealistic that the there will be sufficient capacity of wellboats in all production regions in the foreseeable future and the standard should therefore allow for the use of other methods/procedures to stop spreading of disease
	5.4.4	We agree with the principle of reducing the use of antibiotics listed as critically important for human medicine by the World Health Organisation, but it should also be recognised that banning any use of drugs listed as critically important by the WHO goes beyond anything applied in livestock food production. Many drugs are listed both as critically important for human health by FAO and as critically important in veterinary medicine by OIE, the World Animal Health Organisation. The salmon aquaculture industry is a relatively small industry dependant on few available drugs. If rotation of drugs is not possible and suboptimal choices regarding sensitivity need to be taken due to such a ban, this may compromise a responsible drug management policy to avoid drug resistance developing. If the indicator is kept it is important to be clear that it refers to the substances listed per se and not the drug classes. It would also be valuable with a reference document as these to some extent are living documents and different versions may be confusing.	The standard should allow for the use of antibiotics listed as critically important for human medicine by the World Health Organisation, not as a first choice, but when there are no adequate alternatives. When prescribed their use should be based on a documented and signed policy by the farmer and the designated fish health professional acknowledging the concerns surrounding the use of these products, certifying the rationale for use and committing to limiting their use
	5.5.5	This criterion should only relate to diseases that are contagious and may pose a threat to wild populations and cannot apply to	The standard must specify which diseases it encompasses

		parasites such as sea lice. It is not necessarily true that re-occurrence of a disease is an indication of bad farming practices	
Principle 6		Some of the suggested indicators and standards may need regulatory changes in some jurisdictions in order to be achievable	
Principle 7	7.1.1 – 7.1.5	Several of the suggested indicators and standards will require willingness from a wide group of stakeholders to engage in consultation with salmon farmers. Some indicators also need definition. E.g. what constitutes health effects on community in 7.1.4. and how are potential health effects from a salmon farm distinguished from health effects from other sources (industries, etc.)	Standards need more definition
	7.2.1 – 7.2.3	Suggested indicators will require willingness from indigenous groups to engage in consultations with fish farmers	Standards need more definition. E.g. what should be the components of agreements under 7.2.2 and what constitutes a successful consultation under 7.2.3?
General comments		In some areas the standards must allow for regional differences in the natural variation of specific environmental conditions. E.g. DO levels that can be naturally low in BC and some other areas around the world. For some of the standards it must also be accepted that documentation and records are kept by the parent farming company and not by a single farm	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1			
Principle 2	2.2.1-2.3.5	Relevance of the suggested indicators must be better understood as several of them are not in common use in all regions	Suggested standards need more development/scientific documentation
Principle 3	*3.1.1*	Several farming regions rely on smolt production in lakes and banning the practice will exclude a large proportion of the best performers in countries such as Chile and Scotland from becoming certified. We believe that through strengthened focus on best practices within escapes prevention, biosecurity, stocking densities, carrying capacity of the recipient, benthic impacts, chemical input, fallowing periods, etc. (as is happening in sea water), smolt production in lakes legally approved for such production can be conducted with acceptable environmental impacts.	The standard should be revised. The SAD should look to the best performers of smolt production in lakes and include current best practices in a revised standard to establish minimum requirements/criteria for such farms. Principles from the Rainbow Trout draft standard (and possibly Tilapia) should also be evaluated and possibly included.
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			

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*Name: HM / RL
*Organization/Company: Marks and Spencer
*E-mail address:

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COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	2.5.1 and 2.5.2	Our supplier, SSF, has considerable experience in the use of ADDs and believes that some of the reasons quoted for not allowing the use of ADDs are incorrect; A recent Scottish study of the effects and utility of ADDs (SARF 44, not yet published) shows that the aversive effect on the behaviour of cetaceans and porpoises may not be as great as previous Canadian studies suggest. SSF's 10 year experience of using ADDs clearly shows that ADDs do not become ineffective over time. SSF has site specific management of ADDs which are operated according to the level of challenge from seals. ADDs may be	ADDs should be permitted as part of a hierarchy of seal deterrent activity, in order to reduce the likelihood that a seal would ever have to be shot, or that a fish might escape through damaged nets. Their use should be limited to periods when there is clear evidence of seal activity. At certain sites in particularly sensitive areas for cetaceans, SNH may require an application to the Scottish Government to permit ADD use. ADD systems are being developed with improved triggering mechanisms, and a device operating at sound frequencies closer to the seals hearing range (and therefore less audible to other species) is being tested.

		installed but not operated, but ready for operation should seal activity become evident. The above management technique therefore significantly reduces the potential interaction of ADDs with cetaceans and porpoises. The suggestion that predator nets could be used does not address any of the issues (such as by-catch) surrounding their use at certain locations. It does not address welfare issues concerning animals and birds which may become entangled in the predator nets and this therefore contradicts criterion 1.1.	There could be a commitment to minimising the use of ADDs and active participation in research leading to alternative means of control.
	2.5.3	Animal welfare is a fundamental part of the M&S approach to the farming of livestock. We have taken guidance from the RSPCA on this matter, who have assessed the welfare implications for the livestock, as well as the predator seals. M&S have a very strict policy on the use of lethal action and their supplier employs several measures to deter seals from persistently attacking farmed fish. These include ADD, tensioned nets and removal of moribund fish. Keeping firearms on site is strictly forbidden to prevent inappropriate use. We have worked with seal welfare groups to find alternatives and every incidence of seal attacks is recorded. Lethal action is taken as an absolute last resort, in line with RSPCA advice. Our supplier operates a comprehensive programme to deter predators and with	The exception used in the trout standard should be applied to the salmon standard: *'…where the farm can provide evidence of a third party assessment that demonstrates that lethal action against a particular predator is appropriate, necessary and represents no risks to wild populations or ecosystems. This exception cannot be applied to species that are threatened, endangered or critically endangered. The assessment must come from an EIA or any other credible process of environmental analysis performed by a capable third party accredited by the national authority or regulator.'* We propose, in line with our supplier, that as per new legislation to be introduced to Scotland, licences to cull seals should be issued to fish farms which take into account local seal population dynamics and which are

		specific reference to seals will only resort to culling once all other possibilities have been exhausted. Not having the option to cull out a rogue seal for example would be an unacceptable situation with regard to fish welfare and prevention of fish escapes. Our supplier has a 'statutory duty of care' for salmon welfare. Under the **Animal Health and Welfare (Scotland) Act 2006,** there is a requirement for salmon farmers to protect their stock.	issued on the basis that all possible measures of deterrent are in place beforehand. Where appropriate, farms should work with SNH to monitor local seal populations.
Principle 3		Please refer to our producer, SSF's response	
Principle 4	4.2	M&S have developed a farming process which delivers a unique product, high in long chain omega 3 fatty acids and it is these health promoting properties which appeal to our customers the most. The proposed maximum levels for fishmeal and oil as they currently stand, are forcing retailers to choose between achieving the ASC standard, and producing a healthy product, which maintain fatty acid levels at a similar level to those of wild salmon. The ASC is, in effect, dictating a product specification, rather than a standard that will drive good farming practice. By discounting sources of fishmeal and oil which are certified as sustainable, the incentive for having achieved the highest standards of fishery management such as MSC certification could be increased dramatically. M&S fully support the standards' aim of reducing the use of forage fish in salmon feeds, and will only use oil and meal from fisheries which have	Fishmeal and fish oil from sources which have been certified sustainable by a third party (i.e. MSC) should be omitted from the FFDR calculation. Concerns over the current process for assessing the sustainability of forage fisheries are now being addressed, and changes to the assessment methodologies will be adopted through a peer reviewed and validated process.

		been certified by a third party as sustainable. No allowance is made in the calculations of the potential situation that salmon processing waste (e.g. viscera) maybe processed into animal feed (non-ruminant terrestrials).The volume of fish oil and fishmeal produced, should be deducted from the FFDR input values.	
	4.2.1	With standard diets using 20% fishmeal a FFDRm of <1.31 is achievable. However with diets using higher marine content raw materials (45% fishmeal) this will not be possible.	
	4.2.2	A FFDRo of <2.85 will be impossible with typical diets using 30% added oil and no plant oil substitution. To achieve <2.85, fish oil would have to be substituted by at least 65% and this would undermine the Omega 3 content and the health benefits of the product. Currently there are not adequate supplies of trimmings oil to supply the industry.	It will be impossible for our supplier to comply and we recommend that a 5 year period is provided to allow for adequate volume of MSC (or equivalent) certified fisheries to become available, as well as the development of oil supplies from trimmings. Any slight change to the fish oil level within the M&S diet would require a significant trial period and research prior to any changes being made.
	4.2.3	A FPI of 80% prior to 2014 should be achievable with most diets.	
	4.3.1	5 years not an unreasonable period to achieve this, and Peruvian Anchovy Fishery currently going through IFFO certification.	
	4.3.2	We challenge whether the 'Fishsource' score is a valid system since it is based on a group of fishery scientists who are part of a non-accredited organisation who make assessments purely by reviewing published data which maybe out of date, and there is	Suggest Fishsource system has potential to be improved and cannot be effective if assessments are made on unavailable data. Prior to achieving 4.3.1., should have option of 4.3.2 **OR** 4.3.3.

		no physical auditing of fisheries. Absence of data can disproportionately down score a species, e.g. Peruvian Anchovy has an evaluation category of E mainly because there is a n/a in answer to the question 'will the stock be healthy in the future?'	
	4.3.3	We agree with this, but there could be issues with the time to complete the necessary auditing and certification process, e.g. situation in Peru with IFFO certification.	More time should be given to allow IFFO certification. Prior to achieving 4.3.1., should have option of 4.3.2 **OR** 4.3.3.
	4.6	There is an important contradiction between this section and 3.1.1 in the smolt production standards, since this section aims to reduce the energy use and emissions involved in the production of salmon, but standard 3.1.1 (smolt production stds) will significantly increase the amount of energy required. Re-circulation systems are intensive and energy hungry. Freshwater cage systems are low energy and low intensity systems with particular benefits for the welfare of the fish.	
Principle 5			
Principle 6			
Principle 7			
General comments			

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1			
Principle 2	2.2 and 2.3	Please refer to our supplier, SSF's position	
Principle 3	3.1.1	Unacceptable for Scottish Industry to prohibit use of cages in freshwater lochs where there are native salmonids, since all locations of smolt cages would potentially come under this category, and this would affect more than 50% of smolt production. In the rationale the impacts for concern include the effect of escapes on wild populations, nutrient loading, disease transmission, and antibiotics and chemicals entering the environment. In Scotland (as opposed to Chile) there is no strong evidence that any of these concerns are significant. All of these potential impacts are controlled and monitored by SEPA and Scotland Marine Science. The Industry has reviewed the code of practice for containment in Freshwater, which includes increased technical specification of moorings, cage structure and nets. There are a number of studies to show that escapes do not impact on wild fisheries both in Scotland & Norway.	Floating cages should be permitted in freshwater lochs where native salmonids are present, and SSF will support the existing Scottish regulatory and industry controls to eliminate the impacts of concern.
		This contradicts the Criterion 4.6 on energy consumption, since to relocate all	

		freshwater cage production to re-circulation systems would significantly increase energy use as well as conflict with current welfare standards in relation to stocking densities.	
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			

MONTEREY BAY AQUARIUM

Comments on the Draft Standards for Responsible Salmon Aquaculture

Submitted October 3 2010 by email.

Dear Salmon Aquaculture Dialogue Global Steering Committee,

We recognize the tremendous amount of work involved in developing standards of this nature, and welcome the attempt to set robust standards for salmon farming and the offer to comment on their development. The Monterey Bay Aquarium has been an avid supporter of the WWF Aquaculture Dialogue process for several years, participating in many dialogues around the world and serving on the Global Steering Committee for the Shrimp Aquaculture Dialogues. We would like to be able to submit more detailed comments than those below, but due to ongoing commitments to other dialogues our current comments are limited to key aspects of relevance to our existing five Seafood Watch criteria.

General comments

According to the standards preamble, "*The principles serve as a platform to <u>minimize or eliminate</u> the social and environmental impacts of salmon aquaculture while permitting the salmon farming industry to remain economically viable.*" And according to the WWF SAD website, the goals of the dialogue are to: "*Develop and implement verifiable environmental and social performance levels that <u>measurably reduce or eliminate</u> the key impacts of salmon farming and are acceptable to stakeholders.*" The SAD therefore clearly acknowledges the key environmental impacts of salmon aquaculture yet the option to simply 'measurably reduce' or 'minimize while remaining economically viable' seem very vague and poorly defined goals for known impacts that have the documented potential to lead to the extinction of wild populations of salmon or sea trout.

In addition to the frequently stated (but never confirmed) goal of all the Aquaculture Dialogues to reflect the top 20% of producers, the SAD would benefit greatly in its development, transparency and stakeholder acceptance from providing greater clarity on its specific goals and its ability to demonstrate that certified product will represent a worthwhile improvement in the key environmental and social impacts described. Protection of the global ecosystems impacted by salmon farming and protection of wild salmon populations should be the clear priority of an International Responsible Standard for Salmon Farming.

Specific comments

<u>Principle 2</u>
Criteria 2.3 rationale states: "*The release of nutrients into the environment from salmon farms was identified by SAD participants as a key impact of production. The impact is addressed throughout the standards with a range of water quality and benthic performance metrics*"

This standard ignored the huge release of soluble wastes from salmon farms. We accept that this may be difficult to measure and may not be one of the key impacts of salmon farming except in a few locations, and we accept that other principles attempt to define efficient use of feeds. However this principles ignores the inherent flaw of the predominant 'open' salmon farm production system and the difficulty faced by the SAD to develop a 'responsible' standard with respect to the import (in feed), the loss of these nutrient resources into the environment and the free ecosystem service utilized by the farm to break down its substantial wastes.

<u>Principle 3</u>
3.1 By setting standards for lice per fish, the SAD is not addressing the actual burden or impact of sea lice on a farm or regional level. We propose setting additional sea lice limits according to totals calculated on the biomass and total fish numbers on a farm, AMA or regional basis. We also propose these additional limits be correlated to the wild fish numbers, out-migration time or other indicator of risk.

3.4 We urge the SAD to consider if these best management practices really address this key impact of salmon farming. As acknowledged in the additional information (3.4) the current standards are still poorly defined and are open to flexible interpretation or abuse, particularly around the common industry inability to accurately count fish numbers (for example the use of a low accuracy 'counting method' (3.4.1) or '200 or more fish' (3.4.2)). This emphasizes the fact that the predominant salmon farm production system is inherently vulnerable to escapes and the SAD has a tremendous challenge to develop a truly 'responsible' standard in this respect.

<u>Principle 4</u>
We recognize that the dialogues as a whole are struggling to develop realistic (auditable) feed standards in the absence of a dedicated feed mill standard. As a mature industry operating in the developed world, salmon farming should be at an advantage and should push for high standards for this resource intensive species.

The standards currently only consider the conversion efficiency of marine ingredients, and ignore the crop based and land animal proteins now commonly and extensively used in salmon feeds. While this is still typically the case in most assessment systems (including Seafood Watch) we highlight the need to no longer consider terrestrial ingredients and by-products as 'free' ingredients. These have their own ecological costs of production (in the case of 'by-products' these ecological costs are the same as the product we value for food) and are heavily used in modern salmon feeds.

As an initial recognition of this, the Fish Protein Index could be adapted to include all protein ingredients, not just that provided in fishmeal.

Fishmeal and oil from certified sources must remain included in the FFDR calculations. Whether it comes from 'sustainable' sources is irrelevant to the dependency of salmon farming on this resource.

With a FFDR(oil) limit of 2.85, it is difficult to see how this standard could be called responsible, sustainable, or even ethical. Even ignoring the use of other terrestrial oil ingredients which have significant environmental costs of production in their own right, this is a spectacularly inefficient use of marine resources, and must be reduced substantially.

Again, this is an inherent flaw of salmon farming – the production of a high trophic index species reliant on high levels of high quality proteins and oils. Initially we propose the FFDR(oil) should be reduced to <2.0 with a clear commitment to reduce it further over time.

Principle 5
Due to the nature of its fundamentally flawed approach, salmon farming like all industrial livestock systems is dependent on chemical therapeutants. Significant concerns remain about the release of chemical treatments (and the release of their metabolites) into the environment. Criterion 5.3 makes no attempt to limit the frequency of use of medications and this should be in the standards for all treatments.

To address the WHO antibiotic question (flagged in 5.4) the standards should set a strict and low allowance for repeated use of the relevant treatments and decertify farms that require regular treatments and are therefore operating unsustainably and irresponsibly in open systems.

We will endeavor to provide further comments and inputs to the SAD process where possible, but urge the SAD GSC to honor the intent of the dialogue process and develop robust standards that are not diluted by the economic needs of the current unsustainable global salmon farming industry, or those of the developing Aquaculture Stewardship Council.

Thank you for considering these comments.

Sincerely,

P.Bridson

Peter Bridson,
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Seafood Watch Program
Center for the Future of the Oceans
Monterey Bay Aquarium
(831) 647-6845; ____________________

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*<u>**Name:**</u> Andrés Lyon, Francisco Lobos.
*<u>**Organization/Company:**</u> Multiexport Foods
*<u>**E-mail address:**</u>

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COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1: **COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS.**	1.1.5. Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months	Este punto se debe aplicar a aquellas sustancias que se encuentran prohibidas en el mercado de destino.	Explicitar en el indicador que la exigencia es para productos prohibidos en los mercados de destino.
Principle 2: **CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION**	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos sólo para centros ubicados en profundidades hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.2.2. Maximum percentage of weekly samples from 2.2.1 that fall under 1.85 mg/liter DO	Se sugiere explicitar la metodología que será válida para la medición de DO.	Se debe explicitar que las mediciones serán: 1. Monitoreo discreto en la columna de agua. 2. Máximo de 3 niveles. 3. Medición dentro de la concesión. 4. La profundidad de medición es hasta la profundidad de las redes. 5. Se propone incorporar una frecuencia de medición de 3 veces semanales.

	2.3.1. Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I subsection 2)	De acuerdo a los antecedentes obtenidos desde proveedores de alimento, es muy difícil encontrar el porcentaje de finos en los centros de cultivos. Estándar muy difícil de alcanzar.	Solicitamos que el rango sea de < a 1,5%, que aún es muy bajo y pocos centros lo alcanzarán.
	2.4.1. Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have	El estándar no considera la metodología y definición de especies protegidas y puede ser distinto para los diferentes países, inclusos en distintas áreas de un mismo país. Además, pueden existir otras actividades que afecten a estas especies.	Proponemos eliminar este indicador
	2.5.1. Number of days where acoustic deterrent devices were used 2.5.2. Prior to the achievement of 2.5.1, evidence that if acoustic deterrent devices are in use, the farm is developing and implementing a plan to phase out their use	El uso de aparatos acústicos es utilizado por la industria como alternativa para evitar o minimizar la interacción con los mamíferos. Esto permite no ejercer acciones letales en contra de los mamíferos marinos y disminuyes los riesgos de escapes en los centros.	Se sugiere eliminar este indicador.
	2.5.3. Number of marine mammals and birds killed through the use of lethal action	Dado a que existen en Chile mamíferos considerados como plagas, y no corresponden a especies endémicas, es necesario generar una excepción para estos casos.	Se solicita incorporar una excepción para aquellas especies que constituyen plagas.
	2.6.1. Presence or absence of selected sensitive or sentinel species	Proponemos eliminar dado a que las especies centinelas pueden ser distintas para cada lugar, incluso dentro de un mismo país.	Eliminar
Principle 3: **PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS**	3.1.2. An assessment of key regional cumulative impacts of the farm and its neighbours, Iincluding an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.	El análisis regional de los impactos acumulativos excede al alcance de un solo centro de cultivo. Por lo que es complicado que dicha evaluación la realice una sola instalación.	1. Cambiar concepto de silvestres a endémicas. 2. Es imposible de realizar por un solo centro, excede las competencias y tiene muy alto costo. (inviable) 3. Eliminar indicador.

	3.1.3. A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild almonds must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.	Cambiar concepto de silvestres a endémicas. Además, entendemos que excede al alcance del centro de cultivo (no es su rol).	1. Cambiar concepto de silvestres a endémicas. 2. Eliminar indicador.
	3.1.4. Maximum average sea lice levels on all farms in the area-based management scheme.	Dado a que las especies de parásitos son distintas entre los países, es necesario hacer esta diferenciación.	Se solicita que el indicador sea definido en función de la especie del parásito.
	3.1.5. Timing of wild salmonid out migration and juvenile periods is well established and monitored.	Estos indicadores requieren una aclaración respecto de las especies silvestres de las endémicas, ya que son estas últimas las que se quiere proteger.	Cambiar concepto de silvestres a endémicas.
	3.1.6 Measure lice levels on wild juveniles during out migration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)		
	3.1.7. Maximum average sea lice levels on all farms in the area-based management plan during juvenile out migration (or equivalent for coastal salmonids).		
	3.1.8. In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.		
	3.1.9. Period of demonstrated compliance with standards in 3.1 prior to initial certification.		

	3.4.1. Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes	Solicitamos revisar el valor del estándar, dado a que se debe considerar aspectos como el robo y operaciones no cubiertos con el estándar.	Sugerimos un valor de 2%.
	3.4.2. Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	Se hace necesario definir un periodo para contabilizar este número de escapes. Se hace necesario definir y explicitar cuales serán los eventos excepcionales que se consideraran por el estándar.	Explicitar que el estándar es en el ciclo de producción actual y cual serán los eventos excepcionales que se considerarán. Se sugiere incorporar los robos, dentro de estas últimas.
Principle 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER	4.2.1. Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1)		Se sugiere revisar el estándar
	4.2.2. Fish oil Forage Fish Dependency Ratio (FFDRo) for grow-out (calculated using formulas in Appendix IV, subsection 1)	Los estándares planteados son muy exigentes dada la relación de oferta y precios que hoy existen en el mercado para los ingredientes vegetales y recursos pesqueros.	Dado lo anterior, se solicita modificar el estándar a 5.
	4.3.1. Commitment to source feed containing >90% fishmeal or fish oil originating from fisheries certified under an ISEAL member's accredited sustainability certification scheme. This must be done as the product becomes available and within 5 years of the publication of the SAD standards.	Dada las actuales condiciones de certificaciones de las pesquerías, se debe evaluar otras alternativas. Acá se debe tener presente que un alto porcentaje los países de origen de las materias primas utilizadas para la fabricación de alimento.	Ampliar a otras certificaciones, ejemplo IFFO.
	4.3.3. Prior to achieving 4.3.1, demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO Code of Conduct for Responsible Fisheries.		

	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un importante periodo transitorio para su implementación.
	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
	4.6.3. Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que se consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **benthos.**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **sedimento.**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.

	5.5.1. Percentage of cages or pens that are single-year class (generation)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **a peces** de la misma generación.
	5.5.5. Re-occurrence of a specific disease over more than one generation	Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.	Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 2: CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos sólo para centros ubicados en profundidades hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.1.3. Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1	Se debe considerar la condición oligotrófica de los lagos par la evaluación de este indicador.	Se sugiere, para estos casos, que el estándar sea de ≥ a 1 especie.
	2.2.1S. NETPEN: For any “open” system (e.g. net pen), evidence that carrying capacity of the freshwater body has been established by a reliable entity. Analysis must take into account the natural ecological condition of the lake or water body (e.g., oligotrophic) and have been conducted within a recent (2 years) timeframe.	Es poco factible hacer evaluación de capacidad de carga por parte de un centro para un cuerpo de agua completo, considerando que existen varios actores involucrados.	Se propone eliminar
	2.2.2S. NETPEN: Evidence that total biomass present in freshwater body (e.g., a lake) falls within the established carrying capacity.		

	2.3.4. FLOW: Evidence of use of sediment traps	Se solicita aclarar si las trampas que aquí se solicitan son para el muestreo de sedimento o para la captación de sólidos presentes en el ril.	Explicitar el indicador
Principle 4: **USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER**	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un periodo transitorio para su implementación.
	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que serán consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **benthos.**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **sedimento.**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.
	5.5.1. Percentage of cages or pens that are single-year class (generación)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **a peces** de la misma generación.

<table>
<tr><td></td><td>5.5.5. Re-occurrence of a specific disease over more than one generation</td><td>Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.</td><td>Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.</td></tr>
<tr><td><u>General comments for Grow out and Smolt production</u></td><td colspan="3">1. El estándar debe considerar que, en caso de contradicciones en las normativas nacionales e internacionales, <u>primarán las nacionales.</u>

2. El Estándar debe considerar la verificación de los indicadores a través de información objetiva y documentos legales de la empresa y evitar vacíos en la aplicación de criterios y subjetividades.

3. No queda claro con la información disponible cuales son aquellos puntos que son de cumplimiento obligatorio y si se ha pensado en la ponderación de cada uno de los indicadores de acuerdo a su impacto.

4. Aclarar para aquellos indicadores del criterio 4, que los peces que se pretende resguardar son los endémicos y no silvestres.

5. Existen indicadores de carácter social (en especial lo relacionado con pueblos originarios) que corresponden a políticas públicas de los países, las cuales superan el alcance de un centro en particular y la empresa.

6. En materia laboral, se sugiere que el estándar quede sujeto a las normas laborales de cada país y a las internacionales reconocidas por ellos.

7. La industria salmonera chilena, considera que existen indicadores con poca claridad en algunos de ellos, dado que las metodologías están en discusión no validadas. Por ello, se estima que pocos centros alcanzarán la certificación y el efecto será mínimo. Se sugiere revisar indicadores y estándares de a cuerdo a lo expuesto.

8. Se hace necesario definir la ponderación de cada indicador en la evaluación final. Se sugiere que cada uno ellos tenga un nivel de criticidad, de acuerdo al impacto.

9. Se sugiere eliminar aquellos indicadores que son por “áreas” ya que exceden el alcance de una instalación en particular.</td></tr>
</table>

Nāturxan™
enriching life, naturally

Aquasta®

AQUASTA® *Phaffia rhodozyma* YEAST

To WWF

Miss Katherine Bostick

Aquasta® Product as a Renewable Source of Natural Astaxanthin in Fish Feed.

Comments to be presented at WWF:
Aquaculture Stewardship Council for Salmon and Trout Sustainable Standard

The pink-red flesh color in salmon and trout is achieved with the accumulation of free astaxanthin, which in the case of wild fish is obtained from their prey.

In the case of farm raised salmon and due to the fact salmonids cannot synthesize these carotenoids themselves, the astaxanthin must be added to the feed to achieve the desired color (B. Bjerkeng and G. M. Berge, 2000).

The flesh color in the case of salmonids (Salmon and trout) is considered from the consumer's point of view, the most important quality criteria, and drives the purchasing decision. Freshness is the second most important quality criteria which is true for all fish. (Sigurgisladottir et al 1997).

Besides the color expression, astaxanthin plays other roles on fish, crustaceans and other species. These nutritional functions are related to acting as a powerful antioxidant which have been demonstrated to be 550 times stronger than Vitamin E and 10 times stronger that beta-carotene (Shimidzu, Goto, Miki, 1996). It is a precursor to Vitamin A (Torrissen and Christiansen, 1995), helps fertility and egg quality (Sigurgisladottir, et al., 1994, Sawanboonchun et al., 2008, Pangantihon-Kühlmann et al., 1998) and has a positive effect on growth and disease resistance in Atlantic Salmon (Christiensen et al., 1995).

Naturxan LLC is a joint venture between Archer Daniels Midland Company and Igene Biotechnology Inc. Through the joint venture's parent companies, they have identified and developed for over a decade the P*haffia rhodozyma* yeast and the fermentation process of this yeast, to obtain a sustainable and naturally-source of astaxanthin under the brand Aquasta®.

What Naturxan LLC has achieved is the capacity to offer to the fish farming industry a safe source of astaxanthin, which is made from renewable ingredients without the use of petrochemicals or recombinant DNA modification to the production organism, and therefore helps satisfy the health and purchasing preferences of consumers and retailers that prefer aquaculture products derived from safe methods using natural components .

Besides the organic market, Aquasta® has qualified as the only natural –source astaxanthin for retail stores that promote their farm raise salmon as "Responsible farmed" and "Responsible sourced" which have gained the recognition from consumers and this initiative is expanding to others retail stores and third party certifiers.

The organic food market has growth considerably during the last decade, with a 5% to 20% growth rate per year in markets like Europe, Japan and United States. On a worldwide level, the social consciousness of consumers is increasing as well as their demand to know the traceability of the product they are purchasing and are asking for a diminishing impact over the environment and less use of synthetic components.

Naturxan LLC offers to the worldwide Aquaculture market an environmentally safe, effective and renewable solution for the most important quality criteria for salmon and trout, which is the red color of the flesh.

9110 Red Branch Road • Columbia, Maryland 21045-2024
Phone: (+1) 443 542 5077 • U.S. Toll-Free: (+1) 888 PHAFFIA (742 3342) • Fax: (+1) 410 730 0540 • www.naturxan.com

While the aquaculture industry was once dependent on synthetic, non-renewable sources of astaxanthin to achieve the signature pink color of wild salmon, naturally sourced Aquasta® has proven as effective as synthetic astaxanthin through tests of various feed product extrusion processes, production timelines, storage temperatures, and in commercial field trials involving fresh, frozen and smoked fish such as Atlantic salmon, Coho salmon, King Salmon and Rainbow trout.

Aquasta® is accepted by key organic programs around the world, including Naturland, BioSuisse, DEBIO, KRAV, DEFRA, POSA, the Organic Food Federation, the Irish Organic Farmers and Growers Association and Agriculture Biologique among others.

Together with organic, sustainability is becoming a standard in the international market where the global demand for fish is growing faster than supply and sustainability becomes a big question mark.

Organic and sustainability has become a standard for all major retail stores like Wal-Mart, Kroger, Costco, Whole Foods, Carrefour, Mark & Spencers and Sainsbury among others.

Investors and major retailers do not want to be exposed to negative press because of product that comes from unsustainable sources.

Naturxan LLC supports consumers and farmer's concerns and offers to the worldwide aquaculture market a sustainable and renewable solution for the most important quality criteria for salmon and trout, which is the red color of the flesh.

Naturxan LLC through its mother company ADM, as a leading agricultural processor, recognizes the importance of taking steps to lessen our environmental impact. The ADM 2008 materiality assessment identified climate change and water-resource management as two important areas of focus and the company also has initiated several other projects and programs geared toward environmental improvement.

ADM strives to lessen the environmental impact of operations while enhancing the integrity and sustainability of our global supply chain. These improvements focus on developing a sustainable supply chain consequently decreasing the environmental impact of operations.

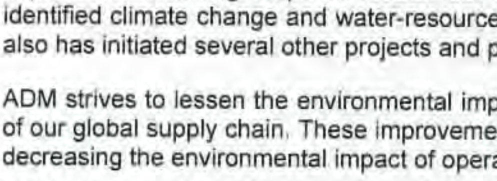
Related to global supply chain, the major efforts involve implementing and maintaining responsible agronomic practices, conserving natural resources and minimizing the use of potentially harmful chemicals. Procedures have been implemented to mitigate potentially negative environmental impacts of raw material producing operations. Adherence to strict labor and workplace standards prohibiting exploitation, discrimination and unfair, unlawful or unethical practices are in place that comply with all local, national and international laws governing their operations.

ADM believes that sustainability is a vital part of business. For more information go to www.adm.com/responsibility

All at Naturxan are excited to be part of the **WWF Aquaculture Stewardship council standard** and offer all the necessary information that you may request to know our company, policy and products.

Best regards,

Naturxan LLC



Richard M. Grelewicz
Chief Executive Officer

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this bulletin are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laboratory prior to use. Our responsibility for claims arising from breach of warranty, negligence, or otherw limited to the purchase price of the material. Freedom to use any patent owned by ADM or others is not to be inferred from any statement herein.

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

***Name: Jorge Torres**
***Organization/Company: Naturxan LLC**
***E-mail address:**

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 4	**4.4.1 & 4.4.2**	**SEE NEXT PAGES**	The standard must indicate the source of Astaxanthin because this carotenoid is a essential nutrient on salnon diets (wild and farmed) not only responsible for color expression. Today exist methods that can obtain naturally - renewable source of Astaxanthin and also according the 7 principles on the Standard. Besides that the Astaxanthin is more than a food safety issue, the color of the flesh is the most important quality criterion and drives the purchased decision from the consumers, so if you can't tell the difference between synthetic and naturally renewable astaxanthin the standard will be weak and the consumers will see a sustainable standard that allows synthetic colorants from non renewable sources and for sure the Retail Stores and consumers will starts asking about the origin of the color. The standard can not include only those Raw Materials that are sources of proteins and lipids, because the fish diets are much more that that.

COMMENTS TO BE RPESENTED TO WWF:

PRINCIPLE 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER

Criterion 4.4 Source of non-marine raw materials in feed

Indicator 4.4.1

Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with recognized crop moratoriums and local laws

Indicator

4.4.2 Documentation of use of transgenic plant raw material or raw materials derived from genetically modified plants, in the feed

COMMENTS

The fish feed ingredients include Protein, Lipids, Carbohydrates, Vitamins, Minerals, and carotenoids among others.

All of these ingredients must be added to the feed of farm raise species like trout and salmon, in order to have a healthy fish and to fulfill the entire fish's physiological requirement to reach the harvest mean weight after several months on the farm.

In the case of carotenoids, the fish feed must contains Astaxanthin which besides acting as a pigment it plays different roles on fish nutrition like acting as a powerful antioxidant which have been demonstrated to be 550 times stronger than Vitamin E and 10 times stronger that beta-carotene (Shimidzu, Goto, Miki, 1996). It is a precursor to Vitamin A (Torrissen and Christiansen, 1995), helps fertility and egg quality (Sigurgisladottir, et al., 1994, Sawanboonchun et al., 2008, Pangantihon-Kühlmann et al., 1998) and has a positive effect on growth and disease resistance in Atlantic Salmon (Christiensen et al., 1995).

Besides that and from the consumer's point of view the flesh color in the case of salmonids (Salmon and trout) is considered the most important quality criteria, and drives the purchasing decision. Freshness is the second most important quality criteria which is true for all fish. (Sigurgisladottir et al 1997).

Today it is possible to obtain a commercial source of natural Astaxanthin through the fermentation process of the yeast *Phaffia rhodozyma*. The product is available under the brand Aquasta® and it is produce by the company Naturxan LLC a joint Venture created between ADM Company and Igene Biotechnology Inc.

This source of natural Astaxanthin is safe and it's made from renewable ingredients without the use of petrochemicals or recombinant DNA modification to the production organism, and therefore helps satisfy the health and purchasing preferences of consumers and retailers that prefer aquaculture products derived from safe methods using natural components.

While the aquaculture industry was once dependent on synthetic, non-renewable sources of astaxanthin to achieve the signature pink color of wild salmon, naturally sourced Aquasta® has proven as effective as synthetic astaxanthin through tests of various feed product extrusion processes, production timelines, storage temperatures, and in commercial field trials involving fresh, frozen and smoked fish such as Rainbow trout, Atlantic salmon, Coho salmon and King Salmon.

Naturxan LLC through its mother company ADM, as a leading agricultural processor, recognizes the importance of taking steps to lessen our environmental impact. The ADM 2008 materiality assessment identified climate change and water-resource management as two important areas of focus and the company also has initiated several other projects and programs geared toward environmental improvement.

ADM strives to lessen the environmental impact of operations while enhancing the integrity and sustainability of our global supply chain. These improvements focus on developing a sustainable supply chain consequently decreasing the environmental impact of operations.

Related to global supply chain, the major efforts involve implementing and maintaining responsible agronomic practices, conserving natural resources and minimizing the use of potentially harmful chemicals. Procedures have been implemented to mitigate potentially negative environmental impacts of raw material producing operations. Adherence to strict labor and workplace standards prohibiting exploitation, discrimination and unfair, unlawful or unethical practices are in place that comply with all local, national and international laws governing their operations.

Naturxan and ADM believe that sustainability is a vital part of business. For more information go to www.adm.com/responsibility

All at Naturxan are excited to be part of the **WWF Aquaculture Stewardship council standard** and offer all the necessary information that you may request to know our company, policy and products.

Best Regards
Naturxan LLC

NEW BRUNSWICK SALMON GROWERS ASSOCIATION

WWF SALMON AQUACULTURE STANDARDS

Comment on Draft Salmon Aquaculture Dialogue Standards

Name: Pamela Parker, Executive Director
Organization/Company: New Brunswick Salmon Growers Association
E-mail address:

I am submitting the following comments on behalf of the New Brunswick Salmon Growers Association of Canada.

Our general comments on the draft standards document are:

- General tone of the document is negative on aquaculture; as a framework document that sets out standards that provide a basis for a certification program, language and tone should be neutral

- Many indicators and/or standards are not within the scope of an individual farming operation nor are they within their area of responsibility. This is particularly true in the area of wild species monitoring for disease and parasites and in feed manufacture

- Setting definitive measurements for a global industry working in very different, very dynamic ecosystems is simply not possible. If these indicators and standards are to be science based the regional differences must be acknowledged. In some cases the focus should be on a desired outcome verses meeting a specified target – this would be adopting the performance based approach that was the original intended goal of the Salmon Dialogue.

- Monitoring on-farm disease, pathogens and parasites is possible; however, monitoring wild salmonids is beyond the scope of individual farms and should not be required.

- Throughout the document the term 'health' is used and it does not always appear to mean the general condition of the fish or the vitality / economic condition of a community. This should be amended.

The following is a detailed table of the comments we would like to submit on the various principles, indicators and standards.

PRINCIPLE 1: COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS			
General Comments on Principle 1: • *The SC has identified the difficulty that some farms will have in collecting the necessary documents from brokers and/or distributors to prove compliance to regulations; however, sales could not be made if the product did not meet the guidelines set down by the regulatory authorities regarding flesh quality, etc. A standard and indicator should focus on addressing the real driver behind each issue under the appropriate category.* *We submit comments on the following indicators and/or standards:*			
1.1.5	Presence of documents demonstrating compliance with importing laws of countries1 that have received products from the farm within the past 12 months	**	*Because many producers sell to a broker or distributor they may not be able to meet this indicator. Suggest that the focus of an indicator specifically address exactly what is the real driver or intent of this indicator.*
PRINCIPLE 2: CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION			
General Comments on Principle 2: • *A salmon farm cannot be held responsible for the population variability of wild species within the proximity of that farm* *We submit comments on the following indicators and/or standards:*			
2.1.1	Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)2	Redox potential > 0 millivolts (mV) Sulphide ≤ 1,500 microMoles / l	*Should be clear this only applies to soft bottom substrates*
2.1.2	AZTI Marine Biotic Index (AMBI3) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	AMBI score ≤ 3.3	*This additional testing / measurements should only be necessary if readings required in 2.1.1 reach a certain level. Also suggest the development of a more user-friendly method of measurement. Should be clear this only applies to soft bottom substrates.*
2.1.3	Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1	≥ 2 highly abundant taxa	*The use of the AZTI would not be a viable measurement tool. In addition there is concern that based on the vast diversity in benthic fauna amongst all geographic regions and graduations between soft and hard bottom surfaces establishing a meaningful standard would be extremely difficult.*

			Any potential standard should only be required if there is a concern outside the allowable zone of effect.
2.2.1	Weekly average percent saturation of dissolved oxygen (DO) on farm	≥60%	*Sample times should be amended to read morning and afternoon since it may not be possible to conduct these samples at 6 a.m. in some jurisdictions at all times of the year.*
2.3.1	Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I subsection 2)	<1% by weight of the feed	*Amend to have the verification of fines accepted as per feed label. At the very most sampling methodology should be confined to sampling upon feed delivery at the warehouse only not upon subsequent delivery at a farm site.*
2.4.1	Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have	Yes	*This indicator appears to be reasonable and allows the regulators within each jurisdiction to regulate this aspect. Additional, global standards are likely not appropriate based on significant ecosystem differences between regions.*
2.5.3	Number of marine mammals and birds killed through the use of lethal action8	0 **	*Allowance should be made to enable lethal action in exceptional circumstances to support humane response to such a circumstance*
2.6.1	Presence or absence of selected sensitive or sentinel species	**	*Delete. While intent for the indicator may be admirable it is not practical based on global diversity, natural variability and impact from other marine resource users. The intent of this indicator is addressed through other indicators throughout this document.*

PRINCIPLE 3: PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS

General Comments on Principle 3:

- *Standards are not intended to 'develop a global body of research' (p23) and it is inappropriate to expect them to do so*
- *National regulators do no certify or accredit third party auditors; this process is done through alternate means (p23)*
- *The intent of these standards was to be science based; therefore, setting uniform global indicators for environmental factors is inappropriate.*
- *The responsibility for monitoring wild salmonids is not within the capacity or jurisdiction of a salmon farm and in many cases it would be illegal for them to do so and pose significant risk to already marginal wild stocks*
- *SC consideration of a standard to address the issue of interbreeding seems inappropriate based on current science. The more appropriate and measurable standard is on prevention of escape.*
- *Since standards must be measurable the consideration for the addition of a 'margin of error due to counting technology' is*

inappropriate. *We submit comments on the following indicators and/or standards:*			
3.1.1	Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport. Detailed requirements are in Appendix II.	Yes	*We can support the concept of area based management; however, the requirements in Appendix II are beyond the scope of a single farm. Examples include: monitoring of wild fish (illegal in some jurisdictions) and transport of fish.*
3.1.2	An assessment of key regional cumulative impacts of the farm and its neighbors, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.	Yes	*Through regulations, all farmed salmon enter the farms disease and parasite free; therefore they should not be considered as the sources. Management of on-farm disease and parasites should be the focus of indicators. Where farms have existed for some time, changes to cumulative impacts may not be attributable to the farm – it could come from another source.*
3.1.3	A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.	Yes	*Support showing a demonstrated commitment to collaboration. However the last sentence"* Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild." *should be deleted. Measuring sea lice levels on wild salmonids is not the responsibility of a farm operator and n many jurisdictions it is both illegal and impractical due to the critically low levels of wild salmonids and sampling often results in death.*
3.1.4	Maximum average sea lice levels on all farms in the area-based management scheme.	**	*Suggest that this be amended to read: Maximum average sea lice levels on all farms in the area-based management scheme based on regulation within the jurisdiction of the farm.*
3.1.5	Timing of wild salmonid outmigration and juvenile periods is well established and monitored.	Yes	*Delete this indicator – It is not the responsibility of the farm to monitor the timing of wild salmonid outmigration; this is already*

			established.
3.1.6	Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)	Yes	*This is not practical in all salmon farming regions due to critically low levels of wild salmonids and the fact that the best monitoring programs require fish to be killed. Sea lice levels will vary from year to year and ongoing monitoring should not be a requirement for certification. Sea lice management at the farm level can and should be the indicator.*
3.1.7	Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids).	Maximum 0.5 mature sea lice per fish or 3 total sea lice. **	*The indicator should be revised to: Meet regulated average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids).* *Remove the maximum standard.*
3.1.8	In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.	TBD **	*The indicator should be revised to: Meet regulated average sea lice levels on all farms in the area-based management plan during juvenile outmigration of coastal trout.*
3.1.9	Period of demonstrated compliance with standards in 3.1 prior to initial certification.	Under discussion **	*If you want to encourage participation in this program – suggest that no period of compliance to the standards be required; however, demonstration of regulatory compliance for a specified period could serve as an alternative.*
3.2.1	If a non-indigenous species is being farmed, evidence and documentation that the species is already widely used in commercial production locally by the standards release date; AND, one of the following is met: A) There is no evidence of establishment or impact in adjacent ecosystems B) The species has been approved for aquaculture use by a process based on ICES code of practice on the introductions and transfers of marine organisms or comparable protocol	Yes **	*Suggest that if additional information is required it be a certificate from the regulatory body and/or report of a risk assessment showing little to no potential impact*
3.2.2	Use of non-native species for sea lice control or on-farm management purposes	None	*Suggest amendment similar indicator be established in this category as in 3.2.1 since the use of cleaner fish for sea lice control can*

			provide a 'green' solution to reducing sea lice within an eco-system
3.3	Use of transgenic salmon by the farm	None	*No comment*
3.4.1	Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes	No more than 0.1% more than the documented accuracy of the counting machines or counting method used **	*Amend to read "Percentage of fish loss during a production cycle (from count at transport to harvest). Certification is for the individual fish farm and not all farms have control at the hatchery level (pre-smolt vaccination)s.* *It will be difficult to ensure the integrity of this indicator because getting accurate counts is very difficult due to current technology and human error at the eyed-egg/pre-smolt stage.*
3.4.2	Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	0	*Amend this to reflect that the maximum escape is based on a percentage of cage production (i.e. 10%)*
3.4.3	Evidence of compliance with national regulations and technical standards aimed at reducing the risk of escapees	Yes	*Amend to read: Evidence of compliance with regulations and technical standards…" Not all jurisdictions are regulated nationally*

PRINCIPLE 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER

General Comments on Principle 4:

- *While we respect the intent to ensure that feed is sourced from a reputable source, many of the indicators and standards for feed are beyond the scope of a single farm operation*
- *We do not feel additional standards that require improvement plans for waste management will be required as these are part of a business cycle and would occur naturally as a result of certification audits*
- *Energy consumption and green house gas emissions needs to be revisited to ensure that a farm is only being measured by those areas over which they have control*
- *It's difficult to understand why, then the document states that the variability in environmental factors makes it very difficult to identify a generic threshold of copper, a threshold is established. There is also no recognition that copper and other metals occur naturally and from other sources so to have a rigid measurement seems even more inappropriate.*
- *We believe that the WWF must ensure that they have done extensive consultation with the feed manufacturers and suppliers prior to finalizing any standards related to salmon feed*

We submit comments on the following indicators and/or standards:

4.1.1	Presence and evidence of traceability of all raw feed ingredients with regard to country of origin, as demonstrated by the feed producer	Yes	*How will this be demonstrated by the feed producer?*
4.2.1	Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1)	<1.31 **	*Requires further consultation with the fish feed sector*
4.2.3	Fish Protein Index (FPI) for grow-out (calculated using formulas in Appendix IV, subsection 2)	80% prior to January 2014 and >100% as of January 1, 2014	*Requires consultation with the fish feed sector*
4.3.2	Prior to achieving 4.3.1, the FishSource score[18] for the fishery(ies) from which a minimum of 80%[19] of the fishmeal or fish oil is derived. (See Appendix IV, subsection 3 for explanation of FishSource scoring.)	TBD **	*To be determined in consultation with the fish feed sector*
4.3.4	Feed containing fishmeal and/or fish oil originating from by-products[21] or trimmings from fish species which are categorized as vulnerable, endangered or critically endangered, according to the IUCN Red List of Threatened Species.	None	*Note: IUCN does not have "threatened' species category*
4.4.2	Documentation of use of transgenic plant raw material, or raw materials derived from genetically modified plants, in the feed.	Yes, for raw materials containing more than 1% transgenics	*The standard of 1% appears arbitrary. Amend to set levels based on knowledge of the biological effects of the ingredient (i.e. corn versus soy, etc.)*
4.6.3	Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology	Yes	*Need to define what will be used to measure GHG* *Ensure footnoted items that determine GHG emissions will be under the control of the farm (i.e. processing, transportation of raw materials, etc.)*
4.7.1	Percentage of copper-treated nets that are cleaned and treated in situ in the marine environment	0%	*Light cleaning must be allowed*
4.7.3	Copper concentration in the sediment outside of the Allowable Zone of	34 mg Cu/kg dry sediment weight	*An absolute value of Cu should not be used; there are background*

	Effect (AZE) at marine grow-out sites		*levels of Cu and other metals in the environment that are not a result of farm operations.*
4.7.4	If the copper level in the sediment is greater than the allowed level in 4.7.3, presence and evidence of a risk assessment conducted by a qualified third party demonstrating that the copper concentration in the sediment does not represent an environmental hazard	Yes	*This could be eliminated with the use of the geonormalization technique*
4.7.5	Evidence that the type of biocides used in net antifouling are approved according to legislation in the European Union or United States	Yes	*All jurisdictions should be included (i.e. Canada)* *Amend to read* – Evidence that the type of biocides used in net antifouling are approved according to jurisdictional regulation.
PRINCIPLE 5: MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER			
General Comments on Principle 5: • *It is critical to remember that all fish entering a marine site enter disease free; this section does not reflect this in the language used throughout the section. Nor has consideration been given to diseases that are endemic to wild fish in an area and the impact that this can have to on-farm fish health management.* • *Correlation to bivalve aquaculture on P 43 is unfounded and therefore inappropriate* *We submit comments on the following indicators and/or standards:*			
5.1.6	Percentage of dead fish that are recorded and receive a post-mortem analysis	100%	*Agree with recording 100% of mortalities. If on-site diagnosis is inconclusive then only a representative sample should need a post-mortem. Because decomposition takes place very quickly post-mortems may not be possible.*
5.1.7	Maximum mortality rate of farmed fish during the previous two production cycles	≤25% **	*This standard will preclude a new site from being certified. Indicator and standard should make allowance for mortality caused by environmental factors (i.e. algae blooms, extreme water temperatures, etc.)*
5.1.8	Maximum unexplained mortality rate from the previous two production cycles	≤40% of total mortalities	*Remove the threshold of 40% and amend the standard to focus on fish health professionals demonstrating that they are tracking mortalities (and related records of potential causes); and that they are analyzing data in a proactive manner to identify trends, possible*

			issues, and potential changes in farming practices that may be required to reduce mortalities.
5.1.9	A farm-specific mortalities reduction program that includes defined annual targets for reductions in mortalities and reductions in unexplained mortalities	Yes	*Delete – the intent of this standard is addressed in 5.1.1*
5.2.2	Allowance for concentrations of selected chemicals and therapeutants in the benthos	TBD**	*Risk assessments are part of the approval process for most products used on salmon farms.* *Suggest this standard be amended to read: Documentation that shows that all chemicals and therapeutants used to manage disease and parasites have undergone a risk assessment on impact to sediments prior to use.*
5.3.4	Allowance for prophylactic use of antimicrobial treatments	None	*This standard should be amended to enable vets to treat when a pathogen is present and not restrict treatment on when the disease has occurred. For diagnosed diseases with carrier status (i.e. BKD)vets should have the ability to treat prior to environmental conditions causing increased mortalities.*
5.4.2	Bio-assay analysis to determine resistance when two applications of a treatment have not produced the expected effect	Yes	*Suggest amendment of the goal for a 90% reduction in lice as a result of treatment is too high and does not include consideration of environmental factors affecting lice*
5.4.4	Use of antibiotics listed as critically important for human medicine by the World Health Organization	None **	*Any standard should allow some allowance for use of these products since little to no product residue (as per regulation)would remain in the meat when the fish is harvested*
5.5.1	Percentage of cages or pens that are single-year class	100%	*No comment*
5.5.2	Percentage of fish transferred live from one sea-based farm site to another, unless explicitly accepted by the designated veterinarian not to increase disease spreading risk	0%	*Amend: Percentage of fish transferred…. unless explicitly accepted by the designated veterinarian and/or authorized by the regulating authority.*
5.5.3	Percentage of fish transported to slaughter in a closed wellboat or a wellboat with discharge treatment and disinfection	TBD **	*Well boats cannot access all farming sites. If fish are healthy there is no reason for the requirement of closed well boat.* *Alternatively, amend to read: Percentage of fish transported to slaughter in a closed system with discharge treatment and disinfection*

5.5.5	Re-occurrence of a specific disease over more than one generation	TBD **	*Disease is transferred from wild fish to farmed fish. If re-occurrence occurs it is because of disease in the wild fish which is beyond the control of the farm. Delete this standard.*
PRINCIPLE 6: DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER			
General Comments on Principle 6: • *The document acknowledges that the unity of certification is the salmon farm; while ensuring that all salmon farms only use suppliers, processing facilities, etc. that also operate in a socially responsible manner this may not be possible to achieve based on the remoteness of the farm location* • *It is critical that what would constitute 'evidence' is provided for many of these indicators* *We submit comments on the following indicators and/or standards:*			
6.1.1	Evidence that workers have access to trade unions (if they exist) and union representative(s) chosen by themselves without managerial interference	Yes	*What would constitute evidence?*
6.1.2	Evidence that workers are free to form organizations, including unions, to advocate for and protect their rights	Yes	*What would constitute evidence?*
6.1.3	Evidence that workers are free and able to bargain collectively for their rights	Yes	*What would constitute evidence?*
6.5.6	Evidence that all diving operations are conducted by divers who are certified for the task	Yes	*Amend – Evidence that all diving operations are conducted by divers who are certified. Very few certification programs are available that are specific to diving on salmon farm sites.*
6.7.2	Evidence of a policy to ensure social compliance of its suppliers and contractors	Yes	*Providing 'evidence' may not be possible if all aspects of the supply chain were included*
Criterion 7.1 Community Engagement			
General comments on Criterion 7: • *What is the difference between a 'Principle' and a 'Criterion'? (questioning why this is a criterion when the others are pinciples)*			

• *It is impractical to expect auditors to have the capacity to review all meeting reports, minutes and interview community representatives to meet the requirements under section 7.2* *We submit comments on the following indicators and/or standards:*			
7.1.4	Evidence of third party assessment of health effects on community	Yes	*Is 'health' defined as the state of the physical body of the citizens or the vitality and economic health of the community? This requires a defining.*
7.1.5	Evidence of effective communication with community representatives to ensure that any displacement of communities will not have adverse impacts	Yes	*'displacement of communities' and 'adverse impacts' requires definition. Salmon farms do not displace communities and adverse impacts in this context is not understood.*
7.2.1	Evidence of acknowledgement of indigenous groups' rights and titles (where applicable)	Yes	*What would constitute evidence?*
7.2.3	Evidence of successful consultation with aboriginal people and support from governance structures in the locality prior to site license approval	Yes **	*Acceptable for new site development.* *Existing site should only need to provide evidence that consultation has taken place and engagement of local people takes place when management changes are contemplated.*
7.3.1	Changes undertaken restricting access to vital community resources without community approval	None	*Amend: New farm siting or changes to existing farm boundaries meet all regulatory requirements and include a community consultation.* *The definition of 'vital community resources' needs to become more specific and should be based on regulatory parameters of the jurisdiction.*
7.3.2	Evidence of assessments of company's impact on access to resources	Yes	*Delete - This is redundant –the intent duplicates 7.3.1*

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Michael Tlusty, Katy Hladki, Matt Thompson
*Organization/Company: The New England Aquarium
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

Preamble:
These comments are provided to the Salmon Aquaculture Dialogue (SAD) on the Draft Standards for Responsible Salmon Aquaculture by the New England Aquarium. Founded in 1969, the New England Aquarium is a global leader in ocean exploration and marine conservation and is committed to building awareness and finding innovative solutions through our marine conservation and research initiatives. The Aquarium's Sustainable Seafood Advisory Services (SSAS) aims to foster long-term sustainability of seafood resources and their supporting ecosystems by raising public awareness and working with the seafood industry to promote continuous improvements and best practices within wild-capture fisheries and aquaculture operations. We appreciate the opportunity to review and comment on these draft standards. These comments should not be considered an endorsement of the SAD or its standards; neither should the suggestions made be considered conditions to obtain that endorsement. We recognize the challenges and potential benefits of certification schemes and offer comments and suggestions to strengthen these standards. These comments are presented from a general perspective and are not prescriptive, as the SAD Steering Committee will generate the specific technical values.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	It seems overly prescriptive to require this. This issue should be dealt with by importing countries and does not have significant environmental consequence.	Change standard to demonstration of no import or export rejections over the past 12 months?
Principle 2	2.1.1	Are these for depositional or erosional environments or are the same measures used for both? If the same values are used for both then the stringency is disproportionate between the two environments.	Create specific standards based for depositional and erosional environments.
		The values for redox and sulphides are not equivalent in terms of the level of organic enrichment	If farms are only required to measure one parameter, values should be set as equivalents.
	2.1.1	The measure of redox would be difficult to meet for farms in depositional environments.	Re-evaluate this number.
	2.1.3	It appears that as set, this standard could potentially allow for significant habitat degradation.	This should be evaluated as a result of local condition, sediment type, and anticipated impact.

	2.1.1	Sulphide of 1,500 μM/l is high too high to protect from environmental degradation of the benthic habitat.	Re-evaluate this number, for reference see New Brunswick salmon regulations where action is required at 1300μM sulphide levels.
	2.1.1-2.1.3	All of these standards are set too high if measured outside the AZE.	All of the measurements in these standards should be taken directly under the cage at peak biomass. The standards should require that farms be at reference conditions (sampled accordingly) outside of the AZE.
	2.2.2	1.85 mg/liter DO is too low.	Reevaluate this number.
	2.3.1	This seems like a minuscule part of the overall impact of nutrient release. Feed is the most expensive operational cost and fines are likely minimized by farms anyways.	Measure or at least collect information on mass balance approach.
	2.4.1	This standard is too vague.	Needs to be specifically address in audit guidance document.
	2.5.2	This standard is too vague and too difficult to audit. Is the two year phase out date necessary to capture the top performers?	Ban AHD from point of standard publication.
	2.5.3	As written this standard is not strong enough. Also I have concerns that based footnote number eight farms may be used loop hole.	No intentional killing, a cap of accidental entanglements or humane killings. And no killing of red list species for any reason.
	2.6.1	This is too erroneous for one farm and too dependent on other activities outside the realm of the farms control. It should be covered under standard 2.4.1.	Delete
Principle 3	3.1.1	A farm can not control another farm outside of their company or legal requirement to be in an AMA. A farms certification should not be dependent on another farm that is not seeking certification.	The farms should operate in a coordinated, area-based fashion with all other ASC certified farms in the area. Where legal AMAs exist, ASC requirements over and above the AMA requirements must be met by ASC farms in the AMA unless legally prohibited.Farms not seeking certification can not be expected to be held accountable to this standard.
	3.1.1	Effective area-based management schemes must have defined boundaries to make them relevant.	An explanation of how management areas will be defined is necessary in this standard. Management areas should be defined by hydrographic information.
	3.1.4	One farm could create pressure that forces all other arms in the area to over treat in order to keep the “area average down”. Farms should not be responsible for actions outside their farm activity or control. This standard also heavily favors Chile, as the only major production region without salmonids.	Limit the average number of lice to on farm. Set lice levels at a precautionary level as to satisfy the intention of this standard. Note: at least half the salmon producing countries already have lice limits on salmon therefore, any level set by this should exceed most legal limits, otherwise it would be addressed by principle one.
	3.1.5	This has more to do with scientific research and not farm activity.	Remove and replace with a standard that is controllable by the farm such as distance from out

			migration rivers or inclusion of available science into risk assessments. A standard such as: not allowing salmon farms within X distance could eliminate the need for 3.1.7-3.1.9
	3.2.1	Should we be limiting farming to areas where it is not already commercially produced? What constitutes commercial production? Farming in an area that does not have establishment is worse than farming in an area where establishment has occurred because the potential for establishment remains. Furthermore this, standard is not consistent with other steering committee decisions i.e. tilapia.	Either eliminate or re-word part A of this standard. Consider the allowance of farming in areas without commercial production. As it is written now, it appears to be a safeguard for the Chilean industry to keep producing.
	3.2.2	Use of fish for biological control on farms should come from robust populations if not farm raised.	Include an aspect of population health for species used for biological control.
	3.3	What about in closed containment?	At this time do not prohibit unconditionally.
	3.4.1 and 3.4.2	These two standards together seem very difficult to achieve.	The intention of these two standards could be achieved through an overall cap of total fish loss at X% or X number of fish which includes, escapes and unknown fish losses.
3.4.2		Footnote 16	Define "high-traffic areas"
3.4.3			Move to legal section
3.4.4			Define "system robustness"
Principle 4	4.1.1	Do these need to be made public?	Clarify in the document
4.3.1			Commitment to source feed containing >90% fishmeal AND fish oil….certified under an ISEAL OR COMPARABLE…
	4.3.1	This standard is too vague.	Who determines this standard? How is availability of resources determined?
	4.3.2	Concern that this standard may ultimately exclude small producers or other less powerful aquaculture industries from being certified.	If this standard or some variation of this standard is in all of the Aquaculture Dialogue standards and a limited amount of fishmeal and fish oil is available to meet these criteria. Thus it maybe that these resources are only available to bigger, richer industries, and as such are the only ones able to get certified?
	4.3.3	This standard is too vague. Also why is ISO 65 acceptable for this standard but not for 4.3.1?	Define what is "acceptable traceability"
	4.5.2	This standard is too vague.	Who determines what is "proper" disposal of non-biological waste?
	4.6.3	This standard seems overly difficult for a single farm to achieve.	Remove, or would be better suited in a specific feed standard.
4.7.5		This standard needs further explanation.	What is considered approved? What about chemicals that are not banned but are not approved or chemicals that have residue limits?

			What about Canadian regulations?
Principle 5			
	5.1.2	Vet visits should be increased during periods of increased risk from or in the presence of disease.	Beyond setting a limit of vet site visits also include provisions requiring increased visitation and monitoring during disease or parasite outbreaks
	5.1.6	This standard seems very difficult to enforce and meet.	Is this necessary for all mortalities. Is this even feasible. What if there is mass disease mortality does an analysis need to be done on every fish?
	5.1.7	The allowable number is set too high.	This standard should be lowered.
	5.1.8	The allowable number is set too high.	This standard should be lowered. Furthermore, it seems to conflict with 5.1.6.
	5.2.1	This standard is not strict enough.	Targets should be set for maximum allowable amounts of chemical use or at least reduction of chemical use over X years.
	5.2.2	This does not consider the effects of point source pollution in the area. It also does not take into consideration impacts on other aquaculture activities in the area.	This standard should be written to ensure that farms are not being penalized for other sources of pollution in the area. It also does not take into consideration impacts on other aquaculture activities in the area. Create a standard for either distance from other non-salmon aquaculture facility or testing procedures.
	5.3.1	If chemicals are banned they should be covered by standards dealing with laws and regulations. Also what about chemicals that are allowed but have residue limits? The U.S. is not a primary farmed salmon production country.	Remove this standard and replace it with a standard that specifically addresses residue limit issues. Remove the U.S. as a primary salmon production country in footnote 42.
	5.3.3	This standard requires verification with subsequent residue testing.	Verify standard with residue sampling.
	5.3.4	Redundant based on standard 5.3.2	Remove.
5.4.2			Bio-assay resistance testing should be done before fish are treated.
	5.4.4	These chemicals may be needed in hatchery production which can be contained through closed production.	No use in open-production. Residue levels must be verified with sampling.
	5.5.2	This standard is too vague.	No movement of live fish from one sea site to another or holding in open systems at processing plants.
	5.5.3	This standard should be absolute	100% of fish transport in closed wellboats.
	5.5.4	This standard needs to be more clearly defined. Furthermore, there are no baseline biosecurity measures within this criterion for which "additional" biosecurity can be measured against.	Define "additional biosecurity" measures. Define "strong disease management." This criterion should also include biosecurity minimums or baselines i.e. footbaths, separate dive equipment, etc. Lastly, if it is determined by a fish health profession that the exotic disease or parasite is not 100% treatable culling should be mandatory.

	5.5.5	This standard is too vague	Define "specific disease" also consider including a standard on the number of overall disease occurrences. A farm that gets several new diseases or different variations of the same disease each year is probably not operating any better than a farm that gets the same single disease each year. What about untreatable diseases?
Principle 6	Preamble	A farm should not be held responsible for the actions at an independent processor.	Remove this section from the standard
	6.4.2	Incidences of discrimination can happen, even under good working conditions; the most important issue is how they are addressed.	Number of unaddressed incidences of discrimination.
	6.5.1	This standard should include access to a first aid responder	A first aid responder, or employee trained in medical response should be on premises at all times when work is undergoing.
	6.5.3	This standard should be more specific	Safety risk assessment must include proximity to a medical facility and proximity to a hyperbaric chamber for divers.
	6.6.3	This standard should be clarified	Evidence of transparency in wage-setting structure to the employee.
	6.8.3	Standard to too vague	Suggest removal or require evidence of a working process. Percentage is arbitrary
Principle 7	7.1.4	How often does this need to be done?	Define a timeframe for this standard, add some definition of requirements of the inspection. How will this work in Scotland, for example? Why health effects only? Would a Social Impact Assessment be better?
	7.1.5	Communities should not be directly displaced as a result of salmon farming	No direct displacement of communities as a result of salmon farming.
	7.2.2	Standard needs to be clarified	Evidence of established agreements? What type of agreements are being talked about here?
	7.2.3	This standard gives to much power to one group and is prone to corruption	Remove.
General comments	Criterion 3	None of these standards explicitly prevent parasite or disease transfer or transmission.	Based on information presented by the disease and parasite technical group at the Boston Salmon Aquaculture Dialogue. The standards in this criterion should be concentrated on biosecurity and risk reduction. Standards in this criterion should include required biosecurity actions.
Standard	6		Should include a zero fatality within x years standard.

On page 62 of the SAD document in the rational for criterion three it states "the vast majority of salmon smolt production takes place in closed or semi-closed systems where these impacts can be significantly reduced in a way that is not possible in fully open systems, such as net pens." If a vast majority of smolts are already produced in the preferred method than simply prohibit open net-pen smolt production. Especially since this standard is aimed at a minority of top producers not the vast majority. The smolt standard should focus greatly on biosecurity, disease testing and alternatives to treatments, such as vaccinations. Sourcing of disease-free broodstock and preventing escapes should receive greater attention in the smolt standard. The smolt standard requires greater attention than as a bolt-on addition to the grow-out standard since the performance of stocked fish are greatly affected by the quality of the fish stocked and could be a source of vertical transmission and introduction of novel diseases.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			

Date:	Document :	Organization Commenting :
Oct 1, 2010	**WWF Salmon Standard**	Newfoundland Aquaculture Industry Association (NAIA), Canada

Name : Miranda Pryor
Organization/Company : Newfoundland Aquaculture Industry Association
E-mail Address :

COMMENTS ON STANDARDS FOR GROW-OUT

Clause No./ Subclause No./ Annex (e.g. 3.1)	**Paragraph/ Figure/Table/Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**
Introduction pg 7	2nd paragraph	ge	The reader is left with the impression that the aquaculture industry in general is not well regulated or good stewards of the marine environment with such statements as "Although there are some businesses addressing these issues well, others are not doing so at all or are doing so poorly." The intention seems to signify non-compliance as a broader issue than compliance.	Remove sentence.
Purpose and Scope pg 7	1st paragraph	ge	The introductory sections which are meant to set the tone for the entire document are quite negative towards salmon farming with such statements as "…that minimize or eliminate the key negative environmental or social impacts, while permitting the industry to remain economically viable." This sentence does not take into account the positive benefits of salmon farming or illustrate the sustainability of this industry. While economic viability is critical, the industry is committed to environmental sustainability through continuous technological and biological advancements. The social sustainability of salmon farming is not in question and so the section needs revision on this concept. The standards need to be couched in terms of continuous improvement models, and not absolutes that are not easily validated scientifically in many regions.	Re-write this section to reflect the sustainability of the salmon farming industry as well.
Principle 1	1.1.5	ge	This is too broad in scope and well outside the capabilities of smaller scale producers.	Remove.
Principle 2	2.1	te	All criterion (2.1.1, 2.1.2, 2.1.3) as discussed relate to soft bottom substrates only. Criterion must be developed that include science-based information for all salmon farming regions, including hard bottom farming zones.	Rewrite.

1 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Date:	Document :	Organization Commenting :
Oct 1, 2010	**WWF Salmon Standard**	Newfoundland Aquaculture Industry Association (NAIA), Canada

Name : Miranda Pryor
Organization/Company : Newfoundland Aquaculture Industry Association
E-mail Address :

COMMENTS ON STANDARDS FOR GROW-OUT

Clause No./ Subclause No./ Annex (e.g. 3.1)	**Paragraph/ Figure/Table/Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**
Principle 2	2.1, pg 15, 3rd paragraph	te	The sentence "Within the AZE, a demonstration that two or more benthic worm species, or macrofauna, are present is required to ensure impacts fall within an acceptable level.", does not allow for regional differences. Baseline studies are currently a requirement of federal regulations within Canada. Further benthic surveys, or more extensive surveys would be cost prohibitive to many operations.	Rewrite. Compliance with existing regulations should be considered sufficient for the standard.
Principle 2	2.2	te	Regional differences will need to be considered when establishing dissolved oxygen standards. Some soft- and hard-bottom zones have low DO in surficial waters to begin with. Science-based information for each salmon region must be reviewed and included. Surficial water DO is not a good indicator of impact, in any event. Otherwise, a reflection of change in DO as a factor of a natural baseline should be included.	Rewrite to include regional specific variations in DO levels.
Principle 2	2.3.1	te	The sampling as outlined for fines is not realistic for each farming operation. Variability could be eliminated if feed were sampled at place of origin (i.e., feed plant) rather than on-site.	Rewrite.
Principle 2	2.4	te	This should be a reflection of existing regulations.	Compliance with existing regulations should be considered sufficient for the standard.
Principle 2	2.5.3	te	It may be deemed necessary to enforce humane, lethal action of marine mammals in/around farm operations for reasons specifically related to fish welfare.	Jurisdictional regulations will vary with respect to legal hunting of marine mammals. Compliance with existing regulations should be considered sufficient for the standard.
Principle 2	2.6	ge	Regional differences will be too great to accomplish the goals of this criterion.	Remove.

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Date:	Document :	Organization Commenting :
Oct 1, 2010	**WWF Salmon Standard**	Newfoundland Aquaculture Industry Association (NAIA), Canada

Name : Miranda Pryor
Organization/Company : Newfoundland Aquaculture Industry Association
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COMMENTS ON STANDARDS FOR GROW-OUT

Clause No./ Subclause No./ Annex (e.g. 3.1)	**Paragraph/ Figure/Table/Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**
Principle 3	3.1	te	Industry supports the concept of area-based management for farms, however, it is beyond the scope of any standard for industry to assume the responsibility of monitoring wild populations of fish. Wild fisheries are a heavily regulated industry already and the sampling as outlined would be prohibited within the current regulatory framework in most, if not all countries, including Canada.	Rewrite.
Principle 3	3.1, pg 23, 3rd paragraph	ge	The sentence “This standard aims to develop a global body of research that measures sea lice levels on wild salmonid juveniles, ….” and anything related to monitoring wild fisheries are not the function of an aquaculture industry standard.	Remove.
Principle 3	3.4.2	te	An escape episode of 200 or more fish may not be detectable depending on level of production at that farm site. A more accurate estimate would be to use a percentage of fish within the cage that would be lost through an escape episode.	Rewrite.
Principle 3	3.4.3	ge	Escape prevention is provincially regulated for our industry and not nationally regulated.	Rewrite to reflect the regulations governing the region in question.
Principle 3	3.4, pg 27, comment	ge	“The SC is considering adding an additional standard to further address the issue of interbreeding / introgression….”. Does this refer to interbreeding between wild and farmed fish? If so, this is beyond the scope of this standard and would be illegal as wild fisheries are federally regulated in our region.	Would not support.
Principle 4	4.5, pg 35, Additional Information	ge	The standard must reflect areas where the industry is developing that currently do not have recycling capabilities and waste management does pose a	Rewrite.

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Oct 1, 2010	**WWF Salmon Standard**	Newfoundland Aquaculture Industry Association (NAIA), Canada

Name : Miranda Pryor
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COMMENTS ON STANDARDS FOR GROW-OUT

Clause No./ Subclause No./ Annex (e.g. 3.1)	**Paragraph/ Figure/Table/Note** (e.g. Table 1)	**Type of com-ment**[1]	**Comment (justification for change)**	**Proposed change**
			challenge. We would support the concept of an improvement plan for farms on this issue.	
Principle 4	4.7.1 and 4.7.2	te	Some light washing of nets at sea must be allowed to continue from a fish welfare perspective and consideration must also be given to developing industries where the facilities to properly wash all nets on land do not exist. An improvement plan for farms would provide the necessary compliance here.	Rewrite.
Principle 4	4.7.3	te	Regional differences must be accounted for as oceanographic and substrate differences will determine the AZE. An absolute value of Cu should not be used for the same reason.	Rewrite.
Principle 4	4.7.5	ge	All farming regions should be identified.	Include Canada.
Principle 5	5.1.6	te	Depending on the condition of the fish when sampling it may not be possible to perform a post-mortem analysis on all fish. Allowances must be made for science-based representative samples.	Rewrite.
Principle 5	5.1.7	te	As noted for this criterion, the SC must consider the exception of extreme weather events when analyzing maximum mortality rates.	Rewrite.
Principle 5	5.5.3	te	It is not feasible to require all companies, in all regions, to use wellboats for fish transport. This is simply not economically possible.	Remove or rewrite with an exception.
Principle 7	7.1.4	ge	"Evidence of third party assessment of health effects on community". The meaning of this indicator is unclear.	Remove.

1 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Alv Arne Lyse & Øyvind Fjeldseth
*Organization/Company: Norwegian Association of Hunters and Anglers
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1 **PRINCIPLE 1: COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS**		To comply with all legal requirements is important, but also obvious.	Strict governmental controls to uncover illegal actions.
Principle 2 **CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION**			Avoid negative impact on crustaceans – e.g sea lice treatment/medicines.
Principle 3 **PROTECT THE**		Sea lice	No serious damage from sea lice to local sea trout (Salmo trutta) populations, nor on post-

HEALTH AND GENETIC INTEGRITY OF WILD POPULATION			smolts or adults. The number of sea lice must be counted on local wild salmonid species and actions must be taken when the level of sea lice reach levels that are dangerous to the wild fish.
			All fish tagged so it is possible to determine a breach in complying with the standards. The number escaped salmon must be counted in local salmon rivers and action must be taken when the level of escaped salmon in the spawning population reach a level that is dangerous to the wild fish (> 5 %).
		Non-native species	Only allowed to rear non-native species (for instance rainbow trout in the Atlantic countries) in closed containment.
			Standards must set end date for transition to all closed containment.
Principle 4 **USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER**			
Principle 5 **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**		Maximum mortality rate	< 10 % MMR Must have precice count of number of fish in each cage/location.
		Fish transportation	All transportation of fish to and from the location in closed well boats with discharge treatment and disinfection and sea lice treatment.

Principle 6 **DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER**		No comments.	
Principle 7 **BE A GOOD NEIGHBOR AND CONSCIENTIOUS CITIZEN**		No comments.	
General comments			A modern and environmental-friendly salmon farming production facility must use closed containment technology.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1 **PRINCIPLE 1: COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS**			Strict governmental controls to uncover illegal actions.
Principle 2 **CONSERVE NATURAL HABITAT, LOCAL**			No interruption of the up- or downwards migration in the water systems of wild species.

BIODIVERSITY AND ECOSYSTEM FUNCTION			
Principle 3 **PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATION**			No smoltproduction in open systems, only in closed systems.
Principle 4 **USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER**			It should only be allowed to produce smolts in facilities with recirculation of water to avoid using unnecessary large quantities of water.
Principle 5 **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**			
Principle 6 **DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER**		No comments.	
Principle 7 **BE A GOOD NEIGHBOR AND CONSCIENTIOUS CITIZEN**		No comments.	

General comments			A modern and environmental-friendly smolt production facility must use recycling- and closed containment technology.

To Salmon Aquaculture Dialogue

Att: Katherine Bostick

WWF

Senior Program Officer
Aquaculture Program

Ramberg, Norway September 29th., 2010

The Norwegian Coastal Fishermen Union comments on Salmon Aquaculture Dialogue draft standard criterion.

The Norwegian Coastal Fishermen Union welcomes the work with establishing an international standard for salmon farming. We appreciate the opportunity of commenting on the draft standard. We also appreciate the strengthen text regarding impact from feed leakage on wild fish, which especially for saithe is a huge problem in Norway, causing change in the ecosystem, quality degradation and thus lost income for our members. The goal of less that 1% leakage is very ambitious as it will reduce the leakage from around 100 000 tons of pellets annually in Norway, to approximately 15 000 tons. Also the concrete reference to coastal trout throughout the document is a huge improvement comparing to the paper issued prior to the dialogue meeting in Bergen.

However, the draft does not give us confident in the process. These comments will mainly focus on impact from salmon farming on our members' time-honoured right to practice their fishery and work for an income, a right which is violated by the farming industry in Norway today. This does not mean that we necessarily endorse uncommented parts of the document, but it fell outside our focus and mandate.

It is still a weakness that the fishery interests being directly affected are not represented in the steering committee.

In our last comments we wrote.

"1.0 We notice that "The Salmon Dialogue is a science based forum initiated by World Wildlife Fund."

1.1 That implies that when science have not established acceptable knowledge the principle must be that doubt about consequence causes refrain from acitivty."

As an empiric example of a phenomenon which dodge control because of the complexity in the ecosystem we used the work of Professor Are Lund and his team at the University of Bergen regarding the *microsporidia*. This single cell organism uses probably the salmon lice as a host causing interaction and diseases in the ecosystem beyond scientific and human control.

The destruction of the Chilean coast by disease infected salmon roe, at the time of export being scientifically considered safe and sound, is another example.

We regret to say that also the draft fails to meet this criterion, a consequence which will be elaborated later.

Our comments will in the following focus on salmon farming impact especially on fish of the cod family which include saithe, pollock and haddock, lobster, crab **(especially** *Cancer pagurus),* crawfish and shrimps, which is the economically most important species for our members, and plankton because of importance in the wild feed chain. We will also comment on the draft in view of this year`s situation for coastal trout and wild salmon. These salmonids had in previous times an economical value for the coastal population as well as a source for recreation and culture, a source deprived by the farming industry. The division in the draft between indigenous people and others are thus false and wrong.

As written, we appreciate your proposal of less than 1% feed leakage. The question remains how such level of leakage shall be measured. However, the draft does not address faeces as a possible source as food for the wild fish, although science still is uncertain whether this happen and if so, to which degree.

The development in Norway during the recent years actualize the subject, which must have impact on several criterion as area for benthic observation, legal framework, impact on wild species, feed loss, free dissemination of faeces to the environment, and the scientific basis for justifying the establishment of the standard. The ultimate question is whether minimum standard can be reached with the current technology.

As known, due to the loss of control with salmon lice during the recent years in Norway caused by lice resistant to commonly used chemicals, the pesticide group *flubenzuron* was reintroduced, added to salmon feed after being banned by the Government in 1999 (Skretting brand name Ektobann, Ewos Releeze). The chemical is even highly diluted extremely poisonous to commercially caught species as lobster, crab, crayfish and shrimp. The European Union only allows the pesticide used indoor in greenhouses, and in land farming in Norway it must be used at least 30 meters from nearest water source. The Norwegian pollution directorate KLIF is very concerned about the consequence from the rapidly increased use of the pesticide in Norwegian fish farming and has recently initiated a research program.

LEGAL. The standard of the legal framework is in every country a result of the quality of the Government and National Assembly, which vary over time. We notice that you propose that the legal framework shall not be a minimum standard, but will propose that in cases as referred to here, when no new scientific knowledge is available shall no former banned chemicals be allowed reintroduced.

LEAKAGE. Flubenzuron is not water soluble. Feed leakage containing flubenzuron will either be eaten by wild fish or probably fell to the bottom where it is measured to be active for up to 6 months. Eaten either by the salmon in the cage or wild fish, most of the flubenzuron is released to the open water through faeces. Here it will be either eaten again by wild fish if so happen, or adhered to a particle and spread. Science believes that particles will fell to the sediments, but there are indications that flubenzuron adhered to fat particles floats to the surfaces. This may have impact on plankton in the same way as for lobster etc. As plankton is low and essential in the food chain, per today scientific knowledge is missing regarding consequences on the ecosystem.

BENTHIC. As the distribution of flubenzuron to the sea bed is unknown, the proposal regarding the area surrounding the farm being monitored is artificial and curious.

Given the above,

INDICATOR STANDARD 5.3.1 Allowance for use of therapeutic treatments that include antibiotics or chemicals that are banned in any of the primary salmon producing countries

is difficult to understand. In Norway the government is a part of the industry and cannot be recognized being impartial and objective. The question remains why regulations in Norway are weaker than in the European Union and why the legal framework from such authority should be recognized by the standard.

Given the above,

5.3.3 Compliance with all withholding periods after treatments Yes

is not adequate as there is no control or withholding period for contaminated wild species.

Given the above,

Criterion 5.2 Contamination levels and health effects in local non-target organisms

is unattainable, as the ecosystem is too complex for scientifically measure the non-target organisms.

This problem rocks the whole fundament for the attempt to create a standard, as we already have referred to.

Your considerations are thus not meaningful as the scale of the industry, even reduced by half, causes unacceptable influence on the ecosystem. Why we refer to reduced to half is the fact that the Norwegian Food Authority`s regulation allowing 0,5 mature female lice per salmon individuals has stay unchanged since the farmed population was the half of today`s biomass.

Given these concepts, the SC is considering the following, as detailed in the indicators above:
♣ A global sea lice level for all farms seeking certification that may be as low as 0.5 motile female sea lice per fish
♣ A sea lice level during juvenile outmigration that is 0.5 motile female sea lice or lower
Draft Salmon Dialogue Standards for Public Comment, August 3, 2010 Page 24 of 74
♣ A feedback loop from testing of sea lice on wild juveniles to ensure the farm level limits are appropriate

♣ A year-round sea lice level for areas of coastal trout that is yet to be determined

Criterion 5.2 is by and large a reflection of the current Norwegian standard. This standard is a failure. The first failure is that the level of lice per salmon is not connected to the total number of host salmons in an area. This is proved by the fact that the Norwegian Food Authority (Mattilsynet) allows the same number of lice per host salmon compared to years back when the total number of host salmons where half. There is no rational reason why the ecosystem shall absorb twice the number of lice compared to when the regulation was adopted. A criterion on sea lice must combine the maximum allowed number of lice with the total number of host salmons in an area.

There are strong indications that the carrying capacity based on 0,5 mature female lice per host require a huge reduction in the total number of host salmons within an area. This contradicts the criteria that the standard shall be "economically viable". As an example, in the Hardangerfjord (source: www.lusedata.no) during winter, spring and summer the figures for mature female lice per host salmon never exceeded 0,5. During a period of four weeks in March-April the figures grew to up to +/- 0,4 in the worst infected areas of the fjord, before being curbed during common treatment by the industry in late April and one month later in some areas especially affected areas. This was depicted as a success by both the industry, the food authorities and the ministry. However, enough host salmons during the period resulted in such amount of larvae released to the free waters that the year became catastrophic to the coastal trout. Knowledge on the impact on migrating salmon smolt is fragmented. A scientist at the Institute of Marine Research described the year such that if repeated over a number of year the lice infection level have the potential for extinction of the coastal trout. There is no longer more incoming salmon from the ocean in many parts of Norway to scientifically measure the effect on wild salmon.

With the current volume farmed there are good reasons for that the number of mature female lice per host salmon should be far below 0,25 throughout the year. Such level is advised against by the industry, the argument being that such level requires so heavy treatment that it will result in immunity and ultimately collapse in the industry as well as the remaining traces of wild salmonids. It seems therefore difficult to determine a salmon lice infection level which is sustainable.

Observing a three dimensional, extremely fluid and invisible ecosystem is a challenging task. Preventing negative impact from a manipulative human factor on the ecosystem is even more challenging. WWF and other stakeholders in the SAD process have committed themselves to observe strict scientific standards in the attempt to establish a set of regulations for bringing the manipulation of nature within ecological sustainable frame. The current situation where the problems escalate faster than the cure from the established expertise, the task may be unrealistic.

The SAD program was established in 2004. At that time the program is easily seen as a progressive attempt for improvement. However, during the last year technological development of closed containment farming has become an alternative. The fish farming industry is profitable. The total 2010 annual profit is for the Norwegian companies only is estimated to NOK 12 billion, equal to USD 2 billion. Marine Harvest alone foresee based on a margin of NOK 10 pr. kg. slaughtered fish a profit of NOK 2,4 billion for 2011. It is only the industry`s resistance to invest that is the hindrance to commercialize closed containment systems. In this situation the SAD-process has become counterproductive as the goal; an Aquaculture Stewardship Council standard for open net cages can conserve a business behind the possible best practice.

The Norwegian Coastal Fishermen Union does not trust that scientifically based and verifiable criteria possible for an economical viable industry is attainable. The scale of the industry with currently 100 times more fish in the cages than the wild population around the year when in past times the fjords were in natural quarantine during most of the time, the impact on the ecosystem is so huge that a standard based on a constant and heavy influence is not realistic. We fear it is a dead end which still will continue to reduce our member`s income. We urge the stakeholders to terminate the attempt to establish a standard based on an outdated technology and instead encourage rapid development of closed containment through a standard which realistically can be utilized by the fish farming industry.

We recognize your hard work over many years and fully understand that it is difficult to abandon it. However, the development, both in problems and possibilities, could not be foreseen in 2004. The standard will probably be outdated by new technology by time of launching. It will be a brave decision to take the consequences of this for which you will be admired.

Yours Sincerely,

Arne R Hole

Arne R Hole
Director
Norwegian Coastal Fishermen Union

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Erik Sterud
*Organization/Company: Norwegian Salmon Rivers (Norske Lakseelver)
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	Suggestion new indicator/standard: 1.1.6	Rationale: Some farms do their work properly and have good management plans, so that all operations are planned well in advance. Including those operations that involve compliance with new laws and regulations. Other farms may have excuses for not being prepared and repeatedly apply for exemptions from laws and regulations. With proper management plans this should not be necessary.	1.1.6 Indicator: Number of times the farm has applied for exemption from laws and regulations within the past 12 months 1.1.6 Standard: 0
Principle 2	2.1.2	The AMBI explores the response of soft-bottom communities to natural and man-induced changes in water quality, integrating long-term environmental conditions. The standard should address the fact that many salmon farms are not located over soft bottom areas.	No specific suggestion how this should be solved
	2.1.3	A typical effect of sediment pollution is that	2.1.3 Indicator:Number of macrofaunal taxa in

		the number of taxa in the sediment declines. Under severe conditions only few taxa may survive. The number of individuals in these taxa may, however, be very high. Thus, the presence of two abundant taxa does not necessarily mean that the impact from a fish cage above falls within an acceptable level. As long as the intent is to detect any negative impacts of the farming activity the number of macrofaunal taxa must be compared to the reference sampling site outside the AZE. It is supposed that this reference site should picture the typical situation within the AZE before farming activity was started. It is recommended that further details should be documented in the annual AMBI analysis.	the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1, compared to the number of macrofaunal taxa at the reference site outside the AZE 2.1.3 Standard: < x% reduction in the abundance of n species and/or < y% reduction in number of species x, n and y TBD. No specific suggestion
	2.6.1	This should be based on 2.4.1:	2.6.1 Indicator: Clear, substantive documentation on the composition of the ecosystem in the proximity to the fish farm, with identification of local sentinel species, evaluation of critical population sizes, and natural fluctuations of population sizes. 2.6.1 Standard: At least x % of macrofaunal species should be identified as sentinel/indicator species. Population sizes below critical population sizes not acceptable X % (above) TBD No suggestions!
Principle 3	3.1.1	Detailed requirements to the ABM scheme are described in Appendix II. However, according to the indicator, compliance with the requirements is not a fulfillment of the standard. It is clearly said that the ABM scheme should be **effective**. It is very difficult to quantify the effectivity of any	No suggestion for amendment to the standard

		preventive measures because one never knows how the situation would have been without it. Nevertheless, the standard needs to clarify this. Who is to decide whether the ABM scheme is effective? Below follows one example with reference to the current sea lice situation in Norway, where there are regional problems with multi-resistant sea lice and high infection levels on wild salmonids, and where premature homing is a major problem for infected anadromous trout: The sea lice levels in Norway were alarmingly high during the summer/autumn/winter 2009. Great efforts were made to reduce the sea lice levels during smolt migration in the spring 2010. This was apparently achieved. However, despite these extraordinary measures, including coordinated treatments, the sea lice levels during the summer 2010 were again at the 2009 levels. This is catastrophic for many sea trout populations. Area-based and coordinated treatment and fallowing has been used in many regions. The question is: are these measures effective?	
	Suggestion for new indicator/standard: 3.1.5	The situation for the wild fish is not defined from the level of sea lice on farmed fish. The sea lice levels on farmed fish might be low (and 0.5 sea lice per fish is indeed low - viewed from a health perspective), but still the situation for the wild fish can be serious. Wild fish are killed by the sea lice that infect them and not by the sea lice that infect the farmed fish! Therefore, the ABM should include maximum limits for sea lice on wild fish in the area. These levels and how they should be registered should be	Indicator 3.1.5: maximum sea lice levels on wild fish in the area/region affected by all farms in a ABM scheme. Standard3.1.5: levels TBD - no suggestions! Methods should be described in an appropriate appendix

		decided on scientific bases. There is a wrong assumption in the rationale for criterion 3.1. The average level of sea-lice **does not** constitute the infection pressure as said on page 23, (additional information, bullet point 5). If this were true the sea lice infection pressure from 10 farmed fish with 1 louse each would be the same as the infection pressure from 10 mill farmed fish with one louse each. This is obviously not correct. The infection pressure is created by the **total number** of sea lice in an area. The number of sea lice on the wild fish is a direct result of this infection pressure. NB. In certain regions, a possible alternative to maximum levels of sea lice on wild fish is described in the suggested new indicator 3.1.10 (see below).	
	Suggestion for new indicator/standard: 3.1.10	In areas with high levels of sea lice, premature return of sea trout is commonly seen. The sea trout seeks rivers or estuaries for freshwater treatment of sea lice infection. According to scientists, the sheer presence of prematurely returning sea trout is a sign of too high levels of sea lice (P.A. Heuch, Natl. Vet. Inst., Norway). To overcome the problem of determining acceptable sea lice levels on wild fish it might be better to use a different indicator.	3.1.10 Indicator: Presence of prematurely returning anadromous salmonids in the management area to which a farm belong. Standard: occasional "occasional" is suggested as the lowest level on a scale going from occasional via common to high (or similar)
	3.2.1	It is recommended that the standard focus on impact rather than establishment. Non-native species, in open systems or as escapees, may transmit parasites or other	3.2.1 Indicator amendment following the operator AND: C) the species is held in closed containment systems if wild salmonids are present in the region.

		potentially disease-causing agents to wild fish. This absolutely not desired. It is therefore suggested that non-native species should be held in closed containment systems.	
	Criterion 3.4	Our general recommendation for this criterion is to move indicator/standard 3.4.3 and 3.4.4 to criterion 5.5 Biosecurity. The criterion 3.4 Escapes should comprise only indicators/standards directly dealing with escapes, such as 3.4.1 and 3.4.2. New indicators should be erected in both 3.4 and 5.5 Suggestions will follow below.	
	3.4.1	**The standard 3.4.1 is not clearly written!** Maximum achievable counting accuracy is 100%. In case this should be achieved, we understand the text so that an unexplained loss of 1 fish per 1000 is maximum acceptable number. Please clarify, and see also suggestion for merging 3.4.1 and 3.4.2 (below)	
	3.4.1 and 3.4.2	The fish farming industry, as well as the draft standard, distinguish escapes from leakage of fish. Leakage of fish is also called unexplained losses. This is clearly stated in the rationale for criterion 3.4: *"the standard around maximum unexplained loss of salmon addresses leakage of fish."* The problem with the current indicators is that leakage is not clearly defined, and because it is supposed to be of unknown causes it cannot be defined. How to define an episode where 199 fish get	To be used in areas where wild salmonids of the same species as the farmed fish are present 3.4.1 and 3.4.2 merged Indicator: maximum number of escapees (defined as the difference between stocked fish and slaughtered fish minus the number of dead fish and removed fish) 3.4.1 and 3.4.2 merged Standard: not more than x % of the number of stocked fish. X should be calculated so that the sum of escapees in a region does not exceed 5% of the number of annual spawners of wild fish (of the

		out of a net pen? According to the draft standard this is not an escape episode since that is <u>defined</u> as involving 200 or more fish. Should it be classified as unexplained loss and be a part of the accepted 0.1% loss? How many episodes involving 199 fish can be accepted? All these questions can be avoided. Independent of concept names, the fish that get out of the net pens get into the surrounding ecosystem where it, according to the rationale for 3.4: *have the potential to disrupt ecosystems and alter the overall pool of genetic diversity through competition with wild fish and interbreeding with local stocks of the same population"* (p. 26). It is therefore recommended that the concepts "escape", "leakage" and unexplained loss" are merged into "one bitter pill" – <u>escape</u>. The main intent for the standard should be to prevent disruption of ecosystems and altering of the natural genetic diversity. The intention is to revise the standard regularly (every 3-5 years). The dynamics in the salmon industry is such that the activity in certain areas can be significantly altered in 5 years. It is therefore of vital importance that maximum allowable limits for escapees are in absolute numbers and not in number of events or percentages of production. Acceptable limits do not need to be the same for all regions, but can be related to the estimated carrying capacities of the local/regional ecosystems. The <u>sizes of wild salmonid populations</u> in areas affected by	same species) in the region. Example: Annual return of 500,000 spawners to a region (objective and scientifically based estimates for any region of choice) allows 25,000 escapees in the region. If 250 million farmed smolt is annually stocked in farms of this region x is thus 25,000/250,000,000 = 0.01% or one escapee per 10,000 stocked fish. If 400 mill fish is stocked, it can be accepted to have 1 escapee per 16.000 fish stocked. 3.4.3 Quantification of the escapee numbers in case of escape episodes. Standard: Number of escapees should be the difference between the number of fish that is left in the net pen/cage and the number at the last documented counting (with a required accuracy that at least equals the accuracy needed to calculate maximum acceptable number of escapees).

		salmon aquaculture are important with respect to this, as these may indicate the robustness/vulnerability of the wild fish. Referring to Norway, the annual return of spawners to Norwegian salmon rivers vary between 400,000 and 600,000 individuals, with an all time low of 370.000 in 2009. The “acceptable” numbers of escapees must be viewed against these numbers. An acceptable limit for escapees is recommended to be similar to the percentage of spawning salmon that returns to a river different from its native river. This percentage is estimated to 4% (Stabell, 1984). If the total number of spawners in Norway is estimated to 500,000, and 5 % of this is accepted as maximum number of escapees (unexplained loss included), the total acceptable number of escapees in Norway should be 25,000. In 2010 it is estimated that 250 mill. smolts will be stocked in Norwegian net pens (Kontali analyses). This implies that maximum acceptable number of escapees constitute 1 per 10,000 fish. It must be the responsibility of the farms to ensure that their counting methods have the accuracy needed to detect losses of such magnitude. The suggested indicator/standard applies to farms located in areas wild salmonids. In areas without wild salmonid populations the ability for the ecosystems to tolerate escapees must be based on other factors. The standard does not need to specify this, but may leave it to the farms to scientifically document the carrying capacity for escapees of non- native species.	

Principle 4			
Principle 5	Indicator/standard 5.1.3	It is required that 100% of the fish are vaccinated. It is supposed that the most commonly used method for vaccination is injection. We propose that 100% injection vaccine is required. The fish farmer then knows the number of fish with 100% accuracy. To keep exact control with the number of individuals in subsequent production should then be quite easy.	Indicator 5.1.3: percentage of fish that are injection vaccinated for selected diseases that are known to present a significant risk in the region and for which an effective vaccine exist. Standard 5.1.3: 100%
Principle 5	Criterion 5.5 Biosecurity Suggestion new criterion name and new indicators/standards	Biosecurity is closely related to both biomass control and technology. Therefore criterion 5.5 should be renamed to reflect this. There is a weakness of the draft standard that it does not reflect the dynamics of salmon farming. The draft standards seem to be fitted closely to the currently used technology, and to farms that have been, and will be, located on the same sites forever. New indicators and standards are suggested to address the facts that used equipment need to be replaced, and that new sites are taken into use while old ones are abandoned. Rationale for suggested new indicator for bio mass control 5.5.10: The farm should like other livestock farms have an exact knowledge of the number of animals and their average weight. The standard should be so strict that it encourages the farms to put individual tags in/on all their fish. Individual tagging will enable:	Suggested new criterion name: Criterion 5.5 Management of biomass, biosecurity and technology Indicator/standard 5.5.6 former 3.4.3 Indicator/standard 5.5.7: former 3.4.4 Indicator 5.5.6: Documentation of AZE recovery following abandonment of a farm site Standard 5.5.6: The physical, chemical and biological state of AZE shall be documented within one month after a site has been aboandoned, and again after 1 year. Which methods that should be used should be described in an appropriate appendix. Indicator 5.5.8: Documentation of a thorough evaluation of technological possibilities when equipment is replaced, with special emphasis on possibilities for closed containment systems, and a clear biologically based justification for the chosen alternative. Standard: 5.5.8:Yes

		• Rapid and precise quantification of any escape episode • Rapid identification of fish at undetected escape episodes so that small scale fish "leakage" can be stopped. • Justify that any missing fish is called an escapee. • Be a "green" argument for the farmer at sales contract negotiations • Enable fair legal reactions in case of escape episodes. Fish farmers should be encouraged to take part in research programs intended to develop individual fish tags that will enable continuous and precise bio mass control down to individual level.	Indicator 5.5.9: Construction of fish farms at new sites AND/OR expansion of the production at existing sites. Standard 5.5.9: Closed containment system should be used. Indicator 5.5.10: Demonstrated knowledge of the number and average weight of the standing stock. Standard 5.5.10: A documented discrepancy of less than 0.01% between counted/estimated numbers of fish and true numbers at harvest (registered by the slaughter), during the previous two production cycles. A documented discrepancy of less that x % between estimated and true weight of fish at harvest during the previous two production cycles. x (above) is TBD. No suggestions
Principle 6			
Principle 7			
General comments		**Please read carefully!** It is said that the SAD through the proposed standard establishes principles, criteria, indicators and measureable performance levels for responsible salmon aquaculture, with regard to social and environmental issues. I can then be supposed that the basic arguments for the requirements set in the	

		standard are social and environmental arguments. This is true for a major part of the draft standard. However, there is at least one really important exception where economical arguments obviously have won over the environmental arguments. <u>Please pay attention to the rationale for 3.1.1S and 3.1.2S (smolt production).</u> The rationale is so precisely and correctly written that the indicators and connected standards come as a natural consequence of the environmental arguments that are used. Then do the following exercise: <u>Remove the word "smolt" and read the rationale over again.</u> There is nothing in the rationale that does not fit salmon aquaculture in general, including on-growing in marine facilities. On the contrary. Because the bio-mass in marine grow-out facilities is thousand-folds higher than the bio-mass in smolt plants, the environmental arguments for using only closed system fit better for marine salmon production than the fit fresh water smolt production. The only arguments that can be used against banning open net pen systems in marine grow-out facilities are economic arguments. This is why we believe that economical arguments in this case have beat environmental arguments. As can be seen from our comments and suggestions we feel that the proposed standard is too closely adapted the currently used open net pen systems. The standard should to a much higher extent be a driver towards closed grow-out facilities, and encourage the salmon aquaculture industry to take this rather small technological step that indeed would be a giant leap for the sustainability	

		of the industry, and for the marine environment that currently lives under high pressure from the negative impacts of the salmon industry. Negative impacts that mostly come from open net pen systems (as admitted with regard to smolt production). We do realize that a shift in technology cannot be made over night. This is why we do not suggest an immediate replacement of open net pen systems, but instead suggest a gradual replacement. Starting with new marine aquaculture sites and natural replacement of old equipment at present sites.	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5	Criterion 5.5 biosecurity management Suggestion new indicators/standards 5.5.6-5.5.8	A major problem with bio mass control in marine on-growing systems is to keep control on the number of individuals. This is partly due to accuracy of the counting machines/methods, but also due to the fact that the smolt dealers often add “a little extra” to compensate expected mortality	Indicator 5.5.6 : counting accuracy for machines/methos used at smolt facilities (including transfer to marine grow-out facilities) Standard 5.5.6: 100% Indicator. 5.5.7 allowable size variation in

		connected to the transfer to marine environment. The need for accuracy at this step in the production cycle needs to be addressed by the standard. It has been argued that size variation in the smolt causes "leakage" of fish after transfer to marine net pens, because the smallest fish are allowed to slip through the nets. Without discussing the magnitude of such smolt "leakage" (escape!) the standard should set requirements to maximum allowable variation is smolt size to prevent the smallest fish from escaping the net pens. Although it is required that the smolt production facilities must meet the health standards under 5.1 and 5.2 there should be additional standards for smolt production with regard to the health of smolt ready to be transferred to the sea. Smoltification and transfer to marine environment puts high physiological pressure on the small fish and disease outbreaks, with subsequent possibility for transmission of disease causing agents to wild fish. This problem should specifically be addressed by the standard. An ATP ase test or similar should be required.	smolts at time for transfer to marine grow-out facilities. Standard 5.5.7: TBD No specific suggestion! Indicator 5.5.8 Degree of smoltification and maximum allowable variation within one smolt batch. Standard 5.5.8: TBD
Principle 6			
Principle 7			
General comments		We applaud that the concerns related to open smolt production, such as disease	

		transmission and the genetic effect of escapees have been highlighted as particularly important in regions where native salmonids exist, and that the SAD standard therefore allow only closed or semi-closed smolt systems to be certified under the SAD standard in areas of wild salmonids. We highly recommend that the even bigger concerns related to the same effects in marine grow-out facilities, will lead to the same conclusion. The draft standard should take the first step towards closed grow-out facilities now, such that only closed grow-out facilities will be allowed when the standard is to be revised in a few years from now.	

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General comments on the draft standards for Responsible salmon aquaculture

Norwegian Seafood Federation (FHL) has reviewed the draft standards for resposible salmon aquaculture. Comments and suggestions for changes of specific criteria, indicators and standards are collected in the "Comment form of Draft Salmon Aquaculture Dialogue Standards" attached.

In addition, FHL has some general comments on important issues that affect the standard. These are described here.

General comments:

From the draft:
"Purpose and scope of the Salmon Aquaculture Dialogue standards"
"The salmon Dialogue is a science-based forum initiated by World Wildlife Fund (WWF) in 2004. The goal of the Dialogue is to credibly develop measurable, performance-based standards that minimize or eliminate the key environmental and social impacts of salmon farming, while permitting the industry to remain economically viable."

As salmon farming is seafood production, and measures to ensure social, economical and environmental sustainable production shall be science-based, there is a need to assess the general framework of all food production also when a standard like the present one, is drafted.

In 1987, the Brundtland Commission defined sustainable development as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Further, the **right to food** is specified (art. 11), in the The UN Covenant on Economic Social and Cultural Rights (CESCR),

In the General Comment 12 "The right to adequate food", from the Committee on Economic, Social and Cultural Rights is elaborated (**Report on the twentieth and twenty-first sessions** (26 April-14 May 1999, 15 November-3 December 1999) of the **Economic and Social Council** (Official Records, 2000 - E/2000/22 E/C.12/1999/11).

From the report:

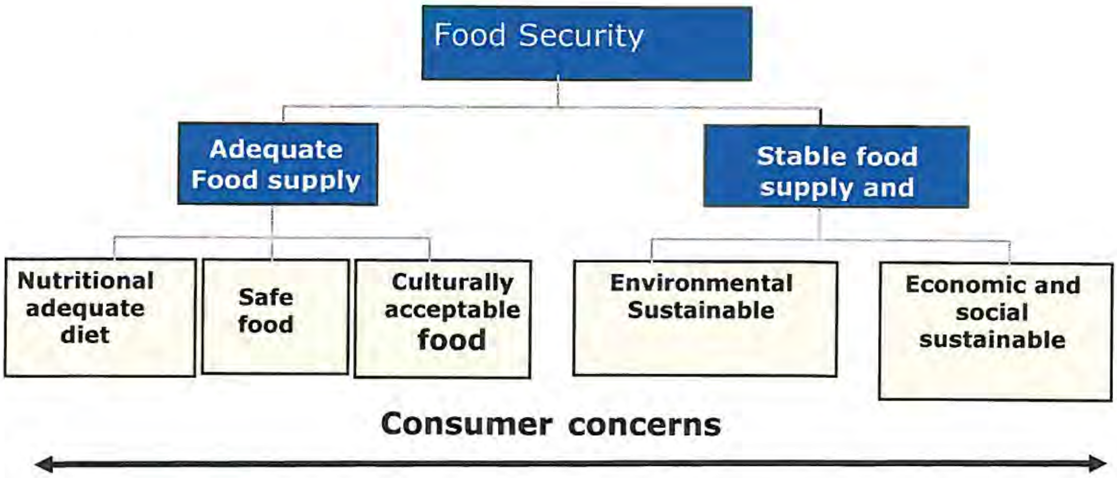
8. The Committee considers that the core content of the right to adequate food implies:

(*a*) the availability of food in a quantity and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances, and acceptable within a given culture; (*b*) the accessibility of such food in ways that are sustainable and that do not interfere with the enjoyment of other human rights.

25. The strategy should address critical issues and measures in regard to all aspects of the food system, including the production, processing, distribution, marketing and consumption of safe food, as well as parallel measures in the fields of health, education, employment and social security. Care should be taken to ensure the most sustainable management and use of natural and other resources for food at the national, regional, local and household levels.

Thus the World Food Summit in 1999 (WFS) defined food security as follows: "*Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*"

Illustration of the concept of food security:



This definition of Food Security is broad in scope and 'normative', meaning that it is composed of a number of sub-goals that must be attained for food security to be achieved as a true developmental goal.

The major subdivision of food security is expressed in terms of *adequacy of the food supply* and *stability of both food supply and access*. Adequacy of the food supply means that the overall supply should potentially cover overall nutritional needs in terms of quantity (energy) and quality (essential nutrients); furthermore, be safe (free of toxic factors and contaminants) and of good food quality (taste, text, etc.), and that the types of foodstuffs commonly available (nationally, in local markets, and eventually at the household level) should be culturally acceptable (fit the prevailing food or dietary culture.

Stability of the supply and access to food presupposes: *environmental sustainability* implying that there is a judicious public and community management of natural resources which have a bearing on the food supply; furthermore, *economic and social sustainability* in terms of conditions and mechanisms securing food access. This concerns a just income distribution and effective markets, together with various public and informal support and safety nets.

The FHL supports such a development and recognises sustainability as well as ensuring food security as elements of its social responsibility even if these are primarily governmental responsibilities. It should be noticed that both environmental, economic as well as social sustainability are equally important elements of these responsibilities. Further that one should bear in mind that there might be conflicting interest to be handled when adopting measures to ensure compliance to each of them.

Thus, as focused later in our comments, a standard which aim to achieve environmental sustainability must properly take into account the existence of the other two pillars of sustainability on food production. FHL can't see that this is done in the current draft and consider this as a major objection to the current draft. It is not sufficient to make permit ***"the industry to remain economically viable"*** Economic sustainability also means to make it possible to ensure food security by producing enough food being affordable for the major proportion of the consumers.

To achieve an optimal choice of measures to ensure environmental, economic as well as social sustainable production of safe food taking into account the aim, the achievable effect as well as the unavoidable negative consequences of the implementation of the measures, a proper risk analysis has to be the basis in the process of all risk management decisions irrespective of the aim being risks concerning food safety, animal health, plant health or risk concerning the environment.

During the last two decades the risk analysis related to food production, including scientific risk assessment, process of adopting proper and balanced risk management measures and risk communication, has developed considerably especially within the framework of Codex Alimentarius, the OIE and the IPPC (the International plant protection convention) organisations. The major elements of risk analysis has also to be the basis for adoption of measures within the concept of "the precautionary-principle"

As observed several places in the current draft there seems to be proposals for measurements ("indicators") where it is difficult to see that any of the major elements of risk analysis has been carried out properly, and this relates to lack of a scientific risk assessment as well as analysis of the expected effect and the practical consequences of each of the proposed indicators. This is the other major objection to the proposed draft.

Conclusion:

Based on the above mentioned concerns, the Norwegian Seafood Federation can not support the current draft standard.

However, the Norwegian Seafood Federation can see that a standard that makes it achievable for the Norwegian salmon industry to document to the market the environmental sustainability of their production, might be important in the future. The current draft standard can be considered as a first step in the process to develop such a standard. On this basis, we have prepared a set of more specific comments and proposals to amend the draft the aim being to eventually make the standard creditable also for our organisation.

The current comments and suggestions must be considered as examples of our major concerns regarding the first draft. What we have not commented, are the texts in the reasoning for the suggested indicators and standards, and we suppose that this can be addressed later before the standard will be adopted thus making the standard consistent with the conditions mentioned in our introduction above.

Specific contribution to the standard

1. Different standards must be harmonized
There are some areas in the proposed standard for salmon farming, where the requirements are different than the corresponding Dialogue standards developed for other fish species. FHL is of the opinion that the different standards must be harmonized as far as possible, to avoid there being important aspects with different requirements for different fish species. Different requirements may distort competition even among different fish species.

Some examples of important aspects that should be harmonized in the different standards:
4.3.2 Requirements for the "Source of marine raw materials"
4.3.3 Requirements for the "Source of marine raw materials"
4.6.3 Requirements for "Energy consumption and greenhouse gas emissions on farm"

2. The standard must be achiveable.
FHL believes that the standard should be at a level where the industry must strive to achieve the requirements so that they contribute to a positive change (continuous improvement) in the areas that the standard covers.

At the same time FHL is concerned that the standard should not be so strict that it becomes unattractive or so un achievable that just very few farmers want to or is able to use the standard. This could result in an insufficient certified volume, but also lead to the standard becoming only a small contribution to the advancement of the industry. A wider entrance will help to ensure that the scheme is real, and that there is a sufficient volume. We refer to the MSC, a standard which set strict policies for the certification, so strict that it was not conducting any certification of fish stocks, and therefore was not possible to obtain a quantity that made the certificate commercially attractive. Later revisions have resulted in changes that have contributed to the MSC being used to a greater extent.

Experience from the MSC, Globalgap etc. suggests that a significant amount (critical mass) of the total amount of produced quantities of salmon and trout from aquaculture must run through the scheme to achieve a good market drive, making the scheme robust. The alternative will probably be the scheme not becoming a great demand in the market, and at best just becomes a mechanism for a very narrow market.

3. Evaluation of audit ability
FHL has engaged Essentia, an independent third party certification agency which has audited a production site based on the present draft standards. Attached is a report on the evaluation of audit ability, as well as a comment form.

Important comments in the report are:

- The SAD standard lacks description of requirements for some indicators that could not be evaluated in detail.
- Some requirements require verification several years back in time. The points are very time consuming and difficult to verify.
- Many clauses in the standard require 100% compliance. This is very time consuming and in reality not feasible within acceptable time and budget. Guidance document must clearly describe what needs to be verified.
- The guidance documents for auditors must include descriptions of what is needed to verify to be able to confirm sufficient compliance against the standard.
- Most items under principle 6 were considered difficult and some even impossible to answer. Several of the indicators under principle 6 also require access to sensitive information, are therefore difficult to audit, and may cause the entire audit process is being perceived as very negative.
- The standard sets a number of requirements for third-party research that will involve many different persons or institutions. Closing of deviations within the time limit could be difficult, for example due to lack of resources with a third party. Some surveys are linked to specific seasons, and closure of non-conformances can therefore be difficult within the time limit.
- The report also provides other examples of challenges in terms of being able to close non - conformances. It also raises questions about the certification status for the period when deviations can not be closed.
- For larger companies the audit must be combined with both a site visit and an audit of the administration to be able to verify all clauses in the standard.
- Most of the requirements involving feed-production were challenging. They demanded sufficient information from the feed manufacturers, and there was uncertainty as to calculations that were used, if the calculations must take place at the farm or whether they could be calculated by for instance Feed Supply Managers, Production Managers etc .

4. Smolt section
The smolt section of the standard is yet to be developed in a manner and to such an extent that it can be evaluated or commented upon in a reasonable manner.
We suggest a prolonged process in which standards are developed to a degree that can be commented.

5. Appendix 2 and 3
FHL assumes that the appendix 2 and 3 must be changed according to the overarching principles.

6. Raw materials that are categorized as sustainable must be possible to use by industry.
In connection with the criterion 4.2, the standard takes an important discussion about whether fisheries certified as sustainable will be utilized, or whether there are social implications of the use of industrial fish such that it should be a maximum limit on the use of fish oil, even if the fisheries are certified as sustainable, for example through the MSC.

Experience indicates that the market will price the raw materials that are attractive to the consumer markets so high that they actually are not used for production of fishmeal and fish oil. There are several alternative markets for fishmeal and fish oil, including high concentrating of omega-3 for human consumption, ingredients in other animal feed, production of cat food, fuel, etc. Thus, the background for the definition of the social implications seems to be based on erroneous assessments. The central sustainability point of view should be that the marine ingredients should be harvested in a sustainable manner.

Ingredients that are categorized as environmentally sustainable must according to our opinion be freely used by the industry. To make social evaluations as well, will be complicated and very demanding and need not lead to overall improvements in relation to the social aspect. It will also contribute to undermining the credibility of the MSC certification program to develop a more sustainable fishery.

FHL therefore proposes that all MSC-certified raw materials must be deducted in the same way as by-products are. It should also be discussed if other raw materials that are harvested in a sustainable way should be deducted for a transition period.

Best regards

Norwegian Seafood Federation

Geir Andreassen
Managing Director

Aina Valland
Managing Director of Environmental issues

Attachments:
1. Consultation Statement, general comments
2. Comment Form with comments on specific points in the standard
3. Report by test audit
4. Comment Form from test audit

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

*Name: Aina Valland
*Organization/Company: Norwegian Seafood Federation
*E-mail address:

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1	It is a great challenge to keep track of and to comply with all international regulations as the criterion requires. It is not sufficient connection between the criteria and indicators.	The word "international" must be removed as a criterion.
	1.1.2	It is a great challenge to keep track of and to document compliance with tax regulations (also international) as the indicator requires. The indicator is difficult to document. An auditor will have difficulties to vouch for a company relate to all the tax rules. We believe this goes beyond the framework of the standard and should be considered withdrawn.	The indicator must be removed.
	1.1.3	It is a great challenge to keep track of and to document compliance with all labor regulations (also international) as the indicator requires.	The wording changed to: ” Presence of documents demonstrating compliance with all relevant national and local labor laws and regulations”
	1.1.5	The principle focus on the gray area of legality between countries. This is a standard for fish farmers and they can	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		hardly be kept responsible for this. Nor is it a type of documentation that one might expect to find at the farming sites.	
Principle 2	2.1.1	Important that both methods can be accepted, as the use of these vary according to national differences	Should take in as well "Measured at the peak production during each production cycle".
	2.1.2	A reliance of only AMBI is not necessary, as other tests as Shannon-Weiner and Hurlbergs Index as examples give the same answers: Are the benthic conditions OK to protect the biodiversity. Most countries already have very good (according to scientists/experts) systems in place to protects the benthos, these should be acceptable to SAD to avoid unnecessary duplication of sampling and lab work. A full benthic survey is not necessary each year, but should be utilized to show good benthic conditions when production is increased (first production cycles or later prod.increase of significance). The redox or sulfide in 2.1.1 will catch developing unfavorable conditions under non-increasing production.	AZTI Marine Biotic Index (AMBI) or documented equivalent national standard for benthic biodiversity in sediment outside of the AZE, conducted a) at the end of the first productions cycle at the site or b) at the end of later production cycles if production has increased by more than 30% compared to the first showing good or better environmental conditions. Where existing, national standards with the same intention and level of protection of benthic biodiversity should be accepted as fulfillment of the standard
	2.4.1	With the proposed change the standard will be adequate and could address the local challenges at different sites. More detailed standards will be difficult to perform and may be inappropriate because the local conditions and thus the local impact will vary widely and depend both on the facility itself and of the species or habitat that the	The company must document that they have considered any occurrence of vulnerable species in the vicinity of the site. They must also document that they have made an assessment of what measures can be implemented to reduce the possible negative effect, and have a plan to implement relevant measures.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		plant should be included to protect	
	2.5.1	Documentation indicates that the use of this type of equipment need not be a problem. We suggest to remove the present indicator and to make a more general and risk-based indicator, that is stressing the need to prevent predator attacks.	Predator controls should be implemented and recorded so as to prevent unnecessary wildlife destruction by the use of preventive measures or scaring devices. Evidence of risk assessments prior to implementation
	2.5.2	Also, this point must be made more generally, while it should address the need to assess whether actions taken are working as intended.	The farm must show evidence that anti predator methods are regularly assessed and found effective.
	2.5.3	Legal hunting should be allowed. This is particularly important in connection with the need to protect the fish for animal welfare reasons, but also in the case of a population that, according to authorities' assessments can or should be regulated in an area.	Number of marine mammals and birds killed through the use of lethal action[8]. Exceptions can be made if this is necessary for animal welfare reasons, or if there is a population that, according to government regulations can or should be regulated in an area.
	2.6.1	According to an auditor who has test audited the standard, this indicator is impossible to verify because there is not defined any standard. We think in general it is difficult to find an indicator that can be used in all areas with salmon farming. We are also concerned that a fish farm can be held responsible for changes or negative developments that in reality they are not responsible for. We also believe that 2.4.1 and the other indicators in the standard will be able to fulfill the intentions under 2.6.	The indicator must be removed.
Principle 3	3.1.1	Principle 3 concerning diseases is in general out of the scope of this standard as	Participation in an area-based scheme for managing sea lice.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		economical sustainability is nor included in the scope (yet) In the "Rationale" there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and indicators should specifically address that risk. As we know the situation today, it is mainly salmon lice that will be of concern in relation to wild fish, and therefore should be the disease of concern in area-based scheme. We do not have sufficient knowledge about environmental impacts of other diseases to day, and these should not be included. We therefore suggest changing the first sentence. For comments on Appendix II, please see our general comments.	
	3.1.2	Principle 3 concerning diseases in general is out of the scope of this standard as economical sustainability is nor included in the scope (yet) In the "Rationale" there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		indicators should specifically address that risk. The indicator will require extensive external resources and will be very difficult for small farmers to achieve. For comments on Appendix II, please see our general comments.	
	3.1.3	Farmers meeting the other parts of the standard will generally constitute a very small risk in relation to this point. We also find it impossible to define an acceptable and science based distance to wild salmon that may be used here. For comments on Appendix II, please see our general comments. and our comments to indicator 3.1.7	The indicator must be removed.
	3.1.4	It is in principle difficult to relate to other or global maximum allowed lice levels than those specified by local or national regulations, and at the same time be sure that both the impact on wild fish and resistance problems are adequately addressed in the various areas. The intentions of this paragraph are met through compliance with regulations and more of the other points in the standard, including the requirement for participation in an area based scheme.	The indicator must be removed.
	3.1.5	The last part of this indicator will be very extensive and have little practical relevance to follow-up for the farming site. Timing of	Timing of wild salmonid outmigration and juvenile periods is established.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		out migration will in practice not change much from year to year. We suggest changing the indicator.	
	3.1.6	The requirement of this paragraph is too comprehensive for a site. R & D activity must be maintained in another way than through this standard.	The indicator must be removed.
	3.1.7	In general the adult female lice are the problem, because they produce larvae that can infect migrating smolts. The requirement should therefore include only adult female lice. It is also important that the requirement for sea lice level not being too low all year round, to avoid many treatments that may give resistance. The requirement should not be as strictly all through the year. It is important to work for switching the strategy from mainly using chemicals to mainly using biological control methods such as the wrasse (labridae). Also regarding optimal use of wrasse, it is important that the standard focuses on adult female lice and not on the total number of lice. In autumn and winter, the adult female lice level should be higher to ensure the efficiency of wrasse and to avoid the standard driving forward resistance. We therefore propose to change the standard.	Maximum 0,5 mature female sea lice per fish during outmigration of wild juvenils. Maximum 1 mature female sea lice per fish the rest of the year.
	3.1.8	Level will vary from country to country. We	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		can not have a global standard here. We lack knowledge of acceptable numbers and the effect of various levels on different recipients.	
	3.1.9	This indicator will be impossible to audit. Conformance far back in time will be difficult to verify and very time consuming to audit.	The indicator must be removed.
	3.2.1	Based on existing knowledge, we agree with the part of the steering committee who felt that it should focus more on the "establishment" than the "impact", and therefore proposes to modify paragraph A) of the indicator.	A) There is no evidence of establishment
	3.4.2	The point is incomplete because it does not establish a period of time for which it shall apply. How to deal with this if the standard would include an entire generation and an audit is carried out before harvesting? For how long will possibly a license be revoked after an escape? Regarding note 16, the second sentence may be misinterpreted. We suggest that this sentence is removed. The first sentence is acceptable and should be kept.	The indicator must be defined in more detail. Note 16 must be changed to: The farmer must demonstrate that there was no reasonable way to predict the events that caused the episode.
Principle 4	4.2	It is subjected social assessments of sustainability that should not be a fundament for SAD / ASC. The central issue of the standard should be that the marine raw materials are harvested in a sustainable way and therefore that all sustainable harvested raw material should be	The changes must be done so that all sustainable harvested raw materials can be subtracted the same way as byproducts. In principle, all MSC approved raw materials should be allowed subtracted.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		subtracted. In the document it is agreed that this must mean that byproducts must be subtracted. FHL is of the opinion that all raw materials based on MSC certified raw materials and, through MSC certification show that they are sustainable harvested, should be subtracted. If no such deduction is made, it will also undermine the MSC certification.	
	4.3.1	There is acceptance that we have ambitious goals in a five-year perspective. At the same time, there is reason to point out that today there are only carried out the MSC certification of about 10% of consumer fisheries, and that it is even a smaller percentage which can make use of the MSC label. This is because using the MSC label requires certification of the whole value chain from boat to market in addition to the certification of the fishery itself. Today few industrial fisheries are MSC certified, and for each fishery that is certified, it is also necessary to certify the value chain. If the goal in 5 years is that there should be about 25% ASC certified fish from aquaculture, this means that approximately 15% of the world's fishing industry must be MSC certified and that all of the value chain is MSC certified. If 100% shall be ASC certified, it means that 59% of the world's fishing industry must be MSC certified during the upcoming 5-year period. This	The point to be rewritten from being an indicator to be discussed in the text. Alternatively the challenges of high ambitions must be considered when the standard is revised.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		ambition may be difficult to achieve. It could also be problems associated with limited access to and capacity in certification agencies, which we have seen in connection with the MSC certification of various fisheries. The result has been delays in the certification process, and that the certification is time-consuming. Careful reviews must be conducted on the realism of this requirement.	
	4.3.2	If the requirements are to ambitious or strict, this means that it will be impossible to get a sufficient quantity into the value chain with ASC certification. This will in turn determine whether the market can play a crucial role in triggering the use of ASC certification, and thus whether the ASC will be a marginal niche brand or a brand that eventually develops as important for the trade in aquaculture products. If the standard sets to strict requirements, we fear that the ASC will undergo the same problems that MSC experienced in the start: MSC was barely noticed in the trade, and there were problems getting the fisheries MSC certified. After the MSC undertook a revision that made it possible to get enough volume through the certification scheme, the market demands increased substantially, and became a strong driver for the MSC certification of more new fisheries. It is therefore sensible to start with the desired volume through the ASC, and then	IFFO or equivalent standard should be accepted and / or requirements for FishSource score 5 – 6. Fish Source scores must be set so that a sufficient volume quantity may be possible for ASC certification. FHL will return with the more exact calculations, but it can be suggested that the scores should be set at level 5 or 6.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		convert requirements back. Calculating this way, we get demands for fish source score of level 5 or 6 and / or acceptance for the use of IFFOR or equivalent.	
	4.3.3	For the producers of fish feed requirement of physical separation of fish oil and fishmeal from ASC accepted raw material sources from non-ASC Certified raw material sources, lead to the need for establishing a double infrastructure, including double sets of silos etc. The logistics will also be very demanding. A physical separation of production will therefore lead to very high costs associated with the production of ASC-accepted feed. Such additional costs and such additional work related purely to logistical challenges may therefore be a serious obstacle to the establishment of ASC-accepted feed. FHL will therefore request the establishment of a mechanism that is not based on physical separation of production, but on the accounting separation or mass balance traceability. In practical the fish feed manufacturer must be able to prove that he for example uses 15% of approved resources. At resale it must be distinguished between customers who buy ASC certified feed and thus buy up shares of the ASC approved resources, and other customers who do not need to buy such quotas. The scheme will thus be based on well-	A system of mass balance tracking must be established which does not require physical breakdown of feed production.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		established schemes in environmental work such as the purchase of green energy and the purchase of CO_2 allowances.	
	4.3.4	In practical terms, this must be solved by the fishmeal and fish oil industry requiring suppliers to declare that the fish trimmings are not from listed species. For the fishmeal and fish oil industry, it will be impossible to make species determinations of received trimmings.	
	4.4	FHL is satisfied that the requirements for certification of vegetabile oils are removed from the indicator level to the text. This is in line with the realities in the development of standards for vegetable oils.	
	4.6.3	This is one of the points where there is a need for harmonization of standards. Documentation requirements for salmon are stricter than for other species.	
	4.7.1	The importance of Cu as having environmentally harmful effects is reduced in recent years. In 2009, Cu in Norway was taken out of the government's list of priority substances with environmentally harmful effects, partly because one has found that Cu does not accumulate in the food chain (ref: KLIF). The toxicity of Cu in seawater is low. Although the continuous ongoing research to find satisfactory alternatives to the use of	The indicator must be removed.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		Cu in antifouling, the farmers still have to use CU as an antifouling agent in some areas. This is done to achieve clean nets, good fish welfare, less risk of disease and optimum conditions when using wrasse in the fight against lice. It is also important to ensure clean nets to reduce the risk of escapes. We therefore propose to remove this indicator since keeping it could lead to far greater negative environmental effects than flushing of Cu-impregnated nets with high pressure.	
	4.7.3	A study of the bottom sediment of the fjords and along the coast at various places in Norway from 1997, showed highly variable values of Cu concentration in the sediment. The reason is probably that there are many other activities at or by the sea that has given or gives emission of Cu (shipyards, marinas, mining). In addition, there are high levels of Cu in the soil in many areas. Because Cu also is an essential mineral in nutrition context, some will also come through feed. With the inquiry referred to and the knowledge of risks related to Cu, the proposed limit for Cu seems to be very low.	What is the scientific justification for the chosen level of the standard?
	4.7.5	It should be sufficient that the anti fouling agent is approved in the country where it is used.	Evidence that the type of biocides used in net antifouling are approved according to national legislation
Principle 5	5.1.2	Principle 5 concerning diseases in general is out of the scope of this standard as	Site visits by a designated veterinarian or equivalent[35] at least every other month.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		economical sustainability is nor included in the scope (yet). In the ”Rationale” there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and indicators should specifically address that risk. Experience in farming shows that it is sufficient with visits from fish health personnel 6 times a year at a site unless special circumstances at the site makes it necessary that such personnel will be summoned extra. Although note 35 protects Norwegian conditions, this should also appear in the text.	
	5.1.5	We propose to change the indicator. We also propose to change the standard to "Yes".	Indicator: The company must have a system to remove dead fish as a routine, and to deal with dead fish in a responsible manner. Standard: Yes
	5.1.6	Autopsies of 100% of all dead fish are not possible in practice, but the company must have a system for autopsy of fish in all occurrences of increased mortality.	Dead fish must be registered and autopsy be carried out in all cases with increased mortality.
	5.1.7	It should be clear that the entire locality is concerned, and not individual cages. Single cages will under special circumstances have increased mortality, and may then exclude the entire site. In order to	Maximum mortality rate of farmed fish on a site during the production cycles.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		certify the time frame can not exceed one production cycle.	
	5.1.8	It should be clear that the entire locality is concerned, and not individual cages. In order to certify, the time frame can not be longer than one production cycle.	Maximum unexplained mortality rate on a site during the production cycles.
	5.2.2	The purpose with this indicator is covered by 5.2.1.	The indicator must be removed.
	5.3.1	This indicator is impossible in practice. National regulations should be followed.	The indicator must be removed.
	5.3.3	The indicator concerns food safety which is not covered by the standard. The indicator is covered by Principle 1.	The indicator must be removed.
	5.4.1	The indicator is ok, but can be removed because it is referred to in 3.1.1.	The indicator can be deleted.
	5.4.3	Harvesting will not always be possible or advisable. We propose to change the indicator.	When bio-assay tests determine resistance is forming, use of an alternative, permitted treatment
	5.4.4	We agree on the comment from the SC:	Use of antibiotics listed as critically important for human medicine by the WHO is not allowed, except when there is a policy signed by the farmer and the designated veterinarian or equivalent[35] acknowledging the concerns surrounding the use of these products and committing to reducing and limiting their use.
	5.5.1	The point concerns stocking of different year classes (separation of generations), and the point must be formulated so that this is clear. Otherwise Ok.	
	5.5.2	Other fish health personnel are approved in line with veterinarians for the topics the	Percentage of fish transferred live from one sea-based farm site to another, unless

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
		standard applies to in Norway (ref. note 35)	explicitly accepted by the designated veterinarian or equivalent[35] not to increase the risk of spreading sea lice. (See comments on environmental impact on diseases in general)
	5.5.3	It must be noted that this requirement should only apply to diseased fish. Furthermore, it must be possible to have exemptions on certain parts of the trip, (determined safe places for open wells/ water exchange) These exemptions must be determined in collaboration with and assessed by certified fish health personnel.	
	5.5.5	Indicator 5.5.5 concerning diseases in general is out of the scope of this standard as economical sustainability is nor included in the scope (yet). In the "Rationale" there is no information that substantiate (lack of proper risk analysis) that diseases in general have any significant impact on wild species (the biodiversity) thus the proposed indicators is not relevant and disproportional. Sea lice may represent a risk to wild salmonids and indicators should specifically address that risk. This indicator must be removed. For further comments, see general comments.	The indicator must be removed.
Principle 6	6.10.2	The indicator requires that overtime work shall be voluntary. According to Norwegian regulations overtime work can be imposed on employees in Norway. The indicator is therefore contrary to Norwegian regulations. The indicator may be retained provided the word "voluntary" is removed.	Overtime is limited, paid at a premium rate and restricted to exceptional circumstances.

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 7	7.1.4	The indicator is difficult to understand and will therefore be difficult to verify. In a community with several fish farms, it will be difficult to separate the effects, if any. The indicator concerns food safety which is not part of the standard.	The indicator must be removed.
	7.1.5	The indicator and range of it is difficult to understand and to consider.	
General comments		For several of the indicators it should be considered what can be accepted as a deviation / tolerance.	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1	1.1S	It is a great challenge to keep track of and to comply with all international regulations as the criterion requires. It is not sufficient connection between the criteria and indicators.	The word "international" must be removed as a criterion.
	1.1.2S	It is a great challenge to keep track of and to document compliance with tax regulations (also international) as the indicator requires. The indicator is difficult to document. An auditor will have difficulties to vouch for a	The indicator must be removed.

		company relate to all the tax rules. We believe this goes beyond the framework of the standard and should be considered withdrawn.	
	1.1.3S	It is a great challenge to keep track of and to document compliance with all labor regulations (also international) as the indicator requires.	The wording changed to: ” Presence of documents demonstrating compliance with all relevant national and local labor laws and regulations”
Principle 2	2.5.1S	Legal hunting should be allowed. This is particularly important in connection with the need to protect the fish for animal welfare reasons, but also in the case of a population that, according to authorities' assessments can or should be regulated in an area.	Number of marine mammals and birds killed through the use of lethal action[8]. Exceptions can be made if this is necessary for animal welfare reasons, or if there is a population that, according to government regulations can or should be regulated in an area.
General comments		The smolt part of this standard is yet not developed in a way that we can evaluate or comment in a proper manner.	We suggest a delayed process.

REVIEW OF SALMON AQUACULTURE DIALOGUE STANDARDEN (SAD) – EVALUATION OF AUDITABILITY

KARI-ANNE LENVIK, ESSENTIA AS, BERGEN 17.9.2010

The assessment is based on an evaluation of each clause in the standard combined with a trial audit on a fish farming site together with interview of a representative of the administration.

The intention of SAD standard is to develop clauses that are measureable to be able to evaluate improvements. This is in principle positive, but such standards are challenging to audit; and the report is describing these cases in detail. Normally other auditable standards demand that there must be routines in place, given a non-conformance, the company can improve their routines to comply, in the SAD standard focus is on the results and in many cases it requires a long time before the results can be verified.

SAD standard lacks description of requirements for some indicators, these have not been evaluated in detail, but some comments are given.

The detailed comments on each clause are given in an attachment to this document; my main conclusion is described below.

1. **Time consuming and expensive audits**

There are several examples in the standard where the audit must include a comprehensive work to find necessary background information. Some of the clauses require a verification of historic data as far back in time as 5 years. One example is no violation against legal requirement. Gathering of such information to be able to have a proper verification will be both time consuming and difficult.

Many of the clauses in the standard require 100 % compliance or “none” present. To be able to verify and ensure that the conclusion from the audit is reliable, the preparation time before the audit and during the audit will be comprehensive. In reality this will not be acceptable since such use of time will result in extensive auditing costs. Several of the clauses are requiring third party assessment and this will also be costly.

The guidance documents for auditors must include description of what is needed to verify to be able to confirm sufficient compliance against the standard, based on sampling (not 100 %).

Another example that could have an impact on the audit time is the suggestion in the standard that the auditor should interview representatives of the local community; this could be difficult to combine with an audit of a site, and who should define “a representative person”?

2. Access to sensitive and personal information

Several of the clauses in chapter 6 (Social responsibility) are difficult and challenging for an auditor to verify. It is a requirement that the auditor should; quote;"*investigate any allegations of corporeal punishment, mental or physical coercion, or verbal abuse*". As auditors we are trained to avoid such cases, and it will require special personal skills (and experience) of the auditor to handle such incidents properly.

The intention of this chapter is good and it is important that the companies are reliable in the areas mentioned under chapter 6, but I am very doubtful to use an audit; that normally have the intention to contribute to the improvement processes, to look into personal conflicts etc. Normally when you have a conflict, there will be different opinions on what is the "truth", and during an audit you will not have time or the assumption to conclude objectively and correct. This is not acceptable from an auditor's point of view, and these clauses should either be removed or revised to ensure a reliable audit.

My recommendation is that SAD standard should recognize certification against OHSAS 18001 (standard for occupational health and safety management system) as a compliance to chapter 6.

As mentioned under 1; the standard require no violations against legal requirements. A source for this information could be the authorities (e.g. access to audit reports), but this is regarded as confidential and not available from e.g. Directorate of Fisheries or Food Safety Authority.

3. Dependence on other parties – closing of non-conformances

Several of the clauses require a survey done by a third party; this will include consultants, scientists, feed suppliers and government as example. This will be challenging due to lack of formalized activities according to several of the standard requirement at present.

When the surveys have been done and the reports are in place; verification will be easy, but if a survey is missing and a non-conformance is given; closing of this non-conformance will depend on the availability of the third party. Normally a company have one month to close a non-conformance, and this could be difficult if the third party don't have available time. Some of the surveys are linked to specific seasons (e.g. monitoring of lice on wild smolt in the spring), if a certification audit is done in the autumn and this survey is not done; the closing of this non-conformance must wait until spring.

The other closing challenge is when the non-conformance involves results several generations back in time. It is a requirement that the mortality rate must not be higher than 25 % the last two generations; if the audit reveals a higher result; the company must wait until they have finished a new generation with a better result before they can close the non-conformance.

Another example is in case of escapes; it is acceptable to have an escape if it is beyond the company's control. In many cases clarification of the responsibility could take some time; and do we need to suspend the certification status of a company until they are proven innocent?

4. Result from trial audit

The site which was audited is producing rainbow trout. The site manager, operator and Quality Manager were interviewed on site, and the Production Manager was interviewed at the central office. The main purpose of the trial audit was to evaluate the auditability and not to verify the sites compliance against the standard; it is recommended to perform a new trial audit when the final version is out for comments, also since several clauses did not have a defined target. The next trial audit must be performed as a realistic certification audit.

The audit clarified that to be able to verify all clauses in the standard, for larger companies the audit must be combined with both a site visit and audit of the administration.

Most of the clauses involving feed production were regarded as difficult to comply since they were dependent on sufficient information from the feed suppliers. There were uncertainty about the calculations mentioned in the standard; do each site need to make their own calculation or could be coordinated by more centrally placed positions such as Feed Supply Managers, Production Managers etc.?

Most of the clauses in chapter 6 were regarded as difficult and in some case impossible to comply. Normally they are two persons on site, and the transparency on matters like personal wages, conflicts and discrimination will be difficult and very sensitive to reply on.

There were some clauses in the standard they concluded as impossible or very difficult to comply with; these were:

3.4.1 A requirement of less than 0, 1 % unexplained loss is unrealistic

4.7.1 Cleaning is done regularly, and this requirement will be difficult to comply with

5.1.6 A requirement of 100 % post mortem analysis is not possible to accomplish

6.8.2 It is regarded as very difficult (or impossible) to verify 100 % compliance

6.10.2 The requirement in the standard to limit overtime to a minimum indicates a lack of understanding for how the work on a fish farm is organized

5. Detailed comments to the standard

The document attached includes the detailed comments to the standard.

Bergen; 17.9.2010, Kari-Anne Lenvik, Essentia AS

Principle	Criterion	Indicator	Standard	Auditable		If Yes; how?	If no; why?	Comments from trial audit	Other comments
				Yes	*No*				
1: COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS									
	1.1: Compliance with all applicable local, national and international legal requirements and regulations								
		1.1.1 Presence of documents demonstrating compliance with local and national authorities on land and water use	**YES**	*Yes*	*No*	License documents and copy of or access to relevant legal requirements. Evaluation of compliance if the company is certified against ISO 14001 or OHSAS 18001.	It is a requirement that the auditor must verify 5 years back in time to confirm any violation against legal requirements. This type of investigation could take a lot of time depending on the availability of such information. Must be based on trust and conscientious-ness from the audited company. It is also required to check compliance against legal requirements that are stricter than this standard.	Old documents and records are centrally stored, only information of the present generation is available on site. For this company they have changed the recording system three times during this period, and it will be difficult to trace back in the records to find any non-conformances against legal requirements. Could be possible to verify non-conformances from external audits or inspections performed by the authorities, but this information cannot be obtained from the authorities directly (classified as confidential) and must be given from the company. Computer gives access to legal requirements, and copy of the license was on site.	To be able to verify all requirements in the standard, audit on site must be combined with audit of a central administration. This company is based on a merge of three different companies. Will be difficult to find records confirming compliance to e.g. maximum total biomass. This information is reported to the authorities but is regarded as confidential and not available from the Directorate of Fisheries or Food Safety Authority. Lice counts are reported to the local area management agreement (Fiskehelsenettverket)
		1.1.5 Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months	**YES**	*Yes*	*No*	Integrated companies have this information within the organization, but not necessary at the site. Examples are lists of prohibited chemicals in different exporting countries.	Small companies without their own sales department does not necessarily have this information	This is handled by the sales department and the information was not known or available on site. Suggested that either the veterinarian or the quality manager should have this information.	
2: CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION									
	2.1: Benthic biodiversity and benthic effects								
		2.1.1 Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	**Redox potential > 0 millivolts (mV) Sulphide ≤ 1,500 microMoles / l**	*Yes*		As long as the sampling is based on the requirements in the standard, a report can be verified		Reports from benthic surveys (MOM) was verified, but we were not able to confirm total compliance against the standard. Some of the concepts where not known.	
		2.1.2 AZTI Marine Biotic Index (AMBI3) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	**AMBI score ≤ 3.3**	*Yes*		Same as above		Same as above	
		2.1.3 Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1	**≥ 2 highly abundant taxa**	*Yes*		Same as above		Same as above	
	2.2 Water quality in and near the site of operation								
		2.2.1 Weekly average percent saturation of dissolved oxygen (DO) on farm	**≥60%**	*Yes*		Oxygen levels are controlled and records can be verified; either manually or electronic.		Equipment for continuous logging of oxygen was in place. Information given both in percentage and dissolved oxygen per liter. The limit of 60 % is regarded as low, but not unusual in periods with high temperature and high algae concentration.	The standard does not define at which depth the oxygen should be measured. The results can differ quite a lot between different depths. Could adding of oxygen be a solution if the result is below 60 %?
		2.2.2 Maximum percentage of weekly samples from 2.2.1 that fall under 1.85 mg/liter DO	**5 %**	*Yes*		Same as above		Same as above	Same as above
	2.6: Cumulative impacts on biodiversity								
		2.6.1 Presence or absence of selected sensitive or sentinel species	**Not defined**		*No*		This is not possible to verify since the standard is not defined. Will be a challenge to verify since a negative trend not necessarily depends on fish farming alone, and how can such data be obtained?		
3: PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS									
	3.1 Introduced or amplified parasites and pathogens								

	3.1.3 A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to **measure possible impacts on wild stocks**. Farms located in areas of wild salmonids must focus this research on **measuring sea lice levels on wild juveniles** and understanding the link between sea lice levels on farms and in the wild.	**YES**	*Yes*	*No*	Can be verified by documents confirming participation in relevant projects or financial contribution. Such assessments will require scientific support and must cover larger areas such as fjords and not only the proximity of the site.	There are limited possibilities to catch wild fish, and this must be coordinated by the authorities. It will be costly to finance such projects and governmental support will be needed (especially in big scale). The positive impact will be a better knowledge on actual status and impact from fish farming.	This site is part of a big project covering the areas mentioned in the standard Vossollauget/Lusalaus). Such projects are not common in all fish farming areas.	
	The following indicators would only apply to farms located in areas of wild salmonids that cannot demonstrate total containment or separation of parasite and disease vectors from the wild environment							
	3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)	**YES**	*Yes*		Small companies will have problems to confirm with the requirement, must be coordinated with research institutes. Will be a challenge to ensure yearly assessments.		See comments 3.1.3	
	3.1.9 Period of demonstrated compliance with standards in 3.1 prior to initial certification.	**Under discussion**		*No*	SAD is asking for input on the time frame for implementation of the requirements; e.g. one generation or more? Normally as auditors we require that the routines must be in place during the audit, even though they are recently implemented. Further surveillance audits will confirm the effectiveness of the implementation.	Not possible to verify before the standard is defined	The frequency should be per generation. The food safety authority is using two years as a definition of a generation to have a more harmonized fallowing.	
3.4 Escapes								
	3.4.1 Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other known causes	**No more than 0.1% more than the documented accuracy of the counting machines or counting method used**	*Yes*	*No*	The loss is recorded and can be verified.	A requirement of < 0, 1 % unexplained fish loss is considered to be impossible to comply to based on the lack of accuracy of the measuring device.	A requirement of less than 0, 1 % unexplained loss is unrealistic. 3-4 % is quite normal. Several sources of error that will have an impact on the total result. The final percentage will be able to verify after all fish is slaughtered.	It is not possible to verify the total result if an audit is done on a site in the middle of a generation. Do we have to verify the result for the previous generation?
	3.4.2 Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	**0**	*Yes*		Will be possible to verify since it is a legal requirement to report such incidents. Serious incidents of escapes will some times be reported to the police; and the conclusion of whether they are guilty or not will take some time. My understanding of this requirement is that in such cases the company cannot be certified until the case is clear and it is confirmed that the cause was beyond there control.		No incidents of escapes on this site. They will emphasize the importance that this standard does not refer to escapes beyond their control.	
4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER								
4.1 Traceability of raw materials in feed								

4.1.1 Presence and evidence of traceability of all raw feed ingredients with regard to country of origin, as demonstrated by the feed producer	**YES**	*Yes*	*?*	Can be verified, but it must be clarified whether the auditor have to confirm this directly with the feed supplier, or verification of the supplier assessment done by the company (e.g. audit reports).		Not possible to verify on site. The clauses related to feed were considered as difficult to reply on. This type of information will normally be achieved by different personnel depending on the size of the company. The challenge will be to ensure that the fish farming companies can achieve the required information from the feed suppliers and produce the results in an effective way.	It was suggested that SAD should define a separate standard for feed suppliers to cover this chapter; my conclusion is that several of the clauses also require information on e.g. feed conversion rate and cannot be covered by a separate standard. Clause 4.3 and 4.4 however is mostly the responsibility of the feed suppliers.
4.3 Source of marine raw materials							
4.3.1 Commitment to source feed containing >90% fishmeal or fish oil originating from fisheries certified under an ISEAL member's accredited sustainability certification scheme. This must be done as the product becomes available and within 5 years of the publication of the SAD standards.	**YES**	*Yes*		The requirement can be verified by a statement from the feed supplier. After 5 years it must be a part of the product description from the feed supplier		This is regarded as the responsibility of feed suppliers (see comments 4.1.1).	
4.3.2 Prior to achieving 4.3.1, the **FishSource score** for the fishery(ies) from which a minimum of 80% of the fishmeal or fish oil is derived. (See Appendix IV, subsection 3 for explanation of FishSource scoring.)	**TBD**	*Yes*	*No*	Not defined, but must be based on information from the feed supplier	FishSource score is not yet implemented?	Same as above	
4.6 Energy consumption and greenhouse gas emissions on farm							
4.6.3 Documentation of **GHG emissions of the feed** used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology	**YES**	*Yes*		The conclusion must come from the feed supplier. Documented as an average result for a generation.			
4.7 Non-therapeutic chemical inputs							
4.7.1 Percentage of copper-treated nets that are cleaned and treated in situ in the marine environment	**0 %**	*Yes*		Treating of nets with impregnation on site is not allowed in Norway. Cleaning is done regularly and can be verified in records such as site dairies etc.		Cleaning is done regularly, and this requirement will be difficult to comply with.	
5: MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER							
5.1 Survival and health of farmed fish							
5.1.3 Percentage of fish that are vaccinated for selected diseases that are known to present a significant risk in the region and for which an effective vaccine exists	**100 %**	*Yes*	*No*	Documentation from the smolt supplier will verify the vaccine used.	Verification of this clause requires that the auditor have knowledge of the diseases representing a significant risk in the region. Conclusion on effectiveness is difficult; e.g. ongoing discussion on PD vaccine.	The company strives to choose vaccines that are suitable for the normal health status on site. They take in to consideration any particular incidents, and for this site they had problems with winter wounds in the previous generation, and this generation is vaccinated against winter wounds. A Veterinary health plan can be verified and all smolt documents include information of the vaccine used.	
5.1.6 Percentage of dead fish that are recorded and receive a post-mortem analysis	**100 %**	*Yes*	*No*	Causes of mortalities are recorded; but post-mortem analysis is normally done by the veterinarian; either as a normal procedure during regularly visits, or suspicion of disease outbreak. Can be verified in reports from veterinary visits.	Verification of 100 % post-mortem analysis is not possible.	Cause of mortality is indicated by representatives on site. Post mortem analysis is done during visits from veterinary or fish health representative. A requirement of 100 % post mortem analysis is not possible to accomplish.	
5.5 Biosecurity management							
5.5.5 Re-occurrence of a specific disease over more than one generation	**TBD**	*?*	*?*	This can be caused by other factors than poor biosecurity management on site and will be difficult to comply with if the standard is "none". Verification of productions records and veterinary reports.	Not possible to verify before the standard is defined	Depending on the final standard, this requirement can be difficult to comply with. E.g PD situation in the western part of Norway.	
6: DEVELOP AND OPERATE FARMS IN A SOCIALLY RESPONSIBLE MANNER							
6.1 Freedom of association and collective bargaining							

6.1.1 Evidence that workers have access to trade unions (if they exist) and union representative(s) chosen by themselves without managerial interference	**YES**	*Yes*	*?*	Verification of this clause is easier when the labourer is organized. Verification of policy documents, labour contracts, minutes from meetings concerning this matters and interview of employees.	If the labourer is not organized, this can be a sensitive question to ask.	Most of the staff is organized. Comments during the trial audit that several of the clauses under chapter 6 are difficult to answer; especially on site. It could be a problem if a person is using this opportunity to complain to the auditor just for their personal interest; how should an auditor deal with this and confirm the rightness of this allegation?	
6.3 Forced, bonded or compulsory labor							
6.3.1 Number of incidences of forced, bonded or compulsory labor	**NONE**	*Yes*	*No*	Not considered as relevant in Norway, can be verified by labour contracts and interviews.	Verification of actual incidents will be difficult. Could be sensitive information.	Has not been relevant for this site.	
6.8 Conflict resolution							
6.8.1 Evidence of worker access to effective, fair and confidential grievance procedures	**YES**	*Yes*		Verification of procedures, minutes and other documents confirming follow-up, interview of employees.		Not possible to verify on site; will perhaps be documented in the HR manual. Interview of safety deputy and minutes from health and safety meetings (AMU) could be used for verification, but since these matters often are confidential, this will be difficult to clarify.	
6.8.2 Percentage of grievances handled that are addressed	**100 %**		*No*		Difficult to verify 100 % compliance, must have information on all incidents.	It is regarded as very difficult (or impossible) to verify 100 % compliance. These cases are discussed on a higher management level and must be discussed centrally.	
6.8.3 Percentage of grievances that are resolved	**≥70%**		*No*	Same as above	Same as above	Same as above	
6.9 Disciplinary practices							
6.9.1 Incidences of excessive or abusive disciplinary actions	**NONE**	*Yes*	*No*	Difficult to verify, can be based on information from media or court cases.	Verification of such cases is very difficult for an auditor; both sides have their own opinion; and the auditor will not be able to make a correct conclusion.	This clause will be both difficult to discuss and verify.	
6.10 Working hours and overtime							
6.10.2 Overtime is limited, voluntary, paid at a premium rate and restricted to exceptional circumstances	**YES**	*Yes*		Overtime is accepted according to Norwegian legislation; also by decree. Verification of time sheets compared with salaries.		The requirement in the standard to limit overtime to a minimum indicates a lack of understanding for how the work on a fish farm is organized. Handling of living organism is not necessarily done from 9-4. Feed could be delivered in the evening, the well boat must come late and other incidents could require assistance without normal working hours.	
7: BE A GOOD NEIGHBOR AND CONSCIENTIOUS CITIZEN							
7.3 Access to resources							
7.3.2 Evidence of assessments of company's impact on access to resources	**YES**	*Yes*	*No*	Will be described in license documents and discharge consent	It is suggested that the auditor should interview representatives of the local community; this could be difficult to combine with an audit of a site. Who should define a representative person?	Not clarified during the trial audit.	

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Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	Criterion 1.1- Indicator 1.1.2 & 1.1.3 Indicator 1.1.4 Indicator 1.1.5	Too cumbersome to keep these records at each farm Only site-specific information should be required kept on site Could be a nightmare to find all applicable laws	Keep records at company Head Office Other information to be kept at H.O. Specify which laws/what documentation
Principle 2	Criterion 2.1 Criterion 2.2- Indicator 2.2.1 & 2.2.1 Criterion 2.3 Criterion 2.4	The British Columbia regulations provide a reasonable approach, based on the principles that impacts are limited to the area immediately near the farm (30m is o.k.), reversible and not increasing over time (years) This is beyond the control of a salt water farm operator Is this realistic? All habitats could be described as "sensitive"	Should be addressed through siting criteria Research needed to determine actual % fines Some common sense should be inserted here in order to avoid abuse of this Criterion

	Criterion 2.5 Criterion 2.6	The statements that ADDs have damaged hearing of marine mammals and that ADDs attracts rather than deters mammals are contradictory Conditions are different between each region- often also between farms. Some species' may be positively impacted by the presence of farms (reduced poaching of abalone, for example)	Killing of seals should be allowed in areas where they are abundant (or even over-abundant, as long as every other reasonable method has been tried. Operators should work closely with First Nations where applicable
Principle 3	Criterion 3.1- Indicator 3.1.1 Indicator 3.1.2 Indicator 3.1.3 Indicator 3.1.4 Indicator 3.1.5 Indicator 3.1.7 Criterion 3.3	Difficult to rotate treatments when only one is available (B.C.) Need to specify which "key regional impacts" are contemplated for assessment-farms only? Research and monitoring of wild fish should not be done by industry, as data will be criticized by ENGO's. Suggestion about distance from salmon migration route (75 km) is not defensible from a scientific point of view- just a means of eliminating farms from areas with wild salmon (like all of B.C.) Few problems with lice on Chinook This can not be applied unilaterally, as conditions are different in many jurisdictions What about ranched/enhanced salmon Is this meant to read 0.5 mature *female* lice? Can one tell if a motile louse is male or female? Mention should be made of the fact that fish farmers also don't want to see fish escape. Also, escaped Atlantic salmon in the Pacific has no wild salmon to reproduce with.	In B.C., treatment triggers should be reduced in order to lower the number of treatments required for sea lice. Current regulation is not based on sound science Focus should be on a good (farmed) fish health management program Should be done by governments, with industry cooperation Provide guidelines for each production region Specify relationship between farmed/ranched/wild salmon The contemplated maximum number of lice on farmed fish are not appropriate for B.C. Include a reference to *Ginetz; On the Risk of Colonization by Atlantic Salmon in British Columbia Waters*

	Indicator 3.4.1 Indicator 3.4.2	Unrealistic- time at vaccination is first opportunity to get accurate numbers. The issue of "leakage" from salmon farms has been overblown and based on statements from government officials- not industry experience This should be a percentage of all fish in a farm (or pen) rather than a specific number of fish	Change to cover time between vaccination and harvest. Allow for unusual episodes of mortality, when dead fish can not reasonably be counted. Research should be conducted to evaluate the appropriateness of the 0.1% level
Principle 4	Criterion 4.2- Indicator 4.2.1 & 4.2.2	The use of available fish meal (and oil) in aquaculture should be encouraged over uses by other (non-aquatic) livestock producers, as fish convert these products to edible protein much more efficiently. Fish farmers are continuously striving to improve EFCR, no standard required	Ensure that fish meal and oil used to feed livestock is sourced from sustainable (certified) fisheries
	Criterion 4.3	The SAD's aim "…to allow approximately 25% of the salmon industry to meet the SAD standard" is inappropriate	If more (or less) than 25% of the salmon (farming) industry can demonstrate that they are operating in a truly sustainable fashion, then they should be certifiable under a SAD standard
	Criterion 4.4- Indicator 4.4.2	All sources of raw materials should be documented (Indicator 4.1.1)	As long as food for human consumption is not required to be labeled with source or amount of raw materials derived from genetically modified organisms, fish feed should not be required to do so either
	Criterion 4.6- Indicator 4.6.3	This is not realistic at the individual farm level, as sources of raw materials for feed production changes all the time. GHG emissions can also change quickly, based on mode of transport (truck, rail, air) and size of shipments	Require feed manufacturers to provide data on a by-country of origin basis, farms can provide a "typical" scenario
	Criterion 4.7- Indicator 4.7.5	Biocides approved for use in other countries (Norway, Canada) should be acceptable	Use international standards for approving biocides, if available. Encourage support for research into new methods for the control of biofouling (SINTEF)

Principle 5	Criterion 5.1- Indicator 5.1.6 Indicator 5.1.7 Indicator 5.1.8 Indicator 5.1.9 Criterion 5.2- Indicator 5.2.1 Criterion 5.3- Indicator 5.3.3 Criterion 5.4- Indicator 5.4.2 & 5.4.3 Criterion 5.5- Indicator 5.5.1 Indicator 5.5.3 Indicator 5.5.5	This is not realistic in case of mass mortality where cause is obvious This rate is only realistic if applied to mortality causes within the control of the fish farmer. This rate is too high- fish farmers should always know the cause of mortalities This should be an integral part of the Fish Health Management Plan (Indicator 5.1.1) Allowable concentrations should be established by governments, based on scientific documentation. Evidence of this Indicator must be documented This should be at the discretion of the veterinarian Individual farm sites should be single-year class (with the exception of sites used to hold brood stock) This is not realistic until Norway allows for the slaughtering (stun & bleed) at the farm site. Not realistic with respect to endemic diseases	Specify a difference between low ("routine") mortalities and major events If this is a goal, then it should be lower (20% or less) A maximum of 5% (considering comments to Indicator 5.1.6) Chemicals being used must be approved for that specific purpose by the appropriate authority Documentation should be required by slaughter/processing/packing facility as condition of acceptance of product (as in B.C.) No repetition of a treatment that is deemed non-effective should be allowed. Number of treatments should be minimized based on sound scientific research and due consideration by veterinarians Companies should be encouraged to use a single-year strategy as part of an area-based management plan Include a specification of no liquid discharge (unless treated) from vessels transporting slaughtered fish Apply to "exotic" diseases only
Principle 6	Criterion 6.1, 6.2, 6.3, 6.4 Criterion 6.6	Excessive wording? "Basic needs" can be hugely different between individuals and families. Also, you can not realistically ask a company to have a different rate of pay for different people	A statement that operators must carry on their business according to the rules set forth in the ILO could possibly suffice. Establish a "Basic needs wage" for each jurisdiction so it is known to all.

		doing the same work and having the same experience.	
	Criterion 6.7- Indicator 6.7.1	Contracts with each worker not necessary or practical. The use of Probationary Periods should be allowed. The term “socially responsible practices and policies” can mean anything to anybody- too vague.	The use of Job Descriptions with wage details should suffice in most situations, where there are no collective labour agreements. Make a reference to an acceptable definition
	Criterion 6.8- Indicator 6.8.3	There should be a time limit associated with this Indicator. There may be situations were the resolution of grievances will not require “corrective action” to be taken	Suggest a maximum of 90 days for grievances to be resolved. “Corrective action” to be taken when deemed necessary
	Criterion 6.9- Indicator 6.9.1	The term “excessive or abusive disciplinary actions” is open to interpretation	Make a reference to an acceptable definition
	Criterion 6.10- Indicator 6.10.1	Must allow for shifts like 8 days on, 6 days off etc. When interviewing employees regarding overtime, Job Descriptions should be considered.	The situation around overtime should be clearly described in Job Descriptions, allowing for flexibility in unforeseen circumstances
	Criterion 6.11- Indicator 6.11.1	The word “sometimes” should either be taken out or defined Improvement of income should be connected to advancement based on increased knowledge, skill level, capacity	
Principle 7	Criterion 7.1- Indicator 7.1.4	A reference to how this will be done should be included Language should reflect that salmon farming may have a positive effect on communities. Communities must also be expected to act reasonably in their interaction with operators and owners. No complaints for the sake of complaining.	Interactive communication committee good idea- perhaps with third party adjudicator?
	Criterion 7.2- Indicator 7.2.1	Rights & Title is generally accepted as a principle, but seldom clearly defined due to the lack of signed traties. Consider the	

	Indicator 7.2.2 Indicator 7.2.3	addition of "and defined" In Canada, operators should work with the Aboriginal Aquaculture Association and its approach to certification Aboriginal people must also be expected to act reasonably. While every effort should be made by the fish farmer to obtain support from the local aboriginal community, there should be no veto power granted to aboriginal governance structures unless established by law	Farm operators should work with indigenous aquaculture associations where applicable Fish farm owners should encourage and support the participation in the salmon farming industry of aboriginal people for their social and financial benefit
General comments	Appendix II- <u>Application and rotation of treatments.</u> <u>Stocking</u> <u>Transport</u> <u>Production levels</u> <u>Monitoring schemes</u>	"…coordinated treatments"- for what? "…prior to outmigration"- of what? Wild/ranched/enhanced salmon smolt? Must mention that the "same year class" refers to individual sites or sites within an are under ABM Need a definition of a "closed wellboat". Stocked net cages may have to be moved within farm (transport cages for grading) and between farms and shore (fresh water treatments in Australia for gill amoeba) The term "on-farm and area farm density" must be defined- different methods used in industry today Monitoring of wild fish should be done by governments. Relationship between lice on farms and lice on wild fish may never be established, as there are many other factors influencing sea lice levels on both. Sea lice levels within farms and on wild fish will likely vary considerably from one year	

		to the next, often due to conditions far beyond the control of the fish farmer. Acknowledgement should be made of the biological differences between areas of many lice-carrying "wild" salmon and areas with low populations.	
	Appendix III	What constitutes a "change" in the requirement for "a new assessment if there have been changes made to an existing farm"? The procedures for "an analysis of the appropriate density and infection pressure risk on wild populations" must be clear- you are not dealing with a constant set of circumstances	
	Potential impacts on wild species	Procedures must be clarified Information about the health/disease status of wild salmonids will be hard to find. The relative density of wild salmon in any area changes constantly- often by hours and even minutes	All proposed farms must undergo an environmental assessment or screening that will address such issues
	Sea lice infection pressure risk	Documented differences between populations of sea lice (Atlantic vs. Pacific) should be recognized, along with requirements for different management approaches.	Sea lice management should be based on each country's government research results

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			

Principle 2	Criterion 2.2-Indicator 2.2.6S Criterion .3-Indicator 2.3.1, 2.3.2 & 2.3.3	The DO level in discharge water needs to be above a certain level in order to maintain good health. The prohibition of the use of “aeration and other oxygenation systems” doesn’t make sense. Such water treatment may be necessary in order to maintain good fish health during fish handling and emergency situations beyond the control of the operator. In general, water quality might be beyond the producer’s control. Standards also need to be established where the smolt production facility discharges water to the ocean, unless fish farm standards are applied	Refer to Fish Health Management Plan, unless waste water treatment systems are used that can cause the reduction of DO in the discharge water
Principle 3	Indicator 3.1.1S & 3.1.2S	Acknowledgement should be made of the fact that some lake populations of wild fish may benefit from the addition of nutrients from a cage smolt operation (lake fertilization in B.C., farms operated by government for that purpose)	Lake rearing of smolts must be demonstrated to be sustainable
Principle 4		Comments as above	
Principle 5		Comments as above	
Principle 6		Comments as above	
Principle 7		Comments as above	
General comments			

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COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5	5.1.2:	The standard for visits by a fish health professional at least once a month's should be taken out for the following reasons: 1.There is no defined educational definition of the title "fish health professional". The only formal and recognized educational background for dealing with veterinary matters is a veterinarian. 2. For this reason the standard will for sure add costs but there is little or no guarantee that it will provide value. Thus we find that the obligations to have minimum four annual visits from a	only visits by veterinarian.

		veterinarian and to have a veterinary and biosecurity plan are sufficient.	
Principle 6			
Principle 7			
General comments			

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	**2.2.4 S – 2.2.7S; 2.3.1S -2.3.4 S**	These standards should follow the standards for freshwater trout production and focus on the key impacts which are discharge of nitrogen, phosphorus, organic matter and the content of oxygen in effluent water.	
	2.3.4 S	The standard should be extended to also include presence of sediment traps or similar particular sedimentation.	Presence of sediment traps or similar particular sedimentation.
	2.3.5 S	The standards should follow the standards for sludge management in the FTAD.	
Principle 3			
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments		The standards for smolt production should follow the standard for freshwater trout production.	

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Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4	4.4.1	There are no responsible sources validated schemes by the ISEAL for Soybean. So it won't be possible sources without an evolution plan for this indicator or other level of requirements. Moratoria da soja, is not a certification scheme.	Include all the schemes that are in process of becoming accredited by ISEAL or other kind of recognized Authority. We invite to consider RTRS Standard (available at www.responsiblesoy.org), that is already affiliate to ISEAL, as one of the accepted schemes.
Principle 5			
Principle 6			

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COMMENTS ON STANDARDS FOR GROW-OUT AND SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
All	General	A separate assessment guidelines is needed on how auditors are supposed to assess - and farmers to implement - the standard. This has been produced now for tilapia after the dialogue ended. However for the other dialogues it is of high importance to start working on this as the standard is finalised. Peer review and field-testing by auditors is highly recommended.	Write an auditor assessment document and field-test it before use as a formal certification document by the ASC. Furthermore, a farmer implementation document would also be an important tool helpful for interested producers.
Principle 1	General	To demonstrate compliance with all relevant laws is obvious but how to verify this is a completely different story. It also needs specific expertise from an auditor inparticular if you talk about tax laws since you would almost need an accountant in the team which already needs to consist of environmental and social specialised auditors.	Include in auditor assessment documents which objective evidence is to be demonstratd to auditor. Most realistic option is to have a farmer document its farming activities and how these are covered by the relevant legislation. Farmer to confirm legal compliance in conjunction with governmental registrations/approvals/inspection reports. Tjis puts the burden of proof with the farmer and not with the auditor. In addition many auditing companies would not want this responsibility/liability on their plate for the right reasons.
	1.1.5	The standard is not confined to the farm level but includes a whole supply chain over which the farmer has no control let alone has the capability to retrieve the required information.	Remove criterion since it is not realistic and very difficult to audit.
Principle 4	4.1.1	The criterion cannot be audited at farm level so does this mean another audit at the feed mill?	Requires auditors clarification so needs to be removed or included in the auditors assessment

			document.
	4.2.1 / 4.2.2	FFDR becomes redundant when marine ingredients come from certified fisheries sources. Unilateral action by aquaculture to reduce forage fish use won't promote human consumption, given the demand for fishmeal and oil from other, less efficient users of the resource (e.g., pig and poultry production).	Exclude all fish meal and oil from the calculation when it comes from certified sources.
	4.3.1	An ISEAL member accredited sustainable fisheries scheme does not provide any assurance over the content of the standard nor whether it is compliant with the FAO Guidelines for Fisheries Ecolabelling.	Refer to a credible fisheries ecolabel scheme deemed compliant with the FAO Guidelines for Fisheries Ecolabelling. There are various studies done that could be used to agree a shortlist.
	4.3.2	FishScore is an NGO tool so the scoring methodology can be changed unilaterially anytime having big impact on certified producers. Apart from this, not all fisheries are covered (or can be covered due to resource constraints) so what happens in this case? Does the farm need to pay for this? And if yes to whom?	Refer to IFFO or equivalent other schemes and just as with 4.3.1 a shortlist needs to be drawn up acceptable to most stakeholders. By the way in the text on page 31 (third para), reference is made to FishScore or equivalent schemes but no further details are given of this equivalence.
	4.3.3	What is the difference with 4.1.1?	Clarify difference.
	4.3.3	ISO 65 does not exist.	Reword into "ISO Guide 65" and include clarification as to what is meant with this.
	4.4.1	It is unclear what is meant with "... recognised crop moratoriums..." but recognised by whom?	Clarification needed since otherwise it is impossible to audit.
	4.4.1	A responsible sourcing policy is required however no reference is made to existing other commodity roundtables such as Roundtable for Responsible Soy Production (RTRS) or Roundtable for Responsible Palmoil Production (RSPO) which is a missed opportunity.	Review other applicable commodity roundtable certification schemes and consider including these in the AD standards.
	4.5.1	It is unclear what is meant with "...a functioning policy..."	Suggest to reword as "effective policy" but then it has to be specified how to auditor is supposed to verify effectiveness in the auditor assessment document.
Principle 6	First flagged para	There is no ISO standard that covers labor and social compliance at the processing level.	Better references would be SA8000, BSCI, ETI, etc.
	6.5.1	Further description is required of what evidence a farm should be able to provide.	Include in the auditor assessment document which is to be produced for the entire standard.
	6.6.2	This is a much better formulation compared to the Shrimp standard - to allow employers to improve towards paying a basic needs wage, rather than expecting it now. However, it is still not entirely clear how the Dialogue defines basic	Definition and calculation of basic needs wage to be included in the auditor assessment document which is to be produced for the entire standard

		needs wage (particularly the "etc.").	
	6.6 Auditing Guidance point 2	If you leave the calculation of basic needs wage to the employers and their stakeholders, there is a risk that the basic needs wage differs from farm to farm depending on the strength of the stakeholders.	Some additional guidance on which stakeholders to consult and which elements to consider would be encouraged to be included in the auditor assessment document which is to be produced for the entire standard.
Principle 7	All Principle 7	All indicators under principle 7 are quite advanced, and I wonder if they can realistically be expected from salmon farmers.	In any case, clear and comprehensive guidance for farmers is required.
	All Principle 7	There is improvement in how social criteria are defined and described, but more guidance is needed on how auditors are supposed to assess - and farmers to implement - the standard.	Write an auditor assessment document and field-test it before use as a formal certification document by the ASC. Furthermore, a farmer implementation document would also be helpful for interested producers.
	All Principle 7	All available AD Standards (Tilapia, Pangasius, Bivalves, DRAFT Trout, etc.) have different social criteria and interpretations. That will have implications for implementation, auditability and building audit capacities - i.e. it will be difficult to group auditor training if each standard has a specific set of requirements.	Review and agree universal social criteria to ensure a consistent approach across the dialogues.

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Sacha Ilic
*Organization/Company: Salmofood
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2	2.3.1	Even when the <1% might be an accepted value by the farmer in front of this SD protocol. The feed does not goes out from the plant to the farming in short distance of few handling. Therefore, the % of fine is to be determining once the product has been produced if the actions wanted to be over feed plant. In this regard, the 1% is too low for the physic condition to what the product is oblige to. Plus, the fine content varies from one size to other in the feed.	Responsibilities of and when has to be directed here, in terms of the feed fine content. Plus, the index a <X% has to be determinate per size and water conditions (Hatchery, recirculation system, sea water, offshore or fjord, etc) I think more work has to be done here. A single wide index applicable to all, is not logic.
Principle 3			
Principle 4	4.2.1	Fishmeal as a Raw material is an available product that Aquaculture has taken as the good quality parameters it has and is needed for the farming of fish. There are some	In association with IFFO, to built the ratio in a polynomial where in one part is the formula with higher acceptance of index as they are regulated already in the fishing activity +

		fishing activities that are regulated, controlled and monitored so biomass is health and industry has proven to be effective and efficient. Example of this are Peru and Chile in South America and Norway and Denmark in Scandinavia. These origin should have a different consideration for the construction of the ratio	another part where to put the others with more exigent ratio as the one presented in the proposal of 1,31. By weighing average, we will obtain the final ratio. Results of this is if fish feeding industry uses only regulated and controlled sources (by a new definitions of regulated fishery, I think, as Chile and Peru has) then indirectly we are supporting the regulated fishery.
	4.2.1	As much as the current value of Fish oil makes it a first line product, reality is that by production means it keeps being a byproduct of the Fishmeal factories. Pretending to control the usage of it directly or indirectly in the feed will not avoid the fishery. Plus, do not forget the Human Consumption o omega-3 that could be the driver for the fishery more than Aquaculture	FFDRo should be addressed in terms to avoid that fishery is made only for the oil but in the usage. It is healthier to eat salmon or carp or tilapia as you receive not only the oil but also protein and other nutritional values than to reduce the usage of Fish oil (main ingredient today) limiting the aquaculture and then let the Human consumption take fish oil pills. I would suggest to leave the FFDRo out of this cycle of discussion as it is a byproduct and the driver of its commercialization is just on its beginnings
	4.2.3	Not all the fishmeal are 68% and some time they can reach lower values.	By certification, the company should be able to change the protein content of the FM for the formula, according to the certified average protein value of their fishmeal as raw material for feed.
	4.3.4	What if the trimmings are from a company well certified to produce the Human Consumption products but does not have the certification for the selling of the trimmings, because the species are vulnerable. Who's responsibility is the banning of that business	Once a fish is dead, is less wise to waste it all than to eat or transform it for food or feed. The tackle for these vulnerable species should be at the time of fishing. Then a penalty should be done but not a banning. Who different from a country can force a country to fish or not fish in their "Sea Economic Zone" therefore how to avoid it?
Principle 5	5.1.6	Analysis considerate is by clinical actions, open fish and checking one by one or for Lab analysis. Even in cases of low	100% of mortalities has to be informed under oath by the company's site and to be collected and published by an independent entity or the

		mortalities, a site (number of cages) can imply lots of fish that even it is recorded, controlling it is quite naïve to manage to be effectively done.	authority. Then yearly, it is this entity who issues the certificates under request.
Principle 6			
Principle 7			
General comments			

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments			

1st October, 2010.

To Whom It May Concern,

The Salmon and Trout Association welcomes the opportunity to comment on the draft Salmon Aquaculture Dialogue standards

The Salmon & Trout Association (S&TA) was established in 1903 to address the damage done to our rivers by the polluting effects of the Industrial Revolution. For 107 years, the Association has worked to protect fisheries, fish stocks and the wider aquatic environment on behalf of game angling and fisheries. In 2008 it was granted charitable status. S&TA's charitable objectives empower it to address all issues affecting fish and the aquatic environment, supported by strong scientific evidence from its scientific network. Its charitable status enable it to take the widest possible remit in protecting salmonid fish stocks, and the aquatic environment upon which they depend.

General comments

Overall, we feel the indicators are still very weak, and we are concerned about the apparent lack of progress. The wording of the indicators seems to be tentative to say the least, and the actions almost appear voluntary with wording such as requires 'participation' and 'assessment'. The indicators do not state how the industry will be required to improve and progress through the process, and thus seems to be maintaining the status quo.

We are very disappointed that the current standards do not champion closed containment, which we feel is the only true solution to ensure sustainable salmon aquaculture. The standard must make specific reference to continuous improvement, and must set the bar high to ensure sustainable practice.

We support the draft Standard's proposal that smolts raised in open net pens in wild salmonid systems are ineligible for certification, due to risk of genetic dilution, the spread of diseases and parasites, and the risk of uneaten food disrupting the surrounding environment.

Comments on Principle 3

The current indicators in Principle 3 seem to be more aimed at improving understanding into the impact of salmon aquaculture on wild salmonids, than actually determining if they are sustainable or not. Certifying a farm on gathering information on the impact on wild salmonids does not demonstrate the farm is sustainable. There is also no indication on how the information applicants are required to collect and monitor as part of the certification will feed into the process, and drive improving standards. At the moment, the standards appear very static.

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Patron: HRH The Prince of Wales | President: The Duke of Northumberland
The Salmon & Trout Association Limited is a company registered in England and Wales.
Registered No. 5051506 | Charity No. 1123285

The impact of salmon farms on the health of wild salmonids is difficult and expensive to obtain. However, in order for the certification to state the farm is functioning in a manner which is sustainable for wild salmonids, this issue cannot be ignored or written off as too difficult to deal with. Operators must be required to fund the collection of baseline information, by independent bodies, before certifications deem their actions as sustainable.

3.1.1. Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport.
The term 'participation' in effective area based schemes does not infer progressive action. The term 'effective' must be defined.

In order to truly manage the cumulative impact of salmon farms the process must be transparent, with data sharing and communication between fish farms and all other stakeholders, including wild fish interests.

3.1.2. An assessment of key regional cumulative impacts of the farm and its neighbours, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.
Although the information which is to be gathered sounds promising e.g. 'potential impact on wild species' the certification only requires an 'assessment' to be conducted- there is no mention as to how the information collected in the assessment will be used to better the management and ensure sustainability. Although gathering and sharing information is a positive step forward, we believe this highlights the fact that at the moment it is not possible to certify farms as being able to produce sustainable salmon until this information is known. Monitoring will be required prior to certification.

3.1.3. A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.
What does a 'demonstrated commitment to collaborate with NGOs, academics and Governments' actually mean? It does not quantify the resource with will be expected to achieve this. The data must be publicly available.

3.1.5 Timing of wild salmonid outmigration and juvenile periods is well established and monitored.
This evidence must be a precondition of entering the accreditation process, not a criterion for certification. 'Well established and monitored' needs to be defined- well established and monitored by who?

It must be ensured that the monitoring protocol designed does not damage already vulnerable native stocks.

3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)
The indicator simply says 'measure' lice levels- what happens if high numbers are found? How will this feed back into the process and what will happen to the certification? This as it stands does not demonstrate 'sustainable farming', just the ability to count.

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3.1.9. Period of demonstrated compliance with standards in 3.1 prior to initial certification
A period on compliance with standards prior to certification is essential. Farms that cannot demonstrate their compliance in a measurable and auditable way should not receive certification. This is vital to avoid confusion in the marketplace.

A minimum of one production cycle must be completed demonstrating full compliance before certification. The period of compliance should not just show the farms are 'measuring, demonstrating and assessing' the impacts, but the results/outcomes of the monitoring must be acted upon before certification in order to ensure sustainability.

Criterion 3.2 Introduction of non-native species
We believe farms with non-native species should only be certified if farmed in enclosed systems, where they cannot impact native wildlife.

Criterion 3.3 Introduction of transgenic species
We support the ban on use of transgenic fish because of the unknown impact on wild populations.

Criterion 3.4 Escapes
3.4.2. Maximum number of escape episodes (defined as 200 or more fish) with exemption of episodes clearly out of the farms control.
We are concerned that the draft indicators only focus on the prevention of large-scale escape incidents, as the escape of 200 fish could be catastrophic to some already degraded wild salmon populations.

With exception of freak weather events, everything else should be 'within the farm's control', as careful siting and adequate staff training will minimise predator management and equipment failures.
Yours sincerely,

Paul Knight

Salmon and Trout Association Chief Executive

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Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*__Name:__ Paulo Jorquera Olave.
*__Organization/Company:__ Salmones Itata S.A.
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Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1: **COMPLY WITH ALL APPLICABLE INTERNATIONAL AND NATIONAL LAWS AND LOCAL REGULATIONS.**	1.1.5. Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months	Este punto se debe aplicar a aquellas sustancias que se encuentran prohibidas en el mercado de destino.	Explicitar en el indicador que la exigencia es para productos prohibidos en los mercados de destino.
Principle 2: **CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION**	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos. Que sea aplicable sólo para centros ubicados en profundidades de hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.2.2. Maximum percentage of weekly samples from 2.2.1 that fall under 1.85 mg/liter DO	Se sugiere explicitar la metodología que será válida para la medición de DO.	Se debe explicitar que las mediciones serán: 1. Monitoreo discreto en la columna de agua. 2. Máximo de 3 niveles. 3. Medición dentro de la concesión. 4. La profundidad de medición es dentro del rango de profundidad de las redes. 5. Se propone incorporar una frecuencia de medición de 3 veces semanales.

	2.3.1. Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I subsection 2)	De acuerdo a los antecedentes obtenidos desde proveedores de alimento, es muy difícil encontrar el porcentaje de finos en los centros de cultivos. Estándar muy difícil de alcanzar.	Solicitamos que el rango sea de < a 1,5%, que aún es muy bajo y pocos centros lo alcanzarán.
	2.4.1. Clear, substantive documentation on a) proximity to critical, sensitive or protected habitats and species, b) the potential impacts the farm might have on those habitats or species, and c) a program underway to eliminate or minimize any identified impacts the farm might have	El estándar no considera la metodología y definición de especies protegidas y puede ser distinto para los diferentes países, inclusos en distintas áreas de un mismo país. Además, pueden existir otras actividades que afecten a estas especies.	Proponemos eliminar este indicador
	2.5.1. Number of days where acoustic deterrent devices were used	El uso de aparatos acústicos es utilizado por la industria como alternativa para evitar o minimizar la interacción con los mamíferos. Esto permite no ejercer acciones letales en contra de los mamíferos marinos y disminuyes los riesgos de escapes en los centros.	Se sugiere eliminar este indicador.
	2.5.2. Prior to the achievement of 2.5.1, evidence that if acoustic deterrent devices are in use, the farm is developing and implementing a plan to phase out their use		
	2.5.3. Number of marine mammals and birds killed through the use of lethal action	Dado a que existen en Chile mamíferos considerados como plagas, y no corresponden a especies endémicas, es necesario generar una excepción para estos casos.	Se solicita incorporar una excepción para aquellas especies que constituyen plagas.
	2.6.1. Presence or absence of selected sensitive or sentinel species	Proponemos eliminar dado a que las especies centinelas pueden ser distintas para cada lugar, incluso dentro de un mismo país.	Eliminar
Principle 3: **PROTECT THE HEALTH AND GENETIC INTEGRITY OF WILD POPULATIONS**	3.1.2. An assessment of key regional cumulative impacts of the farm and its neighbours, Iincluding an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.	El análisis regional de los impactos acumulativos excede al alcance de un solo centro de cultivo. Por lo que es complicado que dicha evaluación la realice una sola instalación.	1. Cambiar concepto de silvestres a endémicas. 2. Eliminar indicador.
	3.1.3. A demonstrated commitment to collaborate with NGOs, academics	Cambiar concepto de silvestres a endémicas. Además, excede al alcance de un solo centro de	1. Cambiar concepto de silvestres a endémicas.

	and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild almonds must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.	cultivo.	2. Eliminar indicador.
	3.1.4. Maximum average sea lice levels on all farms in the area-based management scheme.	Dado a que las especies de parásitos son distintas entre los países, es necesario hacer esta diferenciación.	Se solicita que el indicador sea definido en función de la especie del parásito.
	3.1.5. Timing of wild salmonid out migration and juvenile periods is well established and monitored.		
	3.1.6 Measure lice levels on wild juveniles during out migration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)		
	3.1.7. Maximum average sea lice levels on all farms in the area-based management plan during juvenile out migration (or equivalent for coastal salmonids).	Estos indicadores requieren una aclaración respecto de las especies silvestres de las endémicas, ya que son estas últimas las que se quiere proteger.	Cambiar concepto de silvestres a endémicas.
	3.1.8. In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.		
	3.1.9. Period of demonstrated compliance with standards in 3.1 prior to initial certification.		
	3.4.1. Percentage of fish loss during a production cycle (pre-smolt vaccination to harvest) that is unexplained by mortalities or other	Solicitamos revisar el valor del estándar, dado a que se debe considerar aspectos como el robo y operaciones no cubiertos con el estándar.	Sugerimos un valor de 2%.

	known causes		
	3.4.2. Maximum number of escapes episodes (defined as involving 200 or more fish), with the exception of episodes that are clearly documented as being out of the farm's control	Se hace necesario definir un periodo para contabilizar este número de escapes. Se hace necesario definir y explicitar cuales serán los eventos excepcionales que se consideraran por el estándar.	Explicitar que el estándar es en el ciclo de producción actual y cual serán los eventos excepcionales que se considerarán. Se sugiere incorporar los robos, dentro de estas últimas.
Principle 4: USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER	4.2.1. Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1)	Los estándares planteados son muy exigentes dada la relación de precios hoy existentes para los ingredientes vegetales y provenientes de recursos pesqueros en el mercado.	Se sugiere revisar el estándar
	4.2.2. Fish oil Forage Fish Dependency Ratio (FFDRo) for grow-out (calculated using formulas in Appendix IV, subsection 1)	Los estándares planteados son muy exigentes dada la relación de precios hoy existentes para los ingredientes vegetales y provenientes de recursos pesqueros en el mercado.	Dado lo anterior, se solicita modificar el estándar a 5.
	4.3.1. Commitment to source feed containing >90% fishmeal or fish oil originating from fisheries certified under an ISEAL member's accredited sustainability certification scheme. This must be done as the product becomes available and within 5 years of the publication of the SAD standards.	Dada las actuales condiciones de certificaciones de las pesquerías, se debe evaluar otras alternativas. Acá se debe tener presente que un alto porcentaje los países de origen de las materias primas utilizadas para la fabricación de alimento.	Ampliar a otras certificaciones,
	4.3.3. Prior to achieving 4.3.1, demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO Code of Conduct for Responsible Fisheries.		
	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un periodo transitorio para su implementación.

	& assessment)		
	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
	4.6.3. Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que se consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **benthos.**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **sedimento.**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.
	5.5.1. Percentage of cages or pens that are single-year class (generación)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **a peces** de la misma generación.
	5.5.5. Re-occurrence of a specific disease over more than one generation	Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.	Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 2: CONSERVE NATURAL HABITAT, LOCAL BIODIVERSITY AND ECOSYSTEM FUNCTION	2.1.1. Redox potential or sulphide levels in sediment outside of the Allowable Zone of Effect (AZE)	Dada las actuales exigencias normativas aplicadas en nuestro país, esto es factible metodológicamente para centros con profundidades de hasta 60 metros y con fondos blandos.	Se solicita considerar y explicitar medición de parámetros químicos sólo para centros ubicados en profundidades hasta 60 metros y fondo blando.
	2.1.2. AZTI Marine Biotic Index (AMBI) in sediment outside of the AZE, following the sampling methodology outlined in Appendix I subsection 1	En Chile está en desarrollo un proyecto de investigación por parte de la Universidad Austral, el cual pretende validar para las especies de nuestro país este indicador. Por lo tanto, hoy se utilizan otros indicadores para evaluar la biodiversidad.	Solicitamos incorporar explícitamente la opción de evaluar la biodiversidad mediante otros indicadores, como por ejemplo el Indice de Shannon - wiener.
	2.1.3. Number of macrofaunal taxa in the sediment within the AZE, following the sampling methodology outlined in Appendix I subsection 1	Se debe considerar la condición oligotrófica de los lagos par la evaluación de este indicador.	Se sugiere, para estos casos, que el estándar sea de ≥ a 1 especie.
	2.2.1S. NETPEN: For any "open" system (e.g. net pen), evidence that carrying capacity of the freshwater body has been established by a reliable entity. Analysis must take into account the natural ecological condition of the lake or water body (e.g., oligotrophic) and have been conducted within a recent (2 years) timeframe.	Es poco factible hacer evaluación de capacidad de carga por parte de un centro para un cuerpo de agua completo, considerando que existen varios actores involucrados.	Se propone eliminar
	2.2.2S. NETPEN: Evidence that total biomass present in freshwater body (e.g., a lake) falls within the established carrying capacity.		
	2.3.4. FLOW: Evidence of use of sediment traps	Se solicita aclarar si las trampas que aquí se solicitan son para el muestreo de sedimento o para la captación de sólidos presentes en el ril.	Explicitar el indicador
Principle 4: **USE RESOURCES IN AN ENVIRONMENTALLY EFFICIENT AND RESPONSIBLE MANNER**	4.6.1. Presence of an energy use assessment verifying the energy consumption on the farm and representing the whole life cycle at sea (see Appendix V for guidance and required components of the records & assessment)	La metodología para realizar esta medición esta en desarrollo. Esta una vez desarrollada debe necesariamente validarse.	Se propone dar un periodo transitorio para su implementación.

	4.6.2. Records of greenhouse gas (GHG) emissions on farm and evidence of an annual GHG assessment.		
Principle 5: **MANAGE DISEASE AND PARASITES IN AN ENVIRONMENTALLY RESPONSIBLE MANNER**	5.1.7. Maximum mortality rate of farmed fish during the previous two production cycles	El alcance de las evaluaciones para que un centro se certifique debe ser el ciclo actual. Se hace necesario definir un listado de enfermedades que no pueden ser recurrentes. Además, se debiera considerar para lo anterior el control sobre la enfermedad y su impacto en la producción.	Se sugiere que la evaluación de este indicador sea del actual ciclo producción. Definir las enfermedades que serán consideradas para la evaluación del estándar.
	5.2.2. Allowance for concentrations of selected chemicals and therapeutants in the **<u>benthos.</u>**	Dado a que las especies pertenecientes al Bentos son distintas para cada país y sitio, se sugiere que la evaluación sea en el sedimento.	Aclarar que la medición es en **<u>sedimento.</u>**
	5.4.1. Participation in an area-based management plan (as outlined in Principle 3) that includes coordinated treatments and coordinated resistance monitoring (see Appendix II for details)	Este indicador supera al alcance del centro.	Se propone que estos estudios sean a nivel de industria y universidades, especialmente el monitoreo de resistencia.
	5.5.1. Percentage of cages or pens that are single-year class (generación)	No se entiende que la edad o generación considerada sea de los peces.	Explicitar que el indicador es correspondiente **<u>a peces</u>** de la misma generación.
	5.5.5. Re-occurrence of a specific disease over more than one generation	Listados de enfermedades que no pueden se recurrentes e incorporar control sobre la enfermedad y su impacto en la producción.	Generar un listado con las enfermedades que el estándar considere que no pueden ser recurrentes.
<u>General comments for Grow out and Smolt production</u>	**1.** El estándar debe considerar que, en caso de contradicciones en las normativas nacionales e internacionales, **<u>primarán las nacionales.</u>** 2. El Estándar debe considerar la verificación de los indicadores a través de información objetiva y documentos legales de la empresa y evitar vacíos en la aplicación de criterios y subjetividades. 3. No queda claro con la información disponible cuales son aquellos puntos que son de cumplimiento obligatorio y si se ha pensado en la ponderación de cada uno de los indicadores de acuerdo a su impacto.		

	4. Aclarar para aquellos indicadores del criterio 4, que los peces que se pretende resguardar son los endémicos y no silvestres. 5. Existen indicadores de carácter social (en especial lo relacionado con pueblos originarios) que corresponden a políticas públicas de los países, las cuales superan el alcance de un centro en particular y la empresa. 6. En materia laboral, se sugiere que el estándar quede sujeto a las normas laborales de cada país y a las internacionales reconocidas por ellos. 7. La industria salmonera chilena, considera que existen indicadores y estándares muy difíciles de cumplir y poca claridad en algunos de ellos, dada que las metodologías están en discusión no validadas. Por ello, se estima que pocos centros alcanzarán la certificación y el efecto será mínimo. Se sugiere revisar indicadores y estándares de a cuerdo a lo expuesto. 8. Se hace necesario definir la ponderación de cada indicador en la evaluación final. Se sugiere que cada uno ellos tenga un nivel de criticidad, de acuerdo al impacto. 9. Se sugiere eliminar aquellos indicadores que son por “áreas” ya que exceden el alcance de una instalación en particular. 10.

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: SCOTT LANDSBURGH
*Organization/Company: SCOTTISH SALMON PRODUCERS' ORGANISATION
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1	1.1	**Comment: This criterion does not take into account the Animal Health and Welfare (Scotland) Act 2006, the requirement for the farmer to protect his stock, which conflicts with the standard in Criterion 2.5.**	
	1.1.5	**Comment: This indicator would be very difficult for smaller producers to comply with, due to the requirement to obtain all the relevant data from exporters / wholesalers, over which they have little control. Small producers do not necessarily have control over the future value chain of their product or the final country that the product is delivered to. The focus on importing laws related to chemical use may be acceptable.**	
Principle 2	2.1	**Comment: The draft standard defines the AZE as a distance of 30m from the cages. However, Scotland now uses site**	

		specific AZEs which take account of the hydrography round the cages, based on evidence required by the regulatory agencies. The attempt to find a 'one value fits all' figure for environmental impact is not logical. Each country which produces Atlantic salmon has different geographical, hydrological and environmental conditions. The attempt to standardise a figure for environmental impact shows how little the processes in each country are understood.	
	2.1.1	**Comment: Sulphide readings are not currently required for regulatory sampling in Scotland; however, Redox is commonly used. There is no indication of the depth within the sediment where the reading is to take place, which is vital in establishing the impact which this indicator could have.**	
	2.1.2	**Comment: This index is not commonly used in Scotland and does not directly relate to the current methods required by our regulators.**	
	2.2.1	**Comment: DO levels at a seawater farm would normally remain stable. There is little to be gained from measuring twice per day, especially at 6am, which is an unrealistic burden on the farmer. This does not take into account any seasonal variations in water quality parameters and the subsequent need to adjust sampling to cope with these differences.**	
	2.5	**Comment: The view laid out in the rationale is provocative and one sided. ADDs are used in many locations to good effect and help to maintain a balance between the activity of seals in the local area and protection of the stock**	

		of farmed salmon. Stock welfare is of considerable importance to the farmer.	
	2.5.1 and 2.5.2	**Comment: ADDs are a vital part in a range of predator control measures on Scottish salmon farms. The standard dictates that these should be phased out within 2 years without a viable substitution. The suggestion that predator nets be used does not address any of the issues (such as by-catch) surrounding their use at certain locations. It also does not address welfare issues surrounding animals and birds which may become entangled in the predator nets. This is in contradiction to point 1.1**	
	2.5.3	**Comment: The use of lethal action as a last resort against predators is necessary and can be justified in certain circumstances. The farmer has a duty of care for his stock (Animal Health and Welfare [Scotland] Act 2006) and lethal action may be the only way to prevent the loss of stock through predation, stress of a predation event or a breach in containment from a predation act.**	
	2.6.1	**Comment: This criterion has clearly not been fully completed or well thought out. This would provide an unknown and unproven additional sampling and cost burden for the farmer, depending on what the indicator species is. The draft does not detail what the species is at this stage. As detailed in the comment on Criterion 2.1 there is not a 'one size fits all' species which would 'represent' the global production of salmon.**	

Principle 3	3.1	**Comment: This whole section is based on pre-conceived ideas which do not fully take into account the potential interactions between farmed salmon and wild salmonids. The facts are that there is very little known about the true effects and how much salmon farming has a part to play in the dwindling populations of wild salmonids, with the consensus being that global warming is the most likely cause. There are many other factors involved which seem to have been left out, including the risk of recently stocked smolt sites becoming infected with sea lice by wild salmonids. For farmers to sample the wild population around their farm is short-sighted and ill-conceived and is likely to have little impact on how the farmer manages any sea lice burden which his stock has, but such extensive sampling could have a detrimental effect on the future of the wild population in the area. The farmer's duty is to protect the welfare of his stock and he has a legal requirement to do this. The rationale behind this section shows that it has not been fully thought through and is therefore not ready for this consultation phase.**	
	3.1.1	**Comment: These are detailed as single year class areas; however, it is not clear what constitutes an 'effective' area based management scheme and who prescribes the areas. This is particularly biased against smaller companies who may not have an opportunity to locate in two separate areas and have operated in multi-year-class zones without any issues. It does not take into account the complex geography of Scotland or the complexity of ownership. We would seek**	

		flexibility on this point.	
	3.1.2	**Comment: The burden of proof is placed on the salmon farmer to establish that the farm does not have an impact on the population of wild salmonids. This section assumes that salmon farming has a direct impact on wild salmonids within a range of 75kms. This is not a proven fact and is based on speculation.**	
	3.1.3	**Comment: This indicator is particularly poorly written. The requirement to sample lice levels on wild salmonids close to the farm is nonsensical. This would be an irresponsible act and would endanger wild salmonids for little overall benefit.**	
	3.1.4	**Comment: By establishing a maximum level, there is a reduction in the scope for flexibility in being able to control the lice levels, specifically when they approach the maximum level. There are no life stage categories for the sea lice mentioned in this indicator.** **Areas for wild salmonids are defined as areas within a certain distance. This distance is likely to be set at 75km from a salmonid migration route. This implies that all Scottish farms would be categorised as located in areas of wild salmonids and would have to comply with the five further points detailed below. The wild salmonid population in Scotland is not pristine from a genetic viewpoint, following stocking programs which have occurred on many Scottish rivers over a long time period.**	
	3.1.5	**Comment: Monitoring of wild salmonids**	

		is carried out by RDOs who work for the fisheries trusts in each region.	
	3.1.6	**Comment: This suggestion is ill-conceived and potentially would endanger the depleted population of wild salmonids.**	
	3.1.7	**Comment: This standard is not an issue in itself, but it is unclear whether all farms in a management area need to comply with this, even if they are not within the SAD scheme. If your neighbours (in an area) do not comply or are not signed up to the SAD, does the farm lose its accreditation? These are questions which still require an answer. Also, is this all mature lice or only mature females?**	
	3.1.8	**Comment: The difficulty which remains is the defined scientific link between sea lice numbers on wild fish and how they relate to farmed fish. This standard already clearly defines this link and places an additional burden on the farmer when the salmon farm is only one of many potential factors.**	
	3.1.9	**Comment: Time period has not yet been fixed, but this is a very subjective and difficult area to comply with to the satisfaction of all.**	
	3.4	**Comment: This section should be titled 'Breaches of containment', which is an accurate reflection of the issue.**	
	3.4.1	**Comment: Cumulative errors can occur, starting from the freshwater stage, which makes this standard a tough proposition. The documented error**	

		accuracy on any counting method is an average figure which could be multiplied several times. The farmer can only be as accurate as his method and stipulating such a low potential error rate may not be within his control. There is no mention of unexplained gains, which presents a similar problem to losses but is potentially less contentious.	
Principle 4	4.2.1	**Comment: For conventional diets with 20% fishmeal content, this level is achievable. It would not be possible for diets such as Label Rouge which has higher fishmeal content.**	
	4.2.2	**Comment: A conventional diet with 30% fish oil and no replacement with vegetable oil, produces results well outwith this compliance figure. The replacement with vegetable oils would need to be close to 65% and this would undermine the Omega 3 content and health benefits of the product.**	
	4.2.3	**Comment: This target is currently possible but it is another calculation for FFDRm.**	
	4.3.1	**Comment: Depending on the rate of application and approval for forage fisheries within the MSC scheme, it should be possible to meet the 5 year timescale.**	
	4.3.2	**Comment: This process gives considerable uncertainty to the future raw material sources available to feed manufacturers and the potential costs involved. At present there is a very small amount of raw materials which could**	

		comply. The justification for using the fishsource system lacks credibility, as it is a guide rather than scientific justification. To base decisions on this method puts farmers and feed manufacturers in a difficult and compromising position with questions raised over the reliability of the information. The level of compliance is still to be determined, which is a significant risk to the industry.	
	4.3.3	**Comment: This process is currently just being initiated and is still in its infancy. It will take time to establish with a notable restriction in supply in the short term.**	
	4.3.4	**Comment: Use of trimmings meals by-passes the issues related to forage fisheries ratios, but there are significant availability issues which will arise from wide-scale use. They are currently utilised in organic production and in conventional feeds. There can be questions over the quality of the meal / oil and there is restricted availability. It may be difficult to segregate species which could have been termed as vulnerable, in certain circumstances.**	
	4.6	**Comment: There is a significant contradiction between this section and 3.1.1S. This section aims to reduce the energy use and emissions involved in the production of farmed salmon, while section 3.1.1S will dramatically increase the amount of energy required. Re-circulation systems are intensive and energy hungry. Freshwater cage systems are low energy and low intensity systems with particular benefits to the welfare of the fish.**	

	4.7.1	**Comment: Current practice is for the increasing use of in-situ net cleaning equipment to reduce the costs associated with frequent net changes. These nets may previously have been anti-fouled at the start of the cycle and may not comply with the requirements of this section of the standard.**	
Principle 5	5.1.2	**Comment: Current industry standard is a minimum of an annual visit in addition to using a risk-based approach involving trained on-site health staff. It is standard practice for the vet to focus on sites which have particular health challenges rather than ones which don't. The vet will be instrumental in the development of the farm VHP and this standard leaves little flexibility in approach.**	
	5.1.3	**Comment: The wording of this section implies that if a vaccine is available, it should be used; however there are circumstances where the use of the vaccine may not be the most appropriate course of action, such as the PD virus. It should also be noted that in some circumstances, only a single company may produce a vaccine and this standard may be seen to be promoting a particular product in the market.**	
	5.1.6	**Comment: This section is badly written as it is almost impossible to carry out a post mortem on every fish which dies of an unexplained reason. A statistical approach would be more sensible. Carrying out a PM on a sample of the unexplained mortalities is a normal and**	

		routine procedure for farmers.	
	5.1.8	**Comment: It is difficult to understand why this is necessary and what this would achieve.**	
	5.4.2	**Comment: This clearance level is at an unrealistic rate for the current products with a MA. This would be almost impossible to achieve on a regular basis and would also impose a significant burden on the outcome of a bio-assay which can yield inconsistent or false results. There is significant variability in both the methodology and the results for bio-assays, which has been well documented. Standardisation would be the first step down the path of using bio-assays in a wider context to help direct treatment strategies.**	
	5.4.3	**Comment: Basing decisions on treatment options purely on bio-assay results is difficult to understand. There are lots of different reasons behind the decision to treat with a particular medicine based on the circumstances involved (e.g. appetite and the use of SLICE)**	
	5.4.4	**Comment: The actual list of antibiotics which are of concern to the WHO is not available in the standard.**	
	5.5.1	**Comment: It is not clear what the actual definition entails, whether this refers to a single farm and whether there could be a six month gap in stocking with juveniles coming from the same stripping but having had photoperiod manipulation (i.e. S0 and S1).**	

	5.5	**Comment: This would restrict any thinning operations or double stocking in the first year. Currently movements within a biological area are permitted using a risk-based approach.**	
Principle 6		**Scotland is a member country of the European Union, where employment law standards significantly exceed those of the proposals laid out in the draft standards. Scottish producers, who are required to operate under official authorisation, would therefore be automatically compliant with these principles.** **This brings us on to a more general theme that we are proposing: that some countries can be eligible for a derogation on certain principles due to the fact that a different or better practice than that currently proposed by the draft standard is enshrined in the law of those countries. This is the basis on which international treaties are drafted and one which we believe will create confidence in the standard, enabling it to be adopted more readily throughout all producer countries.**	
Principle 7			
General comments		**See attached**	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	Criteria/Indicator /Standard (e.g., 2.1.2)	Comment(s)	Proposed solution or amendment
Principle 1			
Principle 2	2.2.7S	**Comment: The farmer is unlikely to have total control over the external inputs of phosphorous into the receiving water in a freshwater loch for example, only the discharge from his own farm.**	
	2.5.1S	**Comment: This standard is more realistic, but still restricts the flexibility of being able to deal with predators which are destroying or harassing and stressing stock. As before, there is a legal requirement for farmers to protect their stock welfare.**	
Principle 3	3.1.1S	**Comment: All the locations of smolt cages in Scotland would potentially come under this category. Every loch in Scotland where there are smolt cages could potentially link into an area or river containing wild salmonids. This affects more than 50% of the smolt production in the Scotland which is currently well regulated, producing quality smolts for the on-growing sector. There is little evidence that cage production over the last 30 years has resulted in damage or reduced the salmon population in Scotland.**	
	3.1.2S	**Comment: This would potentially conflict with the current welfare standards for some other standards where stocking density is limited. Costs and physical ability to relocate all freshwater cage production to hatchery**	

		recirculation systems would be prohibitive. There is also a conflict with Criterion 4.6 on energy consumption. Recirculation units are energy intensive and would increase consumption considerably. The carbon footprint of re-circulation systems is much greater than cage systems. Is this an issue which WWF agrees with?	
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments		**See attached letter**	

DRAFT SALMON AQUACULTURE DIALOGUE STANDARDS
Comment from Scottish Salmon Producers' Organisation

The Scottish Salmon Producers' Organisation represents over 95% of Scottish farmed salmon production. Total Scottish farmed salmon production for 2009 was around 135,000 tonnes (whole fish equivalent). This is expected to grow by around 30,000 tonnes in the next five years.

Scotland is therefore a significant global producer of Atlantic salmon, consistently ranking in the top three countries worldwide.

Your Steering Committee will be aware that over 90% of Scottish salmon production already operates in accordance with the Code of Good Practice for Scottish Finfish Aquaculture to ensure it continues to embrace the highest standards of production, with environmental sustainability and animal welfare at its core. This Code is fully endorsed by the Scottish Government and by all relevant regulatory bodies and regulation and legislation underpinning this is in place in Scotland.

In the last 3 years, we have engaged with the Salmon Aquaculture Dialogue at meetings held in Edinburgh, Boston and Bergen. During this process, we were not minded to seek representation on the Steering Committee, or in the Technical Groups, as we believed industry's interests should have been well represented by those appointed.

During the Dialogues, we consistently voiced our opinions on the topics of the day and sought to maintain a consistent approach to issues which were raised. We have, since publication, fully read the draft standards and do not believe they begin to address our concerns on some substantive issues. We wish, through this consultation, to be as constructive as possible, but have to state at this point that there are at least 3 significant issues within the criteria proposed which we believe represent serious deficiencies in the standards and present serious difficulties. In other words, should these proposals be adopted, the Scottish farmed salmon industry would be unable to participate in your scheme. We will deal with these in each case for your Committee to consider.

In addition, we would make the point that, as yet, no estimate of projected costs of accreditation appears to have been considered. Cost will be a major consideration for the Scottish industry and we would urge the Committee to publish its proposals at the earliest opportunity.

In addition to this response from SSPO, it is likely there will be additional submissions from individual Scottish producers. We have consulted widely within the Scottish industry and this paper accurately reflects the overwhelming majority position on the substantive points at issue.

Currently, within the draft standard, there are a number of proposals which contravene both national and European legislation, which directly impact on the production of farmed salmon in Scotland. The industry in Scotland will always operate within the law and, therefore, on these specific points, the draft standard will have to be amended if producers are to remain legally compliant.

These are:

1. Under the Animal Health and Welfare (Scotland) Act 2006, there is a requirement for fish farmers to protect their stock. This cannot be legally adhered to if, as is proposed,
   a) the use of ADDs is proscribed (Indicator 2.5.1), or
   b) (as a final resort) the use of lethal action to prevent predators from attacking salmon net pens is not permitted (Indicator 2.5.3)

2. The standard defines the AZE as a distance of 30 metres from the cages. In Scotland, the regulatory agencies apply site-specific AZEs which take account of site hydrography. These are based on highly sophisticated predictive dispersal models which are accepted under Scots Law.

The above legal compliance issues constitute three of the four difficult positions which the Scottish industry could not countenance under any circumstance.

There is one additional difficult position which, at this point in time could not be accepted by the Scottish industry and which we strongly advise your Committee to revisit, as we believe the proposal would bring this standard into direct conflict with those already existing (Freedom Food) and will also have a significant impact on the carbon footprint of the industry.

We refer, of course, to Indicator 3.1.1s which, in fact, contradicts Criterion 4.6 which aims to reduce the energy used and emissions involved in the production of farmed salmon.

3. Indicator 3.1.1s proposes that the production or holding of smolt in net pens or cages in areas where there are native salmonids be closed down. We strongly reject this proposal.

The main argument supporting your proposal is the potential risk to the genetics of wild salmonid populations in Scotland from farm escapees. We would make the following points:

i. The current wild stock in Scottish rivers and lochs is not pristine. The River Boards have been mixing wild salmon stock over a long period of time, with little thought of the consequences.

ii. There is no evidence that, in the last 30 years of freshwater production in Scotland, salmon farming has caused any damage to wild salmon populations in rivers and lochs. Indeed the statistical evidence is to the contrary.

iii. In Scotland, the salmon farming industry is one of the most highly regulated sectors of the food industry. Producers adhere to all requirements of government, legislation and regulation, codes of practice and demands of retail customers. The Scottish industry cannot be compared to other countries which have not always been able to demonstrate that production takes place to such high standards.

iv. A large proportion of the Scottish industry would lose its Freedom Food accreditation if it adopted this proposal.

v. Diseases and other factors affecting welfare will be much harder to control in recirculation systems.

vi. Finally, and most importantly, the carbon footprint of such recirculation systems is substantially greater than the highly efficient low energy freshwater systems (which use a natural process) in current use. You will be aware that, in line with Scottish Government policy and targets, all industry sectors in Scotland are under direction to reduce their C footprint and greenhouse gas emissions.

We are already aware that the Trout Standard has been amended to take into account similar points raised by the British trout industry. We would naturally expect the same consideration to be applied to the Scottish salmon industry.

The remainder of this submission provides comment on the detail of relevant criteria within the proposed standard. Where the above points are implicated, the comments have been highlighted to emphasise that these are significant issues which may prevent the Scottish salmon industry from participating in the standard.

We believe that this outcome would be unfortunate for the international credibility of the WWF salmon standard. We must, however, adhere to our position on these matters as we strongly believe they will stand up to legal and moral scrutiny. We intend to participate vigorously in the next stage of the consultation process to reinforce this position and to ensure the viewpoint of the Scottish salmon farming industry is fully considered in the development of the standard.

Principle 1: Comply with all applicable international and national laws and local regulations

Criterion 1.1: Compliance with all applicable local, national and international legal requirements and regulations

Comment: This criterion does not take into account the Animal Health and Welfare (Scotland) Act 2006, the requirement for the farmer to protect his stock, which conflicts with the standard in Criterion 2.5.

1.1.5: Presence of documents demonstrating compliance with importing laws of countries that have received products from the farm within the past 12 months.

Comment: This indicator would be very difficult for smaller producers to comply with, due to the requirement to obtain all the relevant data from exporters / wholesalers, over which they have little control. Small producers do not necessarily have control over the future value chain of their product or the final country that the product is delivered to. The focus on importing laws related to chemical use may be acceptable.

Principle 2: Conserve natural habitat, local biodiversity and ecosystem function

Criterion 2.1: Benthic biodiversity and benthic effects

Comment: The draft standard defines the AZE as a distance of 30m from the cages. However, Scotland now uses site specific AZEs which take account of the hydrography round the cages, based on evidence required by the regulatory agencies. The attempt to find a 'one value fits all' figure for environmental impact is not logical. Each country which produces Atlantic salmon has different geographical, hydrological and environmental conditions. The attempt to standardise a figure for environmental impact shows how little the processes in each country are understood.

2.1.1 Redox potential or sulphide levels in sediment outside AZE: Redox > 0mV or Sulphide <= 1,500 microMoles/l

Comment: Sulphide readings are not currently required for regulatory sampling in Scotland; however, Redox is commonly used. There is no indication of the depth within the sediment where the reading is to take place, which is vital in establishing the impact which this indicator could have.

2.1.2 AMBI score in sediment outside of the AZE: <=3.3

Comment: This index is not commonly used in Scotland and does not directly relate to the current methods required by our regulators.

Criterion 2.2: Water quality in and near the site of operation

2.2.1 Weekly average percent saturation of dissolved oxygen (DO) on farm: >60%

Comment: DO levels at a seawater farm would normally remain stable. There is little to be gained from measuring twice per day, especially at 6am, which is an unrealistic burden on the farmer. This does not take into account any seasonal variations in water quality parameters and the subsequent need to adjust sampling to cope with these differences.

Criterion 2.5: Interaction with wildlife, including predators

Comment: The view laid out in the rationale is provocative and one sided. ADDs are used in many locations to good effect and help to maintain a balance between the activity of seals in the local area and protection of the stock of farmed salmon. Stock welfare is of considerable importance to the farmer.

2.5.1 Number of days where acoustic deterrent devices were used: Zero
and
2.5.2 Prior to the achievement of 2.5.1, evidence that if acoustic deterrent devices are in use, the farm is developing and implementing a plan to phase out their use

Comment: ADDs are a vital part in a range of predator control measures on Scottish salmon farms. The standard dictates that these should be phased out within 2 years without a viable substitution. The suggestion that predator nets be used does not address any of the issues (such as by-catch) surrounding their use at certain locations. It also does not address welfare issues surrounding animals and birds which may become entangled in the predator nets. This is in contradiction to point 1.1

2.5.3 Number of marine mammals and birds killed through the use of lethal action: Zero

Comment: The use of lethal action as a last resort against predators is necessary and can be justified in certain circumstances. The farmer has a duty of care for his stock (Animal Health and Welfare [Scotland] Act 2006) and lethal action may be the only way to prevent the loss of stock through predation, stress of a predation event or a breach in containment from a predation act.

Criterion 2.6: Cumulative impacts on biodiversity

2.6.1 Presence or absence of selected sensitive or sentinel (indicator) species

Comment: This criterion has clearly not been fully completed or well thought out. This would provide an unknown and unproven additional sampling and cost burden for the farmer, depending on what the indicator species is. The draft does not detail what the species is at this stage. As detailed in the comment on Criterion 2.1 there is not a 'one size fits all' species which would 'represent' the global production of salmon.

Principle 3: Protect the health and genetic integrity of wild populations

Criterion 3.1: Introduced or amplified parasites and pathogens

Comment: This whole section is based on pre-conceived ideas which do not fully take into account the potential interactions between farmed salmon and wild salmonids. The facts are that there is very little known about the true effects and how much salmon farming has a part to play in the dwindling populations of wild salmonids, with the consensus being that global warming is the most likely cause. There are many other factors involved which seem to have been left out, including the risk of recently stocked smolt sites becoming infected with sea lice by wild salmonids. For farmers to sample the wild population around their farm is short-sighted and ill-conceived and is likely to have little impact on how the farmer manages any sea lice burden which his stock has, but such extensive sampling could have a detrimental effect on the future of the wild population in the area. The farmer's duty is to protect the welfare of his stock and he has a legal requirement to do this. The rationale behind this section shows that it has not been fully thought through and is therefore not ready for this consultation phase.

3.1.1 Participation in area based management schemes

Comment: These are detailed as single year class areas; however, it is not clear what constitutes an 'effective' area based management scheme and who prescribes the areas. This is particularly biased against smaller companies who may not have an opportunity to locate in two separate areas and have operated in multi-year-class zones without any issues. It does not take into account the complex geography of Scotland or the complexity of ownership. We would seek flexibility on this point.

3.1.2 Assessment of key regional cumulative impacts

Comment: The burden of proof is placed on the salmon farmer to establish that the farm does not have an impact on the population of wild salmonids. This section assumes that salmon farming has a direct impact on wild salmonids within a range of 75kms. This is not a proven fact and is based on speculation.

3.1.3 Demonstrate commitment to collaborate with NGOs

Comment: This indicator is particularly poorly written. The requirement to sample lice levels on wild salmonids close to the farm is nonsensical. This would be an irresponsible act and would endanger wild salmonids for little overall benefit.

3.1.4 Maximum average sea lice levels

Comment: By establishing a maximum level, there is a reduction in the scope for flexibility in being able to control the lice levels, specifically when they approach the maximum level. There are no life stage categories for the sea lice mentioned in this indicator.

Areas for wild salmonids are defined as areas within a certain distance. This distance is likely to be set at 75km from a salmonid migration route. This implies that all Scottish farms would be categorised as located in areas of wild salmonids and would have to comply with the five further points detailed below. The wild salmonid population in Scotland is not pristine from a genetic viewpoint, following stocking programs which have occurred on many Scottish rivers over a long time period.

3.1.5 Monitoring of wild salmonid outmigration

Comment: Monitoring of wild salmonids is carried out by RDOs who work for the fisheries trusts in each region.

3.1.6 Monitoring lice levels on wild juveniles

Comment: This suggestion is ill-conceived and potentially would endanger the depleted population of wild salmonids.

3.1.7 Max levels of lice on all farms in an area based agreement during out migration

Comment: This standard is not an issue in itself, but it is unclear whether all farms in a management area need to comply with this, even if they are not within the SAD scheme. If your neighbours (in an area) do not comply or are not signed up to the SAD, does the farm lose its accreditation? These are questions which still require an answer. Also, is this all mature lice or only mature females?

3.1.8 Max levels of lice during non-juvenile periods for areas with coastal (sea) trout

Comment: The difficulty which remains is the defined scientific link between sea lice numbers on wild fish and how they relate to farmed fish. This standard already clearly defines this link and places an additional burden on the farmer when the salmon farm is only one of many potential factors.

3.1.9 Demonstrated period of compliance prior to initial certification

Comment: Time period has not yet been fixed, but this is a very subjective and difficult area to comply with to the satisfaction of all.

Criterion 3.4 Escapes

Comment: This section should be titled 'Breaches of containment', which is an accurate reflection of the issue.

3.4.1 Percentage of fish loss during a production cycle that is unexplained (i.e. Accountability): 0.1% accuracy plus documented error rate of counting method used.

Comment: Cumulative errors can occur, starting from the freshwater stage, which makes this standard a tough proposition. The documented error accuracy on any counting method is an average figure which could be multiplied several times. The farmer can only be as accurate as his method and stipulating such a low potential error rate may not be within his control. There is no mention of unexplained gains, which presents a similar problem to losses but is potentially less contentious.

Principle 4: Use resources in an environmentally efficient and responsible manner

Criterion 4.2 Use of wild fish for feed

4.2.1 Fishmeal forage dependency ratio for grow out: <1.31

Comment: For conventional diets with 20% fishmeal content, this level is achievable. It would not be possible for diets such as Label Rouge which has higher fishmeal content.

4.2.2 Fish oil forage fish dependency ratio for grow out: <2.85

Comment: A conventional diet with 30% fish oil and no replacement with vegetable oil, produces results well outwith this compliance figure. The

replacement with vegetable oils would need to be close to 65% and this would undermine the Omega 3 content and health benefits of the product.

4.2.3 Fish protein index: 80% prior to 2014

Comment: This target is currently possible but it is another calculation for FFDRm.

Criterion 4.3 Source of marine raw materials

4.3.1 Sourcing feed ingredients from ISEAL accredited certification schemes

Comment: Depending on the rate of application and approval for forage fisheries within the MSC scheme, it should be possible to meet the 5 year timescale.

4.3.2 Fishsource scores for fisheries which produce fishmeal and fish oil.

Comment: This process gives considerable uncertainty to the future raw material sources available to feed manufacturers and the potential costs involved. At present there is a very small amount of raw materials which could comply. The justification for using the fishsource system lacks credibility, as it is a guide rather than scientific justification. To base decisions on this method puts farmers and feed manufacturers in a difficult and compromising position with questions raised over the reliability of the information. The level of compliance is still to be determined, which is a significant risk to the industry.

4.3.3 Demonstration of 'chain of custody' certification

Comment: This process is currently just being initiated and is still in its infancy. It will take time to establish with a notable restriction in supply in the short term.

4.3.4 Trimmings meal and oil origination

Comment: Use of trimmings meals by-passes the issues related to forage fisheries ratios, but there are significant availability issues which will arise from wide-scale use. They are currently utilised in organic production and in conventional feeds. There can be questions over the quality of the meal / oil and there is restricted availability. It may be difficult to segregate species which could have been termed as vulnerable, in certain circumstances.

Criterion 4.6 Energy consumption and greenhouse gas emissions on farm

Comment: There is a significant contradiction between this section and 3.1.1S. This section aims to reduce the energy use and emissions involved in the production of farmed salmon, while section 3.1.1S will dramatically increase the amount of energy required. Re-circulation systems are intensive and energy hungry. Freshwater cage systems are low energy and low intensity systems with particular benefits to the welfare of the fish.

Criterion 4.7 Non-therapeutic chemical inputs

4.7.1 Amount of copper-treated nets that are cleaned and treated in situ in the marine environment: Zero

Comment: Current practice is for the increasing use of in-situ net cleaning equipment to reduce the costs associated with frequent net changes. These nets may previously have been anti-fouled at the start of the cycle and may not comply with the requirements of this section of the standard.

Principle 5: Manage disease and parasites in an environmentally responsible manner

Criterion 5.1 Survival and health of farmed fish

5.1.2 Vet visit at least 4 times per year

Comment: Current industry standard is a minimum of an annual visit in addition to using a risk-based approach involving trained on-site health staff. It is standard practice for the vet to focus on sites which have particular health challenges rather than ones which don't. The vet will be instrumental in the development of the farm VHP and this standard leaves little flexibility in approach.

5.1.3 Amount (%) of fish which are vaccinated for selected diseases that are known to present a significant risk

Comment: The wording of this section implies that if a vaccine is available, it should be used; however there are circumstances where the use of the vaccine may not be the most appropriate course of action, such as the PD virus. It should also be noted that in some circumstances, only a single company may produce a vaccine and this standard may be seen to be promoting a particular product in the market.

5.1.6 Amount of dead fish that receive a post mortem: 100%

Comment: This section is badly written as it is almost impossible to carry out a post mortem on every fish which dies of an unexplained reason. A statistical approach would be more sensible. Carrying out a PM on a sample of the unexplained mortalities is a normal and routine procedure for farmers.

5.1.8 Max unexplained mortality rate from previous 2 production cycles.

Comment: It is difficult to understand why this is necessary and what this would achieve.

Criterion 5.4 Resistance of parasites, viruses and bacteria to medicinal products

5.4.2 Bio-assay to determine resistance when two applications of a treatment have not produced the expected effect (a 90% clearance rate).

Comment: This clearance level is at an unrealistic rate for the current products with a MA. This would be almost impossible to achieve on a regular basis and would also impose a significant burden on the outcome of a bio-assay which can yield inconsistent or false results. There is significant variability in both the methodology and the results for bio-assays, which has been well documented. Standardisation would be the first step down the path of using bio-assays in a wider context to help direct treatment strategies.

5.4.3 Use of alternative medicines based on bio-assay result

Comment: Basing decisions on treatment options purely on bio-assay results is difficult to understand. There are lots of different reasons behind the decision to treat with a particular medicine based on the circumstances involved (e.g. appetite and the use of SLICE)

5.4.4 Use of antibiotics (WHO)

Comment: The actual list of antibiotics which are of concern to the WHO is not available in the standard.

Criterion 5.5 Biosecurity management

5.5.1 Single year class (definition)

Comment: It is not clear what the actual definition entails, whether this refers to a single farm and whether there could be a six month gap in stocking with juveniles coming from the same stripping but having had photoperiod manipulation (i.e. S0 and S1).

5.5 live transfer of fish between farms, i.e. thinning / grading operation.

Comment: This would restrict any thinning operations or double stocking in the first year. Currently movements within a biological area are permitted using a risk-based approach.

Principle 6: Develop and Operate Farms in a Socially Responsible Manner

Scotland is a member country of the European Union, where employment law standards significantly exceed those of the proposals laid out in the draft standards. Scottish producers, who are required to operate under official authorisation, would therefore be automatically compliant with these principles.

This brings us on to a more general theme that we are proposing: that some countries can be eligible for a derogation on certain principles due to the fact that a different or better practice than that currently proposed by the draft standard is enshrined in the law of those countries. This is the basis on which international treaties are drafted and one which we believe will create confidence in the standard, enabling it to be adopted more readily throughout all producer countries.

Principles, criteria, indicators and standards for smolt production

Criterion 2.2 Water quality in and near site of operation

2.2.7S Flow: Total phosphorous concentration limit in receiving waters

Comment: The farmer is unlikely to have total control over the external inputs of phosphorous into the receiving water in a freshwater loch for example, only the discharge from his own farm.

Criterion 2.5 Interaction with wildlife, including predators

2.5.1S Number of mammals and birds killed through the use of lethal action

Comment: This standard is more realistic, but still restricts the flexibility of being able to deal with predators which are destroying or harassing and stressing stock. As before, there is a legal requirement for farmers to protect their stock welfare.

Principle 3: Protect the health and genetic integrity of wild populations

3.1.1S Production or holding of smolt in net pens or cages in areas where there are native salmonids.

Comment: All the locations of smolt cages in Scotland would potentially come under this category. Every loch in Scotland where there are smolt cages could potentially link into an area or river containing wild salmonids. This affects more than 50% of the smolt production in the Scotland which is currently well regulated, producing quality smolts for the on-growing sector. There is little evidence that cage production over the last 30 years has resulted in damage or reduced the salmon population in Scotland.

3.1.2S Production or holding of smolt in net pens or cages within X years of the publication of the SAD standard.

Comment: This would potentially conflict with the current welfare standards for some other standards where stocking density is limited. Costs and physical ability to relocate all freshwater cage production to hatchery recirculation systems would be prohibitive. There is also a conflict with Criterion 4.6 on energy consumption. Recirculation units are energy intensive and would increase consumption considerably. The carbon footprint of re-circulation systems is much greater than cage systems. Is this an issue which WWF agrees with?

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: John Barrington
*Organization/Company: Scottish Sea Farms Ltd, Total production 26,000 tonnes.
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5.	This standard should be limited to focusing on chemical use only and where appropriate, documents can be held centrally rather than on a by farm site basis.	
Principle 2	Criteria 2.1	Within the Scottish Industry , the monitoring of benthic impacts is ably covered by the Government environmental regulator SEPA. Sites are modelled using the rigorously tested Autodepomod modelling programme and site specific data on hydrography, tidal movement, site configuration and feed input . A site specific Allowable Zone of effect is set. SEPA formerly regulated on a 25m fixed AZE, but this was found to unreasonably discriminate against sites with good tidal flow and the site specific approach is now	We suggest the WWF standard permit a modelled & approved site specific AZE as an alternative to the suggested fixed 30m AZE. The new model has been in use for a significant period and has demonstrated its effectiveness to control benthic impacts. Therefore we recommend that for Scotland, WWF adopts the SEPA model.

		used in Scotland.	
	Std 2.1.1.	Redox readings are more commonly used in Scotland. Should be made clear how the redox and sulphide values are arrived at. There is is no indication of what depths samples should be taken from. The SEPA redox standard is an average of readings through the sediment core.	
	Std 2.1.2.	Suggest ITI 30 should be an alternative to AMBI. This is the standard set by SEPA & has been in use for many years in Scotland. The two indices both measure the types of faunal community in the sediment and are of equal relevance. The additional calculations would add considerable unnecessary expense.	
	2.3.1	Agree with this…	…but the point of sampling for fines needs to be either at point of delivery to the farm or at point of delivery into the cage, since there could be a significant difference between the two if the feeding system creates some dust and fragments.
	2.4.1.	The requirements are covered by our Environmental Management System (ISO14001) as well as the controls imposed by regulators during site applications/modifications.	
	Criteria 2.5	SSF believes that the rationale behind the 3 standards proposed, is fundamentally flawed because they do not consider the welfare of the fish nor the increased risk of fish escapes. SSF as a producer, has a ‘statutory duty of care’ for salmon welfare.	

		Under the Animal Health and Welfare (Scotland) Act 2006, there is a requirement for salmon farmers to protect their stock. In addition we have a responsibility to prevent fish escapes, and so lethal action as a last resort maybe required to prevent a breach of containment.	
	2.5.1 & 2.5.2	SSF has considerable experience in the use of ADDs and believes that some of the reasons quoted for not allowing the use of ADD's are incorrect; A recent Scottish study of the effects and utility of ADDs (SARF 44, not yet published) shows that the aversive effect on the behaviour of cetaceans and porpoises may not be as great as previous Canadian studies suggested. SSF's 10 year experience of using ADD's clearly shows that ADD's do not become ineffective over time. SSF has site specific management of ADD's which are operated according to the level of challenge from seals. ADD's may be installed but not operated, but ready for operation should seal activity become evident. The above management technique therefore significantly reduces the potential interaction of ADD's with cetaceans & porpoises. The suggestion that predator nets could be used does not address any of the issues (such as by-catch) surrounding their use at certain locations. It does not address welfare issues concerning animals and birds which may become entangled in the predator nets,and this therefore contradicts criterion 1.1.	ADD's should be permitted as part of a hierarchy of seal deterrent activity, in order to reduce the likelihood that a seal would ever have to be shot, or that a fish might escape through damaged nets. Their use should be limited to periods when there is clear evidence of seal activity. At certain sites in particularly sensitive areas for cetaceans, SNH may require an application to the Scottish Government to permit ADD use. ADD systems are being developed with improved triggering mechanisms, and a device operating at sound frequencies closer to the seals hearing range (and therefore less audible to other species) is being tested. There could be a commitment to minimizing the use of ADDs and active participation in research leading to alternative means of control.

	Std 2.5.3.	SSF operates a comprehensive programme to deter predators and with specific ref to seals will only resort to culling once all other possibilities have been exhausted. Not having the option to cull out a rogue seal for example would be an unacceptable situation with regard to fish welfare and prevention of fish escapes	SSF propose that as per new legislation to be introduced into Scotland, licences to cull seals should be issued to fish farms which take into account local seal population dynamics and which are issued on the basis that all possible measures of deterrent are in place beforehand. Where appropriate, farms should work with SNH to monitor local seal populations.
	Std 2.6.1.	Suggest this is an unnecessary and complex approach. In Scotland, SEPA and SNH cover the impacts on biodiversity both at application for new sites (Environmental Impact Assessment) and during monitoring of site operations.	Remove this proposed standard
Principle 3	Criterion 3.1	This whole section is based on pre-conceived ideas which do not fully take into account the potential interactions between farmed salmon and wild salmonids. There is very little known about how much salmon farming has an effect on the dwindling populations of wild salmonids, with the consensus being that global warming is the most likely cause. There are many other factors which seem to have been left out , including the risk of recently stocked smolt sites becoming infected with sea lice by wild salmonids. For farmers to sample to sample the wild population around their farm is shortsighted and ill-conceived and is likely to have little impact on how the farmer manages any sea lice burden on his stock, but such extensive sampling could have a detrimental effect on the future of the wild population in the area. The	

		farmer's duty is to protect the welfare of his stock and he is legally obliged to do so. We suggest that the rationale behind this criterion needs to be reviewed and in its present state is not suitable to be included in the standard	
	Std 3.1.1.	SSF has been committed to working with other producers to establish area-based schemes (which in Scotland are called Area Management Agreements or AMA's) in all areas where we operate. The AMA will only be effective if all other participants co-operate and since participation is voluntary and not a legal requirement, we cannot assure compliance that our participation will be in an effective AMA for managing disease and resistance to disease. Comments on Appendix II, Need clarification that the requirement of only closed wellboats are used, refers specifically to within the area of the AMA. Production levels - need clarification as to exactly what on-farm and area farm density refers to. If these refer to site maximum biomass and spatial distribution of sites within the area respectively, then this is already covered by a range of Scottish govt regulators and consulted stakeholders during planning applications, eg Marine Scotland Science (formerely FRS), Local Planning Dept, SEPA, SNH, The Crown Estate, Local Fishery Boards & Trusts Monitoring Schemes – wild salmonid sea lice monitoring. Results from this will be difficult to interpret. How will stratified sampling be carried out? Lice numbers will	

		be very dynamic and changeable according to environmental conditions, independent of farmed stock lice levels. Appendix II refers to defining an 'area' as ecologically connected, what does this mean?	
	Std 3.1.2.	The cumulative impact assessment in relation to disease and parasites, is already effectively carried out by the govt dept Marine Scotland Science (MSS) and as the Statutory competent Authority , they take a balanced approach between environmental risk vs socio-economic benefit, when deciding on farm biomass in relation to other farms in the area. There is a suggestion that salmon farming has a direct impact on wild salmonids within a range of 75kms, however this is not proven and based on speculation.	Recommend that the current Scottish system is adequate.
	Std 3.1.3.	SSF and the Scottish Industry, as members of the Scottish Salmon Producers Organisation, participate in the Tripartite Working Group. The purpose of the Group, chaired by the Scottish Government, is to address problems common to salmon farming and wild salmon fisheries and to seek solutions for ensuring the maintenance of a healthy stock of farmed and wild fish whilst at the same time promoting a sustainable aquaculture industry. The Group was established in 1999 against a background of declining wild salmon stocks and in recognition of the importance of wild fisheries and the aquaculture	Recommend that the existing TWG/AMA system in Scotland is adequate.

		industry to rural economies. The main aim was how to share common waters in a way which ensures maintenance of healthy wild fish stocks and a sustainable aquaculture industry and how to build trust and consensus The Members of the Tripartite Working Group are: The Scottish Government, Marine Scotland Science(Fisheries Research Services), Scottish Natural Heritage, Scottish Environment Protection Agency, the Crown Estate, Highlands and Islands Enterprise, Highland Council, Association of Salmon Fishery Boards, Rivers and Fisheries Trust Scotland, Scottish Anglers National Association, Atlantic Salmon Trust and Scottish Salmon Producers Organisation. The establishment and operation of AMA's is a key part of the TWG, and includes the following principles; • single year class management and synchronised production/fallowing cycles • Synchronised lice treatments • zero ovigerous salmon lice, particularly during the critical wild smolt migration period (Feb – June) • vaccination of smolts against furunculosis • preparation of containment and contingency plans to minimise escapes • adherence to industry Codes of	

	Std 3.1.3.	SSF and the Scottish Industry, as members of the Scottish Salmon Producers Organisation, participate in the Tripartite Working Group. The purpose of the Group, chaired by the Scottish Government, is to address problems common to salmon farming and wild salmon fisheries and to seek solutions for ensuring the maintenance of a healthy stock of farmed and wild fish whilst at the same time promoting a sustainable aquaculture industry. The Group was established in 1999 against a background of declining wild salmon stocks and in recognition of the importance of wild fisheries and the aquaculture industry to rural economies. The main aim was how to share common waters in a way which ensures maintenance of healthy wild fish stocks and a sustainable aquaculture industry and how to build trust and consensus The Members of the Tripartite Working Group are: The Scottish Government, Marine Scotland Science(Fisheries Research Services), Scottish Natural Heritage, Scottish Environment Protection Agency, the Crown Estate, Highlands and Islands Enterprise, Highland Council, Association of Salmon Fishery Boards, Rivers and Fisheries Trust Scotland, Scottish Anglers National Association, Atlantic Salmon Trust and Scottish Salmon Producers Organisation. The establishment and operation of AMA's	Recommend that the existing TWG/AMA system in Scotland is adequate.

Principle 4	Criterion 4.2.	No allowance is made in the calculations of the potential situation that salmon processing waste (eg viscera) maybe processed into animal feed (non-ruminant terrestrials).The volume of fishoil and fishmeal produced, should be deducted from the FFDR input values.	
	4.2.1	With standard diets using 20% fishmeal a FFDRm of <1.31 is achievable. However with diets using higher marine content raw materials such as used for Label Rouge (45% fishmeal) this will not be possible.	
	4.2.2.	A FFDRo of <2.85 will be impossible with typical diets using 30% added oil and no plant oil substitution. To achieve <2.85, fish oil would have to be substituted by atleast 65% and this would undermine the Omega 3 content and the health benefits of the product. Currently there is not adequate supplies of trimmings oil to supply the industry.	Impossible for the Scottish Industry to comply and recommend that a 5 year period is provided to allow for adequate volume of MSC (or equivalent) certified fisheries to become available, as well as the development of trimmings oil supplies.
	4.2.3.	A FPI of 80% prior to 2014 should be achievable with most diets.	
	4.3.1.	5 years not an unreasonable period to achieve this, and Peruvian Anchovy Fishery currently going through IFFO certification.	
	4.3.2.	We challenge whether the 'Fishsource' score is a valid system since it based on a group of fishery scientists who are part of a non-accredited organization who make assessments purely by reviewing published data which maybe out of date, and there is no physical auditing of fisheries. Absence of data can disproportionately downscore a species, eg Peruvian Anchovy has an evaluation category of E mainly	Suggest Fishsource system has potential to be improved and cannot be effective if assessments are made on unavailable data. Prior to achieving 4.3.1., should have option of 4.3.2 **OR** 4.3.3.

		because there is a n/a in answer to the question ‘ will the stock be healthy in the future?	
	4.3.3.	We agree with this, but there could be issues with the time to complete the necessary auditing and certification process, eg situation in Peru with IFFO certification.	More time should be given to allow IFFO certification. Prior to achieving 4.3.1., should have option of 4.3.2 **OR** 4.3.3.
	Criterion 4.6.	There is an important contradiction between this section and 3.1.1S, since this section aims to reduce the energy use and emissions involved in the production of salmon, but standard 3.1.1S will significantly increase the amount of energy required. Re-circulation systems are intensive and energy hungry. Freshwater cage systems are low energy and low intensity systems with particular benefits for the welfare of the fish.	
	4.7.1.	While we agree with the aim of using antifoulants without copper, with the current lack of an effective alternative, this is not practical. We work within EU regulations and the use of approved products but will continue to pursue an alternative method (coating) In pursuit of good net hygiene and reduced costs of net changing, there is increasing use of in-situ net cleaning equipment. The resulting reduction of number of net changes, means less copper based antifoulant is used.	3 year period for development of alternative non-toxic antifoulant.
	4.7.3.	As previously stated, we cannot accept the 30 metre AZE.	Work with SEPA standard (34ug/kg Cu) for copper in sediment outside of AZE.
Principle 5	5.1.2.	The definition of a fish health professional needs more clarification, what is	The management of site fish health is not just about the number of visits but more about

Principle 5	5.1.2.	The definition of a fish health professional needs more clarification, what is professional expertise in managing fish health? The number of visits per year by the designated veterinarian should be according to the requirements of site health status (which is determined by the fish health professional) and not a fixed min. number.	The management of site fish health is not just about the number of visits but more about cage edge monitoring of fish behaviour, feeding and mortalities. This can be managed through the site Veterinary Health Plan with site staff who are trained in fish health and observing the stock every day.
	5.1.3.	When considering the vaccination strategy for a particular site, a risk assessment should be carried out, and the biological efficacy and economic cost must be taken into account.	
	5.1.6.	Need clarification of post-mortem analysis at cage edge. Visual inspection or also including histology? Post mortem analysis should be carried on a sample of the mortalities – this would be a practical and science based approach.	
	5.4.1.	As stated earlier, SSF can participate in the AMA plan, but there is no guarantee that other participants in co-ordinated treatments for example.	
	5.4.2.	This is a relatively new method and in Scotland and we need accredited labs for the method to be established. There is a lack of calibration between bioassay results and resistance.	Need atleast 2 years to develop this method and establish standardization in methodology.
	5.4.3.	We do not agree with the proposal that the farm should be harvested out immediately, so long as fish welfare is maintained and	If resistance is identified, there is the option of prescribing vet to use different treatment strategy rather than changing treatment(ie

	5.4.4.	Standard should list the antibiotics which are of concern to the WHO	
	5.5.1.	Need a clear definition of single year class. Does this refer to the stocking of a single farm and could there be a 6 month gap between inputs of smolts derived from the same stripping, but having had photoperiod manipulation (ie SO and S1)	
	5.5.5.	Not practical and needs to be balanced against socio-economic impact.	Consideration needs to be given to the severity of outbreak in terms of mortality and clinical symptoms, and the potential threat to wild populations and the ecosystems
Principle 6		Since Scotland is part of the EU, where employment law standards significantly exceed those proposed in this draft, salmon producers will be automatically complying with these standards.	Suggest that Scotland receives a derogation ref this principle on the basis that the high standard of EU employment law will more than cover off the SAD standards proposed.
Principle 7	7.1.4.	Not relevant for Scotland Current EU regulations would not allow any situation where there could be health effects on local communities.	
	7.2. & 7.3.	Not relevant to Scotland	
General comments			
Smolt Production			
Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1		Agreed as per our response for Grow-Out	
Principle 2			
	All of 2.2 & 2.3	The Scottish Aquaculture industry is controlled and regulated by the Scottish Environment Protection Agency(SEPA) who	

		have many years experience in monitoring & protecting the aquatic environment. In order to meet the aim of the Water Framework Directive(WFD) that all water bodies should be of good ecological status by 2015 SEPA have set up a new water monitoring and classification system. This system classifies all Scottish freshwater lochs according to how their phosphorus levels have changed from historic baseline status. SEPA consents for freshwater loch sites are for a strictly controlled maximum production, thus limiting input of nutrients to the water body. Predictive modelling carried out by SEPA determines the carrying capacity & maximum permissible production in a loch, and nutrients levels are monitored by SEPA throughout each year to ensure the water remains of good status. SEPA consents for tank sites have site specific numeric limit conditions for discharge volume and nitrogen, BOD,suspended solids and chloride. These are determined by modelling of the effect of the input to the receiving water body. The acceptable concentration in discharge depends on the volume of discharge, volume of receiving water, dispersion & must not breech SEPA environmental quality standards. SEPA sample the discharge regularly and also monitor the quality of the receiving water body.	

	2.5.1S	Mink are exotic to Scotland and there should be allowance for culling them on the basis of fish welfare and prevention of fish escapes	
Principle 3	3.1.1S	Unacceptable for Scottish Industry to prohibit use of cages in freshwater lochs where there are native salmonids, since all locations of smolt cages would potentially come under this category, and this would affect more than 50% of smolt production. In the rationale it describes the impacts for concern include the effect of escapes on wild populations, nutrient loading, disease transmission, and antibiotics and chemicals entering the environment. In Scotland (as opposed to Chile) there is no strong evidence that any of these concerns are significant. All of these potential impacts are controlled and monitored by SEPA and Scotland Marine Science. The Industry has reviewed the code of practice for containment in Freshwater, which includes increased technical specification of moorings, cage structure and nets. There are a number of studies to show that escapes do not impact on wild fisheries both in Scotland & Norway.	Floating cages should be permitted in freshwater lochs where native salmonids are present, and SSF will support the existing Scottish regulatory and industry controls to eliminate the impacts of concern.
	3.1.2S	This contradicts the Criterion 4.6 on energy consumption, since to relocate all freshwater cage production to re-circulation systems would significantly increase energy use as well as conflict with current welfare standards in relation to stocking densities.	
Principle 4		No comment	

Principle 5		Same comment as for 5.5.5 in Grow –out	Same as for 5.5.5 for grow out
Principle 6		Same as for grow-out	
Principle 7		Same as for grow –out	
General comments			

COMMENTS ON THE DRAFT CRITERIA FOR FARMED SALMON ON BEHALF OF THE SEA TROUT GROUP

September 2010

The Sea Trout Group welcomes the opportunity to comment on the final draft criteria produced by the Salmon Aquaculture Dialogue.

GENERAL COMMENTS

We believe that the setting of a Standard for sustainable salmon farming offers the opportunity to achieve industry buy-in to continually improved performance. We have noted with some dismay that governments have tended to regard economic sustainability as a greater priority than environmental sustainability – the Standard offers an opportunity to bring better balance to this.

However, it is **essential** that the bar is set high enough to offer a challenge to operators, even those who appear to be leading the field in aiming for sustainable practice; otherwise, it will not succeed in its avowed aim of driving up standards. In particular, we are keen to see the Standard use all opportunities to make closed containment of farmed salmon an attractive option. From the Scottish perspective, the draft Standard's proposal that smolts raised in open net pens in wild salmonid systems are ineligible for certification is a very welcome first move in this direction (please note also our comments on page 11). However, there may well be further scope for including further incentives to move to closed systems within the Criteria relating to benthic impact.

It is also crucial that the drive to improved standards is an ongoing process, rather than a static one. Our comments are based on the premise that the intention is to review the Standard regularly on a 2 – 3 year basis, so that improvements in salmon husbandry, and lessons learned from increased monitoring, can be incorporated in succeeding versions. We recommend that the Standard makes more specific reference to the inbuilt ethos of continuous improvement.

We also believe that area management can only proceed successfully on the basis of 5- or 10-year plans, since it is very difficult to turn situations around in the natural environment, and a Standard which is unrealistic risks losing the benefits which a pragmatic and achievable – though demanding - Standard could undoubtedly bring.

We also make a general observation that there are certain points within the Criteria where the term 'research' is used rather loosely, and a better term would be 'monitoring'. Research provides the tools to monitor and assess.

We note that it is suggested that areas of wild salmonids are defined as areas that are within a certain distance of a wild salmonid migration route (or for coastal trout, an equivalent), and that the appropriate distance is still under discussion. Since it is our understanding that the Standard is designed (a) to apply in all countries where salmon is farmed commercially and (b) to offer protection to populations of native salmonids, then we would support the definition offered, although it is based on experience with Pacific salmon populations.

PRINCIPLE 5

We shall restrict our comments on Principle 5 to the following:

We support the criteria suggested for Principle 5, and the only detailed comment we would offer is on 5.5.3, where we would suggest that 100% of fish should be transported to slaughter facilities in a closed wellboat or a wellboat with discharge treatment and disinfection, where such transport involves moving fish between one Management Area and another, or across Management Areas.

We support the solution offered in the rationale for 5.5.2 – namely that the Scottish system of sampling within a dispersal area is adopted.

PRINCIPLE 3

We note that the primary aim of Principle 3, in combination with Principle 5, is to ensure salmon farms do not harm the health of wild fish populations, and are fully supportive of this aim. However, although the Criteria cover impacts of sea lice in some detail, other aspects of impacts on the health of wild salmonids – for example, via the amplification of pathogens – seem to be underplayed. We fully realise that baseline data on incidence of disease (particularly incidence of disease in non-pathogenic form) among wild populations is patchy, and possibly lacking in consistency. Monitoring of the health status of wild salmonids is expensive, which accounts for the lack of consistent baseline data. The Standard does not appear to fully address the question of how far salmon farm operators should be asked to fund such monitoring.

We would suggest that monitoring should focus on the best available sentinel species – in the case of the UK, Ireland, this would be sea trout, and in the case of Norway, sea trout and Arctic char, since they remain in contact with the inshore marine environment for a longer period than salmon.

Criterion 3.1 Introduced or amplified parasites and pathogens

3.1.1 Participation in an effective area-based scheme for managing disease and resistance to treatments. This includes production levels, coordinated application of treatments, rotation of different treatments, open communication about treatment, monitoring schemes, stocking and transport.

Comment: It is crucial that there is a tighter definition of 'effective'. The draft criteria invite comment on the best way to delineate a management area; we believe that it must consist of the biological area within which viable stages of sea lice larvae originating from within salmon farm cages can be transported and dispersed.

It would appear (from Appendix II) that the schemes envisaged relate to area-based management schemes involving only salmon farm operators, similar to the 'farm management agreements' in Scotland. The experience in Scotland is that Area Management Groups, which involve both salmon farm operators and representatives of wild fish interests, do not tend to operate in tandem with Farm Management Agreements. In practice, this has been an 'either/or' situation. It is important that, as well as participating in an intra-industry area based scheme, farms seeking accreditation should participate in AMAs on the multi-stakeholder model.

Similarly, 'open communication' must prevail not only among salmon farm operators, but on a wider, multi-stakeholder basis?

The key to successful area-based management is that, for a particular area of coastal waters, salmon must be farmed on a single-generation basis, with an inbuilt requirement for synchronised lice treatment, and synchronised fallowing.

The optimum fallow period will vary from one area to another; there is no 'magic number'. A sensible requirement can only be that the entire management area is fallowed at a minimum for sufficient time to break the sea lice cycle.

3.1.2 An assessment of key regional cumulative impacts of the farm and its neighbors, including an analysis of the appropriate density and infection pressure risk on wild populations. Specific areas that must be covered are listed in Appendix III.

Comment: How would one define "appropriate" infection pressure on wild populations? We are unclear as to what this means, since sea lice are widely dispersed in the natural marine environment. A better measure would be to look at sea trout as an indicator – measurements could include: percentage of fish which return prematurely to fresh water and a profile of lice burdens on such fish – both in terms of number and developmental stage; condition & growth rate of fish. The crux of the problem for wild salmonids is the situation where juvenile fish encounter large numbers of larval lice as soon as they enter the sea. The significant measurement is thus the level of juvenile lice present in areas adjacent to where juvenile fish enter the sea. This can then be linked to numbers of adult female lice on the farm. These measurements should be the basis for the liaison with NGOs mentioned in 3.1.3

3.1.3 A demonstrated commitment to collaborate with NGOs, academics and governments on areas of mutually agreed research to measure possible impacts on wild stocks. Farms located in areas of wild salmonids must focus this research on measuring sea lice levels on wild juveniles and understanding the link between sea lice levels on farms and in the wild.
Comment: Such a commitment must be demonstrated by having historical evidence of such collaboration, over a period of at least one production-cycle, and the data should be publicly available, in the interests of transparency and successful multi-stakeholder co-operation.

We fully support the concept of co-operation, but suggest that this should relate to a requirement for monitoring, as opposed to research. Research could establish the parameters of what should be monitored. Since monitoring is likely to be less costly than research, salmon farming companies may be more willing to sign up to this.

We note that in the rationale for these criteria, the observation is made that: "The SAD expects that researchers will need to become more consistent in their methodology for testing for sea lice in the wild." This also implies transparency in regard to data-sharing.

We would suggest that, once such monitoring is established, it should be used to set targets in terms of lice pressure caused by farms, and that operators should have to hit these targets according to a mutually-accepted pattern, such as in three years out of five, or six years out of ten. This would allow operators to learn from experience, and to aim for an improving trend.

3.1.4 Maximum average sea lice levels on all farms in the area-based management scheme.

Comment: We support this, in the context of our comments on 3.1.7

3.1.5 Timing of wild salmonid outmigration and juvenile periods is well established and monitored.

Comment: For such criteria, evidence of such monitoring should be a precondition for entering the accreditation process, not a criterion for certification. (this appears to be covered in 3.1.9)

3.1.6 Measure lice levels on wild juveniles during outmigration, as part of an area-based management plan, and in partnership with NGOs, academics and governments, as appropriate. (Note: this would be the way for these farms to meet 3.1.3.)

Comment : We do not agree with the suggestion that lice levels on wild juveniles should be measured during outmigration, for the following reasons: (a) it will be exceptionally difficult to catch a sufficient number of wild fish at this stage, particularly in the case of salmon (b) there is no scientific basis for interpreting such numbers. We prefer the suggestion which we made above: the use of an indicator species such as sea trout, and monitoring according to a set protocol, for example sampling of prematurely-returning fish.

3.1.7 Maximum average sea lice levels on all farms in the area-based management plan during juvenile outmigration (or equivalent for coastal salmonids). Suggested levels: Maximum 0.5 mature sea lice per fish or 3 total sea lice.

Comment: The target must clearly be zero for the spring months and trigger levels sufficient to ensure that progress is made towards achieving this target at least 3 years out of every 5. The absolute maximum trigger level should be 0.5

but levels of closer to 0.2 should, where possible, be agreed locally. We suggest that the standard should allow for the target being met during three years out of five, in order to be achievable. It is essential that there is a link between the critical period for wild salmonids and the rest of the year – during the latter period, levels of 1 or 2 adult female lice per farmed fish may be quite acceptable, in certain areas.

We are convinced that there is a requirement for clear targets in the relevant local geographic zone, and that these targets will vary from one zone to another, even within a single national jurisdiction. It is important to find a formula which is applicable to experience in areas of Atlantic salmon and Pacific salmon, since the size of migrating smolts differs so greatly. The only way to do this is to incorporate a local/regional dimension.

In order to cater for the need to look at optimised trigger levels locally, we suggest that the following wording could be added to any trigger level cited: "or a locally/regionally -agreed maximum, which ever is the lower." Although not all such locally/regionally-agreed trigger levels will have the force of law, it is our perception that they are usually incorporated in some sort of Code of Practice or national Pest Control Strategy.

3.1.8 In areas of coastal trout, maximum average sea lice levels on all farms in the area-based plan during non-juvenile periods.
Comment: we are not convinced that there should be a separate figure for trout, since Atlantic salmon and sea trout will tend to occur in the same rivers and inshore marine environments. We believe that the trigger level should be based on the requirements of sea trout, or other locally-relevant indicator species, since these levels will also offer maximum protection to wild salmon.

3.1.9 Period of demonstrated compliance with standards in 3.1 prior to initial certification.
Comment: We suggest AT LEAST one full production-cycle, since lice impacts will not be evident until second year of production. Possibly much can be learned from the compliance-demonstration period required for organic certification.

We note that the rationale for criteria up to 3.1.9 includes the following:

"The impact assessment intends to ensure a credible third party has analyzed the key cumulative impacts of the farm and its neighbors." We suggest that in this, and the following, paragraph the words 'and impartial' are added to 'credible' . We agree with the components of the EIA as described in Appendix III.

The SC is considering how to set global maximum sea lice levels that are meaningful in different regions and jurisdictions. The following concepts are guiding the deliberation.

§ There is a trade-off between pressing for very low sea lice levels and the danger of over-treatment and development of resistance

We believe that the approach to trigger levels outlined in our comment on 3.1.7 should help address this dilemma.

§ Juvenile outmigration is a particularly sensitive moment for wild salmon populations, and sea lice levels during that period should reflect a precautionary low level

Our comment on 3.1.7 addresses this point, and the next.

§ Coastal trout are susceptible to sea lice because they potentially remain in contact with sea lice from farms throughout the year (***we would suggest amending this to read ".. potentially remain in contact with sea lice from farms for an extended period")***

§ The transmission of sea lice from farmed fish to wild populations, and visa versa, is still poorly understood

The emphasis which the criteria place on monitoring and data-sharing should address this issue.

§ Maximum farm level limits should be an average of sea lice levels on all farms in the area-based plan, since that is the infection pressure that wild populations will experience

We suggest that management areas are delineated to take into account the area over which viable stages of lice larvae originating within farm cages can be dispersed.

Given these concepts, the SC is considering the following, as detailed in the indicators above:

§ A global sea lice level for all farms seeking certification that may be as low as 0.5 motile female sea lice per fish

This does not tally with the suggestion made under 3.1.7? Is the intention here to refer to 0.5 adult (as opposed to motile) female lice per fish?

§ A sea lice level during juvenile outmigration that is 0.5 motile female sea lice or lower
See our comments on 3.1.7
§ A feedback loop from testing of sea lice on wild juveniles to ensure the farm level limits are appropriate
See our comments on use of appropriate indicator species, and protocols for monitoring impacts on these
§ A year-round sea lice level for areas of coastal trout that is yet to be determined
See comment on 3.1.7

We support the suggestion of prohibiting the certification of farms sited in areas that pose the greatest risk to wild salmonids, such as areas where juveniles are most vulnerable, or areas in proximity to stocks of special concern (on national at risk lists or the IUCN Red List of Threatened Species).

EU Directives, such as the Fish Health Directive, Natura 2000, the Dangerous Substances Directive, various Directives relating to health of shellfish etc, will also contain useful guidance as to at-risk sites.

3.1.9 The SC seeks input on the idea of a demonstration period to ensure that a farm is performing and fully implementing area-based management, wild juvenile monitoring and other aspects of 3.1 prior to certification. As is the case with all standards in this document, the standards in 3.1 require demonstrated compliance with the performance measures on an annual basis. The SC is considering for what length of time prior to certification the farm would need to comply with these standards. One option would be an entire production cycle.

We support this option.

Criterion 3.2 Introduction of non-native species
We feel that, in the European context, any provision for farming on non-native species will encounter huge problems in term of Natura 2000. This criterion needs to make reference to a requirement for any non-native species to be sterile.

Although the rationale for this criterion makes reference to the FAO guideline that permits the culture of non-native species only when they pose an acceptable level of risk to biodiversity, we feel that here is NO 'acceptable' level of risk in this context.

We support the Standard's stance on the use of cleaner fish for sea lice control. We also believe that there is scope within a Standard focused on sustainable practice to ensure that cleaner fish are not harvested from unmonitored or unsustainably-exploited native species of wrasse for use in salmon cages, particularly in view of the fact that it is now possible to farm wrasse for this purpose.

Criterion 3.3 Introduction of transgenic species

We support the ban on use of transgenic fish under this standard because of concerns about their unknown impact on wild populations.

Criterion 3.4 Escapes

We are concerned that the suggested criteria in regard to permissible levels of escapes focus on prevention of large-scale escape incidents. Science has now shown very clearly the potential risk from wild / farmed interbreeding – and it is clear that regular small-scale escapes within the same salmonid system may present a larger risk that intermittent large-scale escapes. We therefore object to the arbitrary level of '200 or more fish' cited in 3.4.2.

It is now up to the regulators and wild fish interests to carry out an objective assessment of wild salmon stocks to quantify where and when these impacts have occurred. The stock-specific genetic markers from the SALSEA Merge project will greatly facilitate such a survey. This will help inform revisions of this part of the Standard.

We also believe that the definition of escape incidents 'out of the farm's control' leaves loopholes for bad practice. Examination of the causes to which escapes from Scottish fish farms over the past seven years are

attributed shows that, with the exception of freak weather events, everything else SHOULD be 'within the farm's control', with careful attention to siting, predator management, staff training, correct specification, maintenance and deployment of equipment, etc.

It is important that the Standard does not lose sight of the need to keep escapes at a low level for purposes of lice and disease control, in addition to risks of genetic introgression.

The SC is considering adding an additional standard to further address the issue interbreeding and welcomes input on whether such a standard is needed or what it might look like.

We would make the observation that relatively little work has been done in the field on the extent to which genetic introgression has taken place. It is important that there is sufficiently strong impetus for ongoing monitoring of this, so that the Standard's provisions on escape prevention could be tightened up during successive reviews, if necessary.

SMOLT PRODUCTION FACILITIES

We wholeheartedly support the proposal that the Standard allow only closed or semi-closed smolt systems to be certified in areas of wild salmonids. Our opposition to certification of fish raised in smolt pens within salmonid systems is based on:

- Risk of dilution of the native gene-pool by hybridisation with escaped fish; recent work has shown that precocious parr play a very large role in successful spawnings. This means that there is a high risk that farm escapees could hybridise with native fish without ever having left fresh water. [1]

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[1] Matthews, M.A., Poole, W.R., Dillane, M.G. & Whelan K.F.. (1997). Juvenile recruitment and smolt output of brown trout (*Salmo trutta* L.) and Atlantic salmon (*Salmo salar* L.) from a lacustrine system in western Ireland. *Fisheries Research*, **31**; 19-37.

Matthews, M.A., Poole, W.R., Thompson, C.E. McKillen, J., Ferguson, A., Hindar, K. & Whelan, K.F. (2000). Incidence of hybridisation between Atlantic salmon, *Salmo salar* L., and brown trout, *Salmo trutta* L., in Ireland. *Fisheries Management & Ecology* **7**; 337-347.

- The risk that availability of uneaten feed from the pens will disrupt the migratory behaviour of native anadromous fish
- The risk of spread of disease and freshwater parasites

We have considered whether it would be reasonable to include a 'phase-in' period for farms which use smolts reared on open net pens in salmonid systems. However, since certification will be offered on a farm-specific basis, and since over 50% of smolts raised in Scotland are currently raised within closed/semi-closed systems, we do not believe that it is too onerous to ban all net-pen-raised smolts from the start.

We must emphasise that the issue of net smolt pens in salmonid systems is a "make or break" one for us - no matter how effective the rest of the Standard may be, if smolts from open net pens can still end up on the supermarket shelf with a 'sustainably farmed' label, then it makes a mockery of the entire process.

Contact person:

Fiona Cameron

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Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Nigel Edwards
*Organization/Company: Seachill (A division of Icelandic Group UK ltd.)
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	SAD compliant farmers must know the markets that their products may reach and have controls in place to ensure they comply. The standard should be restricted to permitted chemicals and residue limits.	Presence of documents demonstrating compliance with permitted chemicals and residue limits in the list of countries that the farmer exports to. Evidence that the farmer has agreed the list of countries that the salmon will be exported to with all exporters that purchase their products.
Principle 2	2.1.3	After consultation with our suppliers we recommend that SAD follows the new EU directive on water, and also the MOM system where Shannon-Wiener and Hubert is implemented.	We understand that Marine Harvest have proposed alternative wording.
Principle 3	3.4.1	Our suppliers advise us that the standard is not workable due to the accuracy of counting technology.	Propose an alternative measure based on statistical analysis from farmers following best practice.
Principle 4			

SKRETTING

Salmon Aquaculture Dialogue

General comments on the draft standards for Responsible Salmon Aquaculture

Skretting has reviewed the draft standards for responsible salmon aquaculture and our comments and suggestions for changes to specific criteria, indicators and standards are collected in the attached "Comment form for Draft Salmon Aquaculture Dialogue Standards".

Skretting is represented on the Steering Committee of the Salmon Aquaculture Dialogue. In our opinion, this representation has a wider responsibility than solely being an advocate for the view of Skretting as a company. Therefore, we feel that it is also appropriate for Skretting to make comments to these standards from a company perspective, as a stakeholder of the dialogue in line with all other stakeholders of the dialogue.

In our mission statement we say that "*Skretting will deliver outstanding nutrition and services to fish farmers worldwide for the sustainable production of healthy and delicious fish".* The standards for Responsible Salmon Aquaculture have the potential to become an important asset in promoting the sustainable production of farmed salmon.

It is our view that the finished dialogue standards should identify good practice as demonstrated by today's better operators, and thereby, discourage bad practice. Significant uptake of a certification scheme based on this approach would bring about the greatest operational change on-farm by providing producers with a practicable target of eliminating poor practices and replacing them with good practices. We are therefore concerned that the proposed standard will be seen as a 'platinum' one representing 'aspirational practice', as opposed to 'good practice'. On this basis, we fear that as a result of setting the bar too high, an opportunity to encourage better practice on average through greater participation will be missed.

Best regards of behalf of Skretting

Dr. Paul Morris
Business Development Manager

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*Name: Paul Morris
*Organization/Company: Skretting
*E-mail address:

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COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 2	2.3.1. Percentage of fines in the feed at point of entry to the farm (measured according to methodology in Appendix I Subsection 2. [<1% by weight of the feed]	On that the assumption that this means < 1% dust and fragments in the product at the farm gate (effectively, while the feed is still in the bag / prior to discharge into a silo) then, this should not be an issue for competent salmon feed manufacturers. If however, the feed has to exit a feeding system and enter a pen / cage with <1% breakage then, on the basis that feed manufacturers are not responsible for the design and operation of their customers' feeding systems, a maximum breakage of 1% is not acceptable Please note there is a difference into the English version and the Spanish translation regarding this point: English: …entry to the farm Spanish: …entry to the cage The proposed methodology has two weaknesses: 1. When quantifying fines, the description of the "effort" required for agitation of the sample (Appendix 1, Point No. 5) is insufficiently robust. 2. Sampling. This methodology should refer to the national regulation for sampling, Additionally, the assumed penalty (withdrawal of certification) for failure to achieve 100% success on this	Clarify the wording with regards the term "fines" and the point at which fines are measured e.g. "at the farm gate or immediately before discharge into any feeding system".. Remove the option to sieve the product manually This methodology should refer to the national regulations for sampling. A tolerance for unavoidable breakage must be considered

		criterion appears to be disproportionately high. We would recommend a tolerance of approximately 95% of deliveries.	
Principle 4	4.2.1. Fishmeal Forage Fish Dependency Ratio (FFDRm) for grow-out (calculated using formulas in Appendix IV, subsection 1) [<1.31]	Assuming economic FCRs achieved are within the range considered acceptable for Atlantic salmon, this criterion is deliverable for a sufficient number of farming company / feed combinations. However, when biological FCRs are intrinsically poor, e.g. potentially for some of the *Oncorhynchus* species, this criterion may be too hard to deliver to support fair competition.	We propose that the "discount" afforded to trimmings in the ratio calculation(s) be applied to fish oil (and meal) that has been sourced from sustainable fisheries. This should apply to all three criteria in 4.2. and is described in detail in "General Comments". Consider FCR compensation for salmonids that tend to have a higher bFCR
	4.2.2 Fish oil Forage Fish Dependency Ratio (FFDRo) for grow-out (calculated using formulas in Appendix IV, subsection 1) [<2.85]	From a fish nutrition perspective, it should be possible to deliver this criterion though, it will be necessary to undertake substantial replacement of the added fish oil (especially if FCRs are high). Even with effective fish oil management strategies, there would be a substantial reduction in the levels of LC n-3 PUFAS in the flesh of salmon and therefore, in many markets, a substantial reduction in the perceived value of the fish as a human food product. On the basis that salmon is more likely to be purchased for its attributes as a healthy food rather than its sustainability credentials, delivering this criterion will have a disproportionate impact on consumption.	We propose that the "discount" afforded to trimmings in the ratio calculation(s) be applied to fish oil (and meal) that has been sourced from sustainable fisheries. This should apply to all three criteria in 4.2. and is described in detail in "General Comments"
	4.2.3. Fish Protein Index (FPI) for grow out (calculated using formulas in Appendix IV, subsection 2) [80% prior to January 2014 and > 100% as of January 1, 2014]	With the exception of feeds for salmon grown for certain markets, this criterion is deliverable. For growers wishing to service those markets and yet still attain ASC accreditation we recommend the approach suggested for the FFDR calculations	We propose that the "discount" afforded to trimmings in the ratio calculation(s) be applied to fish oil (and meal) that has been sourced from sustainable fisheries. This should apply to all three criteria in 4.2. and is described in detail in "General Comments
	4.3.1. Commitment to source feed containing >90% fishmeal or fish oil originating from [forage] fisheries certified under ISEAL member's accredited sustainability certification scheme. This must be done as the product becomes	We understand that the MSC is currently the only ISEAL member that can certify fisheries as sustainable and that the MSC is re-evaluating its position with regards the suitability of its own criteria for the evaluation of low trophic level fisheries. On this basis, there may not be sufficient quantities of compliant material to make this criterion achievable within the 5 years allowed	

	available and within 5 years of the publication of SAD standards [Yes]		
	4.3.2. Prior to achieving 4.3.1, the FishSource score for the fishery(ies) from which a minimum of 80% of the fishmeal or fish oil is derived. (See Appendix IV, subsection 3 for explanation of FishSource scoring) [TBD]	Criterion 5.1.7. of the Pangasias Aquaculture Dialogue (PAD) standard stipulates that EITHER the fishmeal / oil be sourced from a fishery with a FishSource score "≥ 6 with no score < 6 or an N/A in the stock assessment category" OR sourced from a supplier who is compliant with the IFFO RS scheme. To assure that Pangasias and salmon are raised according to equal standards, we propose that the SAD standard should support the IFFO RS scheme (or equivalent) as a means of determining suitability. We see that opportunity remains for the use of FishSource scoring of fisheries as a means of establishing equivalence in terms of sustainability credentials. Further, in order to prevent the logistical aspect of segregation deterring membership of the scheme, we believe that a mass balance approach be adopted. On this basis, suppliers need not assure that individual SAD feeds be made with compliant materials but MUST be able to prove that compliant material in proportion to sales of feed to sold according to the SAD standard have been purchased and used within the business.	We propose that the standard accepts sourcing from an IFFO RS supplier (or equivalent) as an acceptable solution until sufficient quantities of MSC (or equivalent) sustainable material (as defined in 4.3.1) become available. Further, we propose that compliance be demonstrated in terms of a mass balance approach to assure that purchases of complaint marine materials is equal to their use in SAD compliant feeds.
	4.3.3. Prior to achieving 4.3.1, demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO Code of Conduct for Responsible Fisheries	This criterion requires modification to separate the ability to demonstrate a chain of custody for marine materials from the requirement to source materials specifically from FAO CoRP compliant fisheries. We feel that sustainable raw materials are adequately defined in 4.3.2.	We propose that suppliers should demonstrate a chain of custody (CoC) that is compliant with ISEAL or ISO 65 requirements. The CoC must be sufficiently robust to demonstrate compliance on the mass balance basis noted in 4.3.2. and obviously, demonstrate that sufficient quantities of materials complaint with either 4.3.1 or 4.3.2 have been purchased. The reference to the FAO CoRP should be deleted as it is covered by our proposal for 4.3.2..
	4.4.2. Documentation of use of transgenic plant raw material or raw materials derived from genetically modified plants, in the feed.	Currently in The Americas and potentially in the future in Europe, the default position for non-marine materials is, or will be, GM. Additionally, there are no constraints on the acceptability or otherwise of GM crops in the PAD standard. Therefore, in order to assure that there is no competitive	Remove the requirement to document the use of GM crops

		disadvantage for salmon, the PAD and SAD standards should be harmonized. In order to assure the widest applicability of the standard and to make it future proof, the burden should fall on the manufacturer's ability to support non-GM claims.	
	4.6.3. Documentation of GHG emissions of the feed used to produce the salmon at site of certification according to ISO-compliant life cycle assessment methodology [Yes]	Given the current uncertainty regarding methodology and many of the underlying principles e.g. allocation of carbon equivalents between product and co-products, we suspect that the effort required to provide this information will be disproportionate to its perceived value. The nearest that the PAD standard gets to this clause is found in 3.6.1 as follows: "Information available on the following variables (per year per farm in the certification unit): – Fuel Used – Quantity of electricity – Amount of dead fish for each disposal method adopted" In order to maintain equality in terms of objectives for the different standards, this requirement for salmon feed producers should be dropped	We propose parity with the PAD standard i.e. no requirement to document GHG emissions for the feed at this time
General comments	Criterion 4.2. Use of wild fish for feed and 4.3. Source of marine raw materials	Salmon feed producers have worked extensively to establish sustainable sources of marine raw materials. Our view is that after direct human consumption, aquaculture represents the most logical use of fishmeal and oil on the basis of the efficiency with which farmed fish convert them into food and simultaneously retain high value nutrients such as LC n-3 PUFAS and micronutrients. A policy focused simply on reduction of their use in fish feeds will not impact on the absolute quantity of fishmeal and oil produced and serves only to divert these resources towards feeds for agriculture and technical applications. The SAD should be a driver for the more responsible use of fishmeal and oil in aquaculture rather than encouraging redirection irrespective of potential benefits to consumers	In addition to "discounts" for the use of trimmings in the FFDR calculations for fish oil and meal, credit should be awarded to the origin of fishmeals and oils used in these calculations. This could take the form of a sliding scale for discount with the use of meals compliant with 4.3.1. awarded the highest value with progressively reduced discount for materials sourced from fisheries compliant with the requirements of 4.3.2 and / or 4.3.3.

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*Organization/Company: Solidaridad Europe
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4	**4.4.1** Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with recognized crop moratoriums and local laws ○ *Specifically, the policy shall include that vegetable ingredients, or products derived from vegetable ingredients, must not come from the Amazon Biome as geographically defined by the Brazilian Soya Moratorium. Should the Brazilian Soy Moratorium be*	The Soya Moratorium is an important to assist companies in defining a responsible sourcing policy for soy, which is an important vegetable ingredient for salmon.. It does not mean that the soy does not come from the Amazon Biome. The Soy Moratorium inhibits trade of soy from areas deforested after July 24th 2006 in the Amazon Biome Conformity to the Soya Moratorium criteria is a relevant element but a really responsible sourcing policy needs supplementary requirements for	Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with recognized crop moratoriums, local laws and compliance to relevant independent, third-party sustainability schemes for the key vegetable ingredients. For soy compliance with RTRS or any standard that is considered to be equivalent by ASC is required in those countries where RTRS soy is available.

	lifted, this specific requirement shall be reconsidered. **rationale** Once traceability is in place, the salmon producers and auditors will be able to determine the conditions of the environment where these ingredients are sourced. This will enable future requirements within the SAD to limit the sourcing of ingredients to areas where the production of these ingredients is causing the least damage When the SAD standards are updated and revised, the addition of a requirement for the certification of key vegetable ingredients by independent, third-party sustainability schemes should be considered. Specifically, the SAD will encourage the ASC to require, during the standards update process, a review of whether the standard should demand that vegetable ingredients,, or products derived from vegetable ingredients,, must originate from an ISEAL-accredited certification scheme.	different reasons: a. The Soya Moratorium is only working in one country (Brazil) in one area with just a very small part of the Brazilian soy production b. Deforestation is a problem in other areas in Brazil and in other countries as well. c. There is a large number of other social and environmental issues that should be part of a responsible sourcing policy. Also, compliance to local laws will only be a relevant criterion if there is a requirement to comply to a relevant standard with a working Chain of Custody. In the rationale the requirement for certification of key vegetable ingredients (where soy is likely to be the major) is announced when there is an update or revision. That would mean that in the meantime there is no possibility for including a truly integral sourcing policy for soy. For soy an international multistakeholder iniatiative, RTRS, has resulted in 2010 in a Standard for Responsible Soy that has been accepted by 140 members from 20 countries. In 2011 certification and supply of RTRS Soy will be there. National interpretation is being executed in countries providing more than 60% of global production. In the rationale it is indicated that products must originate from an ISEAL-	

		accredited certification scheme. RTRS is an affiliate member of ISEAL. The RTRS standard was developed in conformity with all ISEAL standards, meaning that the RTRS Standard is likely to be ISEAL accredited with little additional effort.	
Principle 5			
Principle 6			
Principle 7			
General comments			

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Justine Reynolds
*Organization/Company: Sysco Corporation
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	How will third party auditors validate only approved chemicals are used at the farm level? Will actual raw material sampling be part of the audit process or will compliance strictly be based on documentation? This pertains to 1.1.5, which is still being considered by the steering committee.	
	1.1.5	Comments are made surrounding concerns that farms may not be aware of the countries that will import finished products processed from the fish they raise. A fair assumption. However, is it not reasonable to assume that the farm and the processing location should be communicating on this fact? If not, it is the processing facility and/or the exporter's burden to conduct monitoring. Should it be a goal of the standards created by the SAD to strive for this level of awareness?	
Principle 1	1.1.5	Has any thought been given to action steps in the event an importing country takes regulatory actions on finished products traced back to a certified farm and/or processing location? Will such events lead to certifications being revoked? Root cause analysis? Gaps in auditing that led to certification?	
Principle 2			

Principle 3			
Principle 4			
Principle 5	5.1.5	Should SAD consider program parameters dealing with handling / disposal of dead fish?	
		How will other farm generated waste be covered in the standard?	
	5.2.1	How will the standard address communication to processors and consumers when raw material is exposed to unapproved drugs?	
Principle 6		The proposal pertains to social accountability. How will the adequacy of the social responsibility assessment scheme and qualifications of the auditors be validated?	
Principle 7			
General comments	Page 8	What are the "other" fish welfare standards referenced?	
	Page 9	How are third party audit agencies working under the oversight of ASC accredited? Who is the accreditation authority or authorities?	

Laurie Watt

New Westminster, B.C.

September 10, 2010

World Wildlife Fund Via email:

As a concerned Canadian citizen and resident of the southern British Columbia coast I respectfully submit these general comments on the Draft Salmon Aquaculture Dialogue Standards.

Preparing draft standards for salmon farming is a futile exercise. All salmon farming should be immediately terminated to allow the natural environment to heal itself from this atrocious practice. Why? Your website provides the answer in the seven main impacts of salmon aquaculture: benthic, chemical, disease/parasites, escapes, feed, nutrient loading and social issues, any of the first six of which makes this an unsustainable industry.

I have the greatest respect for WWF, its qualified people and its successful protection of environments around the world. In my opinion, however, WWF cannot possibly accomplish its mission, the conservation of nature, in the area of salmon farming. If only the governments of Norway, Scotland, Ireland, Chile and Canada had simply followed the precautionary principle with respect to salmon farming as did the State of Alaska, all of these areas would not have suffered terrible consequences from open net-cage salmon farms.

I respectfully challenge the purpose of the Salmon Aquaculture Dialogue and its steering committee, a majority of which is salmon-farming industry representatives. I was almost sickened in reviewing the standards' scientific terminology describing all the chemicals your expert technical working groups have uncovered in their six years of hard work.

Now is the time for WWF to change direction and formally present this evidence to all the governments of the world contemplating or accommodating salmon farming in their oceans. You have compiled an incredible database of consequences of this industry which can now serve to accomplish your mission to conserve nature. Trying to somehow manage these consequences with standards is truly futile. The elephant in the room is the salmon-farming industry itself; the solution is to remove it; the way forward is government persuasion and public awareness supported by your unassailable evidence.

I and many others believe that open net-cage salmon farms are a significant cause of reduced wild stocks due to sea lice and disease transfer. More than one hundred of the farms are located in narrow channels along coastal B.C. directly in the way of wild smolt migration paths. Unfortunately Fisheries and Oceans Canada has the impossible dual responsibilities of promoting aquaculture and protecting wild salmon, and have chosen to place salmon farming ahead of wild salmon protection. That is why Canada needs WWF's redirected efforts now to convince our government to remove the salmon farms before it is too late.

A large number of Aboriginal Nations inhabit British Columbia, the vast majority having never ceded their traditional territory and virtually all having survived through thousands of winters by catching or trading for and preserving wild salmon. Today their people still practise these most important cultural activities, but since wild salmon stocks have diminished in recent years, governments have instructed those in Fraser River watersheds to reduce or even cease their annual fishing, 2010's abundant peak Fraser sockeye run notwithstanding.

Laurie Watt

Our Aboriginal Nations also depend upon shellfish harvesting for food and trade, but since the arrival of open net-cage salmon farms their clam beds have become fouled and contaminated by benthic impacts and nutrient loading. Beds cultivated over thousands of years have become unusable. Although the harvesters have displayed the most incredible patience, some of the Nations have recently commenced lawsuits against provincial and federal governments for allowing the damage to occur. I believe if our government doesn't remove open net-cage salmon farms the Aboriginal Nations will have no choice but escalation of protest because wild salmon truly is their lifeblood. Now is the time to remove the cause of this degradation – please help, not by applying standards to salmon farms but by persuading governments to remove salmon farms.

British Columbia's provincial and federal governments have stated that no credible evidence exists to support the argument of damage to wild salmon stocks from open net-cage salmon farms. Alexandra Morton, (www.raincoastresearch.org), the biologist who has worked for years in coastal B.C. to document and publicize such evidence, has published many peer-reviewed scientific papers, but our governments have chosen not to give credence to them. For this body of work she was given an honorary Doctor of Science degree by Simon Fraser University on June 16, 2010.

Some of Ms. Morton's important work has been documented by videographer Twyla Roscovich and can be viewed on Twyla's website, www.callingfromthecoast.com or YouTube; you'll see beautiful albeit heartbreaking scenes of Broughton Archipelago wild salmon smolts before and after swimming near open net-cage salmon feedlots. In the video entitled "Call From a Coast" you'll also see the ruined thousands-of-years-old clam beds, with open net-cage salmon farms nearby.

WWF and its evidence can be a significant force in persuading the Canadian government to remove open net-cage salmon farms from our coastal waters, the territory of wild nature, not the free dumping ground of innumerable chemicals and disease created by giant uncaring foreign corporations. Standards will not eliminate these things. Removal of the farms will. Please give this proposal your most serious consideration.

Attachments:

1. The first page of the Summary of Recommendations to the B.C. Legislature in the Special Committee on Sustainable Aquaculture's Final Report 2007 in which the first recommendation is transfer of open net-cages to closed containment within three years.
2. The August 30, 2010 joint submission by many environmental organizations to the Canadian General Standards Board containing discussions of reasons why open net-cage salmon farms should not be given the "organic" label.
3. A February 18, 2010 news release from the Union of B.C. Indian Chiefs discussing a hunger strike and confirming its position on wild salmon vis-a-vis fish farms.
4. An editorial by broadcaster Rafe Mair from www.thecanadian.org defending Alexandra Morton and confirming in no uncertain terms that even the Norwegian owners of more than 90% of B.C.'s open net-cage salmon farms are aware of their industry's destructive qualities as are our own governments.

SUMMARY OF RECOMMENDATIONS

Principles

All recommendations put forth by this committee take into account the 'Precautionary Principle' as we are dealing with a common public resource. The Precautionary Principle recognizes that the absence of full scientific certainty should not be used to delay actions or decisions when faced with threats of serious or irreversible harm.

Further, these recommendations are framed with the principles and vision of the New Relationship. First Nations, in whose traditional territory work is being conducted must be fully involved in decision making and provided with the capacity to do so.

1. Finfish Recommendations

1.1 A rapid, phased transition to ocean-based closed containment begin immediately. Within three years ocean-based closed containment must be developed. Once developed, industry must transition to this technology within the subsequent two years.

1.2 To meet the initial three year deadline, the provincial government, in partnership with the federal government and the salmon aquaculture industry, must urgently finance and conduct a full commercial scale ocean-based closed containment project.

1.3 The provincial government should develop and provide incentives to the aquaculture industry to facilitate the transition to ocean-based closed containment technology.

2. North and Central Coast

2.1 There be no new finfish sites approved north of Cape Caution.

2.2 The existing Klemtu sites be grandfathered subject to negotiations between First Nations of the area and Marine Harvest.

2.3 In light of the recommended time referenced transition to ocean-based closed containment, any expansion in Klemtu, as elsewhere, must utilize ocean-based closed containment technology.

3. Siting and Monitoring

Expansion and Monitoring

3.1 Once all of the existing sites have transitioned to ocean-based closed containment, the opportunity to expand to new sites with this technology can be considered with the following conditions:

3.1.1 Restoration of local governments and residents' right to approve the siting of new finfish sites.

3.1.2 Changes to the 'right to farm' legislation should be made accordingly – sections of the *Agriculture, Food and Fisheries Statutes Amendment Act,2003 S.B.C. 2003, c.49* must be repealed.

August 30, 2010

Anne Caron
Standards Division
Canadian General Standards Board
Gatineau, Quebec K1A 1G6

Dear Ms. Caron:

On behalf of the undersigned, we are submitting a comment to the Canadian General Standards Board Committee with regards to the proposed Canadian Organic Aquaculture Standard. This submission is a consensus of 43 leading organizations within the organic, conservation, and food safety communities from Canada and the United States. Together, we represent millions of voices including consumers, organic farmers, conservation organizations and scientists in major aquaculture producing and consuming regions.

The proposed organic standards for Aquatic Invertebrates (shellfish) prohibit the use of synthetic pesticides, prohibit the destruction of aquatic organisms or aquatic organism habitat, and prohibit direct dispersal of waste into the environment. The proposed standards for Aquatic Animal Production, which includes the farming of carnivorous finfish in open net pen systems, allow these practices and violate the spirit and intent of the organic law (CAN/CGSB-32.310-2006). In addition, the proposed Canadian draft sets a significantly lower bar for environmental and consumer standards than the recommendations for organic aquaculture standards passed by the US National Organic Standards Board in 2008.

The practice of farming carnivorous finfish in net pens inherently contradicts organic principles and we, the undersigned, oppose organic certification of this type of production for the following reasons:

Antibiotics
The draft Canadian organic aquaculture standard prohibits the use of antibiotics for invertebrates, but 6.5.8 and 6.5.9 allow the use of antibiotics in the production of farmed fish sold as organic. No other organic meat on the market may be sold as organic if antibiotics are used. The allowance of antibiotics in farmed fish would undermine the integrity of the organic label and, therefore, threaten the integrity and viability of other organic meat markets.

Synthetic parasiticides
The draft Canadian organic aquaculture standard 6.10.7.4.8 prohibits the use of pesticides for invertebrates, but 6.5.11 allows the routine use of synthetic parasiticides, such as emamectin benzoate–a registered pesticide, to combat sea lice infestation on fish farms. Current organic livestock standards only allow synthetic parasiticides as a last resort after mechanical or cultural methods to control parasites have failed. Farmed fish produced in closed containment facilities have demonstrated synthetic parasiticides are not needed when cultural methods allow pathogen-free water sources to be used. Synthetic parasiticides are only necessary in net pen systems because of the inability to provide pathogen-free water and should therefore be prohibited in organic standards as other cultural methods that avoid chemical use exist.

Allowance for Use of Non-Organic Feed
The draft Canadian organic aquaculture standards call for all feed to be derived from organic or sustainable sources “unless not commercially available”, in which case up to 30% of feed can come from non-organic, unsustainable sources. These standards directly contradict current organic livestock standards, which require 100% organic feed to be used. In addition,

there is no upper limit for the inclusion of fish meal or oil (derived from wild fish) in feed. This allows higher trophic species such as salmon and tuna to be farmed under organic certification even though farming these species requires much more wild fish to be consumed in feed than farmed fish produced. The losses of marine protein are substantial—research shows farmed salmon can use 5 times more wild fish in feed than salmon produced. The resulting net-loss of marine protein and loss in associated biological productivity in already strained marine ecosystems directly contradicts the General Principles of Organic Production.

Toxins
The allowance of wild fish (which are not produced under an organic system) in feed introduces a source of toxins with significant human health effects including PCBs, heavy metals, and dioxins. There are no measures to determine the level of toxins and pollutants that may be contained in farmed fish derived from wild fish in their feed or exposure to toxins in ocean net pens where effluent from other industries may be present.

Environmental degradation
The General Principles of Organic Production call for the protection of the environment from degradation, erosion and pollution. The standards for Aquaculture Animal Production lack any standards to address these issues despite the large body of scientific evidence linking net pen production of farmed salmon to wild salmon declines, the spread of disease and sea lice, escapes, and pollution that degrades the marine environment. Net pen practices cannot control flows of waste and disease or the escapes of farmed fish. The deleterious effect of these impacts on the marine ecosystem make net pens incompatible with the principles of organics, therefore this production system should not be included in an organic standard.

Inconsistent standards for waste and impacts on marine life
The aquatic invertebrate standards 6.10.7.4.6 and 6.10.8.2 prohibit the destruction of aquatic organisms or their habitat and require the collection and proper disposal of all wastes. Standard 6.1.4 which applies to open net fish farms only requires 'sediment' build-up to be 'minimized'. The proposed standard for net pens ignores the loss of local biodiversity in areas around salmon farms that result from waste build up and omits requirements for waste recapture that are possible in fish production. Organic standards should require recapture of farm waste to meet basic organic principles for “decreased pollution and recycling of materials and resources within the enterprise.”

Aquaculture practices most compatible with organic not prioritized
The draft Canadian organic aquaculture standard for Aquatic Animal Production does not acknowledge that alternative feeds and specific production systems can successfully reduce toxins in feed, avoid the use of chemical treatments and antibiotics, and control waste and disease. An organic aquaculture standard should only allow aquaculture practices with a high level of environmental performance that do not depend on chemical treatments.

Components of the proposed, draft organic aquaculture standard violates the underlying principles of organic production as set out by existing standards. A standard that allows conventional aquaculture practices such as the use of antibiotics, chemicals, uncontrolled disposal of waste, and non-organic feed to be certified as organic threatens the integrity of the organic label and negates others’ efforts to produce truly organic products.

Consumer polling completed in the United States in 2008 by Consumer Reports National Research Centre reflects consumer expectations of what an organic label on farmed fish should mean:

• 93% of consumers polled agree that fish labeled organic should be produced from 100% organic feed like all other organic food animals.

• 90% of consumers polled agree that organic fish farms should be required to recover all waste so they can't pollute the environment.

• 57% of consumers polled are concerned about ocean pollution caused by fish farms advertised as organic.

This joint submission reinforces the broad opposition to proposed regulatory provisions that would allow organic aquaculture production to use non-organic, wild fish as feed, enable the input of antibiotics and other chemicals, and allow open net pen systems.

The undersigned are in support of the development of organic aquaculture standards (specifically for invertebrates and herbivorous species) when grown in systems where inputs, outputs, health and animal welfare can be monitored and controlled. If a Canadian organic aquaculture standard is developed, it must reflect practices that address the well-researched impacts of aquaculture as well as uphold the integrity of the organic label. Such a standard would support producers that are using innovative practices to deliver truly sustainable products.

We urge the Canadian General Standards Board to ensure that the Canadian Organic Aquaculture standard does not accommodate the use of non-organic wild fish as feed, nor open net pen systems. It is our hope that the organic label will continue to provide consumers with a clear and consistent understanding of how their food is produced and ensure them that their choice of an organic food product supports a safer, more humane, more sustainable environment.

Sincerely,

The Undersigned

Jennifer Lash
Executive Director
Living Oceans Society

David Lane
Executive Director
T. Buck Suzuki Environmental Foundation

John Werring
Salmon Conservation Biologist
David Suzuki Foundation

Ruby Berry
Salmon Aquaculture Program Coordinator
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Pacific Coast Wild Salmon Society

Phil Rogers
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Penticton Flyfishers
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BC Federation of Fly Fishers

Neville Gosling
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Celia Brauer
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False Creek Watershed Society

Anne Mosness
Co-Producer Blue Festival
Go Wild Campaign

Jack Cooley
Co-Chair
Squamish Sea to Sky Corridor Streamkeepers

Sara Steil
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Pender Islands Trust Protection Society

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Vice-President
Steelhead Society of BC
Sea-Run Fly and Tackle

Randy Burke
Director
Bluewater Adventures

Michelle Nickerson
Fraser River Ripple Effect Relay and Fundraiser Society

Tria Donaldson
Pacific Coast Campaigner
Wilderness Committee

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OUR LAND IS OUR FUTURE
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NEWS RELEASE

February 18, 2010

Wild Salmon is Our Lifeblood

(Coast Salish Territory/Vancouver, February 18, 2010) Grand Chief Stewart Phillip, President of the Union of British Columbia Indian Chiefs stated today "The UBCIC has long-held the opinion that salmon fish farms has proven to have had a lethal and irreversibly toxic impact on indigenous runs of wild salmon. Especially where there is a concentration of fish farms in waters used by juvenile salmon exposed to the high concentrations of sea-lice from these fish farms."

Earlier this week, the UBCIC Executive joined 45 people who participated in the 29 hour fast supporting the Musgamagw Tsawataineuk Tribal Council's (MTTC) opposition to fish farm tenures in the Broughton Archipelago.

"I am very pleased that many of the fast participants were from Indigenous communities and I was happy to see many supporters from the general public including a couple who participated from their home in Haugesund, Norway" said Chief Bob Chamberlin, Chairman of the MTTC. "92 per cent of fish farms on the BC coast are owned by Norwegian companies Marine Harvest, Cermaq and Greig Seafood including all of the fish farms in the Broughton Archipelago, the heart of our territories. The fish farms operating in our territories are killing wild salmon, the lifeblood of all life that reside in our territories and the lifeblood of our culture."

On September 13, 2007, 143 state members of the United Nations General Assembly, voted to adopt the United Nations Declaration on the Rights of Indigenous Peoples, as recommended by the UN Human Rights Council.

"Norway voted to adopt the Declaration on the Rights of Indigenous Peoples. It was an historical vote and to Indigenous Peoples it is regarded as a solemn commitment to universal human rights," said Assembly of First Nations National Chief Shawn A-in-chut Atleo. "Companies headquartered in countries who voted to adopt the Declaration, such as Norway, should apply the standards of the Declaration in all of their relationships with Indigenous Peoples domestically and internationally."

Grand Chief Phillip concluded “The UBCIC will continue to fully support any and all Indigenous communities who choose to pursue all available steps to ensure that their rights are recognized, respected and protected at the local, regional, national and international levels.”

This Saturday, the UBCIC will join the Wild Salmon Circle to rally for wild salmon, featuring Otto Langer, Chief Bob Chamberlin, and Don Staniford of the global Pure Salmon Campaign. The rally is at Vanier Park at 1:00 PM on February 20. For more information go to: http://www.wildsalmoncircle.com/

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Media inquires:
Grand Chief Stewart Phillip, Union of BC Indian Chiefs
Phone: (250) 490-5314

Chief Bob Chamberlin, Musgamagw Tsawataineuk Tribal Council
Phone: (778) 988-9282

WHAT DOES ALEXANDRA MORTON HAVE TO DO TO PROVE HER CASE AGAINST FISH FARMS?

By Rafe Mair
March 2, 2010

The plain fact is that Alexandra Morton shouldn't have to prove a damned thing. By international law we're bound by the Precautionary Principle, meaning that those who would invade the environment must demonstrate beyond a reasonable doubt that they can do so safely. To put it bluntly, industry has done absolutely nothing to meet the onus of the Precautionary Principle.

All the fish farmers have proved is that they've contributed to Campbell's party and all the Campbell government has proved is that they got the message loud and clear. The Campbell government, when it comes to the environment, doesn't give a damn what it does or says as long as the money's there.

Since Alex blew the whistle nearly a decade ago every independent fisheries scientist has confirmed that sea lice from fish farms were wiping out migrating wild salmon smolts. Every peer reviewed paper confirms Alex's findings all of which were also peer reviewed.

Campbell Knew All Along

Campbell, who makes Pinocchio a minor leaguer, has consistently alleged that he has science on his side yet is unable to produce a single independent report to support him.

"Knew all along" - a tough charge?

Not a bit. Because, you see, BC wasn't the first place to have their wild salmon savagely destroyed by lice from fish farms. When I met with Irish scientists under the eminent Dr. Patrick Gargan a few years ago in Galway, one of them looked at me at said, and these were his words which I won't mince: "Can't ye fucking well read out there in Canada? Don't you know what happened in Norway ... Scotland ... here in Ireland? Can't ye fucking read?"

We can, but Gordon Campbell won't.

The federal government was also warned in 1991. Norwegian MP John Lilletun came to Canada to tell us that Norwegian salmon farmers were coming here to get away from higher environmental standards they faced back home. Clearly, the warning fell on deaf ears.

The Former Norwegian Attorney General Speaks Out

Many of us could read and spoke out again and again based upon this evidence. Now we can hear from Georg Fredrik Rieber-Mohn, a Norwegian judge who, as Attorney-General drew up important environmental protection guidelines for Norwegian fish farms. Here's what he recently said - and I advise Campbell and his toadies to cover their eyes.

During his remarks he alluded to the pending hockey game between Canada and Norway and said this:

In 1999, I was proud to present the so-called "wild salmon plan" which proposed national protection for the 50 best salmon rivers and the 9 most important fjord-systems across Norway - the national laksfjords - where salmon farms would be prohibited. However, intense lobbying from the salmon farming industry watered down the proposals so that by the time they passed the parliament in 2007 the protected fjords had become smaller and gave less protection against the salmon farming industry.

The result has been a heavy defeat for wild salmon and a huge win for sea lice. Scientific research published by the Norwegian Institute of Nature Research indicates that the areas protected from open net cage salmon farms are simply too small to offer adequate protection from sea lice. *(emphasis mine)*

Scientists in Norway detail growing sea lice resistance to the chemicals designed to kill them. The Norwegian Food and Safety Authority recently reported nearly 100 cases of chemical treatment failures as sea lice are now immune. ***So serious is the situation that the Directorate of Nature Management - the Norwegian Government's conservation adviser - has called for drastic reductions in farmed salmon production and slaughter of farm stock to reduce the sea lice burden.*** *(emphasis mine)*

*Put simply, we had an open goal to save wild salmon but we missed the target. Now we are dealing with the consequences of poor defending. Atlantic salmon in the wild in Norway are now threatened with extinction in many rivers in Norway. There are many causes to this decline, but in vast areas the farming of salmon is the main factor. Escaped farmed salmon is a huge problem added to the problem of uncontrolled growth of sea lice. Scientists foresee remarkable damaging effects in new areas in the future. [****EDITOR'S NOTE*** *- in BC escapees indeed are occupying spawning redds but, thankfully, they do not interbreed with wild salmon].*

In Norway we are underdogs to save wild Atlantic salmon - like in today's hockey game - but nature is resilient and wild salmon can make a comeback if given a fair chance. ***The lessons to be learned from Norway are painfully clear but the solution is an easy one.***

If you want to protect wild salmon then you have to move salmon farms away from migration routes. *(emphasis mine) Juvenile wild salmon have to run the gauntlet past salmon farms on their way out to sea and scientific reports show that they are decimated by sea lice - with reports of up to 90% mortality in some regions.*

Even the owner of Marine Harvest - the world's largest salmon farming company and #1 in both Norway and in British Columbia - agrees that we must move the farms. When he was fishing on the River Alta - one of Norway's most majestic wild salmon rivers - in 2007 John Fredriksen made a plea as a passionate angler to relocate open net cages to save wild salmon. *(emphasis mine)*

Last year, I was honoured to meet with sea lice scientist Alexandra Morton in Oslo. I listened with a sense of deja vu as she outlined how Norwegian companies - who control over 90% of BC's salmon farms - are spreading sea lice to wild salmon. I watched Canadian filmmaker Damien Gillis's film "Dear Norway - Help Us Save Wild Salmon" and I was struck by a strong sense of solidarity and eerie familiarity. *(my pride in the work done by my colleagues merited my emphasis)*

Yet there is still hope for wild salmon in both Norway and Canada. With the world watching there is a growing sense of public awareness globally and a passion to save wild salmon.

In the name of God, won't Campbell and federal fisheries minister Gail Shea not listen now?

Where has the Media Been?

When you look back at the last near decade you see that both governments had the means to know as much then as they do now. Alex Morton, with only a few in support, painstakingly re-invented the wheel so that Gordon Campbell, who then had sole control of the issue, would see the facts, do his duty and get rid of the fish farms. In 2002 I presented to him, at his request, a paper laying out the scientific evidence of the catastrophe visited upon wild migrating salmon by lice from fish farms. I didn't even get the courtesy of a reply. Many of "the few," and Alex herself, are finally being recognized by the public but why has it taken so long?

The answer is simple: the media, for that read Canwest, has simply refused to cover this issue. It's not the fault of the many fine people who write for these poor excuses for newspapers. They understand as we in fairness should too, that there's no point in writing that which won't be published. Many of them have slipped little bits of information but this is scarcely "holding the government's feet to the fire!" No, I of all people make no criticism of the journalists for like them I too have had to grovel before these bastards.

The paltry 3-4 pages in the *Globe and Mail*'s BC Section give better coverage of BC matters than the combined rubbish that comes out of the *Sun* and the *Province*.

This Mess Ought Never to have Started

This mess ought never have started. While the NDP government first licensed these contaminators they had the sense to re-evaluate their decision and place a moratorium on further expansion. I believe they should have banished them but at least they recognized that the "precautionary principle" ought to have been applied and wasn't.

When Campbell took office he knew the facts. He also knew who donated to his party; and he couldn't care less about our wild salmon just as he doesn't give a damn about our rivers. Corporate donors meant everything; idiots like Alexandra Morton and her supporters mustn't be permitted to interfere with unbridled capitalism as preached by the ultra right wing Fraser Institute, a former "Fellow" of which is a senior editor at the *Vancouver Sun*.

Campbell has been untruthful (I prefer a stronger term but my lawyer doesn't) about BC Rail and spouts untruths through his teeth about his energy program which has our great power company, BC Hydro forced to pay double what it's worth to private companies for power it can't use and must therefore export at a huge loss.

Alexandra Morton is going to win her fight, for which for those who care for our salmon, is our fight too - a battle to save the very soul of our province.

The Media in this province ought to have seen this issue for what it so clearly was from the outset and pursued Campbell with the same vigour they quite properly pursued Glen Clark over the "fast ferries." Canwest dislikes the NDP so covers for Campbell - as simple as that.

Heroes and Villains

We in BC have an industry, two governments and a media we should be thoroughly ashamed of.

On the other hand, we have a gallant lady who came from California to watch whales and stayed to make the saving of our wild salmon a sacred task and getting nothing but abuse for her efforts from industry, government and media.

Alexandra Morton deserves the undying affection and deepest gratitude of us all.

Comment form for Draft Salmon Aquaculture Dialogue Standards

Public Comment Period 1: August 3, 2010 to October 3, 2010

Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Tatiana de Carvalho
*Organization/Company: WWF-Brasil
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4	4.4.1 Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with recognized crop moratoriums24 and local laws25 25 Specifically,	The Soya Moratorium is the commitment of soya traders (members of Abiove and Anec) not to trade soy produced in areas deforested after July 24th 2006 in the Amazon Biome. It does not mean that the soy does not come from the Amazon Biome. This is an important agreement, but only refers to Brazil. So in addition to it, we recommend that the **Aquaculture Dialogue Standards** demands RTRS (Round Table on Responsible Soy) soy for the composition of its feed in the countries	Presence and evidence of a responsible sourcing policy for the feed manufacturer for feed ingredients which comply with RTRS (Round Table on Responsible Soy) standard or other equivalent standard that prohibits forest conversion and protects high conservation value areas.

	the policy shall include that vegetable ingredients, or products derived from vegetable ingredients, must not come from the Amazon Biome as geographically defined by the Brazilian Soya Moratorium. Should the Brazilian Soy Moratorium be lifted, this specific requirement shall be reconsidered.	where the national interpretation was formally accepted. The RTRS has developed global standards for the responsible soy production through a multi stakeholder approach. The standards include, amongst others, the no conversion of forests and the protection of high conservation areas. www.responsiblesoy.org/ The RTRS Soy is expected to be in the market from February 2011 on. Auditors are being trained and accreditation of the certifiers will start this month. The traceability, supply chain and certification system are 99% ready.	
Principle 5			
Principle 6			
Principle 7			
General comments			

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Email the completed comment form to salmonaquaculture@wwfus.org by 11:59 p.m. EDT October 3, 2010.

*Name: Primary contacts: Jose Villalon, Karoline Andaur, Piers Hart, Ricardo Bosshard, Mariann Breu
*Organization/Company: WWF Network offices (including but not limited to US, Scotland, Norway, and Chile)
*E-mail address:

Note: Information with an asterisk is required, as all comments will be posted with attribution (commenter's name and organization/company) on the salmon Dialogue website. This is in line with the Dialogue's policy of being transparent. The commenter's e-mail address will not be posted but is required in case we need to contact you for clarification on a comment.

COMMENTS ON STANDARDS FOR GROW-OUT

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1	1.1.5	There is a need to clarify and ensure the auditability of this standard. As written, the scope of this standard is extremely broad.	Consider addressing the reason for inclusion of this standard through a different type of standard under the disease management or therapeutic inputs component of the standard.
	1.1.1 – 1.1.4	These are appropriate key issue areas where it is important to ensure farms are compliant with laws prior to being considered for certification.	In 1.1.1, change the term "authorities" to "regulations and requirements". This edit clarifies the indicator.
	1.1	WWF recognizes the complexity of the crossing-cutting principle which states "obey the law" with respect to international law. International law is enforceable on a domestic level when a sovereign state is not only a signatory party to a treaty or convention, but, has additionally ratified the said treaty or convention via a recognized and legitimate domestic political process. While we hope that sovereign states are signatories to relevant environmental and	Remove "and international" from the criterion

		social treaties and conventions, and ratify these treaties and conventions on a domestic level, this aspiration is beyond the scope and control of the Aquaculture Dialogues. For the purposes of the Aquaculture Dialogues, focus should be confined to applicable national, regional and local laws where the farm is located. However, as a conservation organization, we do feel it is both proper and within the realm of the Aquaculture Dialogues to cite relevant international treaties and conventions where applicable as a component of specific standards. For instance, an example would be a reference to the Ramsar treaty when addressing wetlands impacts or ILO principles with respect to social impacts.	
Principle 2	2.1	- Standards 2.1.1 – 2.1.3 are applicable for farm sites with soft-bottoms only. Hard-bottom sites should also be evaluated for benthic health. - WWF agrees with the inclusion of standards for both chemical and faunal measurements of benthic health. - We support AMBI as the best method for measuring benthic faunal health.	- The SC should consult with experts to solicit recommendations for benthic standards related to hard-bottom sites. - Methodology related to sampling outside of the AZE (in 2.1.1 and 2.1.2) should take into account currents in determining appropriate location for sampling.
	2.2	Agree that it is important for both operational and environmental reasons to monitor oxygen levels. Questions have been raised as to whether there are production sites where oxygen is regularly added to the water column and the environmental implications of this practice.	- Consider the addition of a standard related to the extent to which sites can add oxygen at the farm site. -
	2.2.1	WWF wants to ensure that the level of this standard is appropriate for ecological health and fish health (due to link of water quality to health of salmon and required treatments,	- Refine the methodology for measuring 2.2.1 with information related to depth and position in relation to the cage of oxygen readings.

		disease transfer, etc). From an environmental and fish health perspective, it is not clear that it is better to use a percent saturation rather than straight dissolved oxygen level under the standard. Regardless of which is used, WWF supports strengthening this standard. Back-of-the-envelope calculations tell us that at 60% saturation, in seawater with salinity of 30 ppt, DO falls below 5 mg/l at temperatures higher than 15 degree C. DO at or below 5 mg/l is not what we would consider to be ecologically good. A stronger standard here will promote both better environmental health and better farmed fish health.	- Consult additional water quality experts to determine whether 70% or 80% is an appropriate level for the standard globally, and the best way to structure the standard to allow for periodic exceptions to this. One option to consider would be to have more than 90% of the samples taken over the course of a year be above 80% saturation. This would allow for some weeks of lower DO.
	2.2.2		Consult additional water quality experts and consider raising the 1.85 mg/l to be higher as one expert suggested that less than 2 mg/l can lead to death in many fish species.
	2.3.1		Clarify how often this test is required on-farm. Consider a combination of proof of testing of fines from the feed manufacturer with periodic testing at the farm site.
	2.4	As a conservation organization, WWF supports the inclusion of strong standards related to the interaction of farms with critical or sensitive habitats and species. More rigorous standards related to performance, not just documentation, about siting and sensitive/critical species and habitats is needed. We recommend consultation with ecosystem-based coastal zone management experts as a first step in further developing these standards	• Include additional standards related to siting and interaction with habitats and species. • Include some language around High Conservation Value Areas in the standard. Although this scientific methodology is not yet commonly applied in marine areas, as it is increasingly done standards related to siting can and should be adapted to take this into account. • In order to determine how to most optimally focus additional standards, it must be discussed what types of species and habitats are of most concern to protect under this criteria.
	2.4.1	The requirement, under 2.4.1, to document	• Recommend clarifying within the SAD and

		potential impacts and mitigation or minimization plans is an important first step which WWF supports. Under this standard, how do we deal with differences in opinion between what impacts are being had and definition of “sensitive” or “protected” habitats and species?	with SAD SC what impacts this standards is trying to protect against. Once this is better understood, definitions should be added to this standard to further clarify it.
	2.5	WWF supports the use of technologies that do not harm marine mammals and predators to deter them from farms. Given the exception provided in the draft for entanglement, it should be clarified that in cases of entanglement a farm should be able to demonstrate that netting is set up (net mesh size, mooring, etc) that is aimed at avoiding entanglement. WWF also would like to encourage further development of ADDs that are not harmful to wild species.	Suggest working with experts to rewrite standard in a way that will allow for use of ADDs that are being designed to not harm cetaceans through different wavelengths, etc. This could be built in as an exception in a footnote, though there would need to be a burden of proof on the producer to demonstrate that the ADD is not harmful.
	2.6	Although the primary intention of the SAD standards is to address performance of a particular farm, WWF supports the inclusion of standards that are more geared towards addressing cumulative impacts. As written, we have concerns about how a sentinel species standard would be implemented. For example, Who picks the species? How do you know that the species is absent due to impacts of salmon farms vs climate change or anything else? The EU definition of Good Environmental Status for aquatic environments, which WWF can provide to the Steering Committee, may serve as a useful reference for this issue.	The SAD SC should consider whether it will be more effective to ensure that the cumulative impacts that we care about are addressed through the rest of the standard, rather than attempt to develop an overarching cumulative impact standards. In particular, this can be done through strengthening standards under 2.4 and standards related to cumulative impact of therapeutant use.
Principle 3	3.1	WWF strongly supports the overarching approach of requiring area-based	

		management under the standard, including the component of demonstrated commitment to collaborative research. Ultimately, this type of research is needed to continue to better understand and prevent or mitigate negative impacts of salmon production.	
	3.1.1	WWF supports the requirement for area-based management in combination with immediate on-farm actions and performance levels.	In Appendix II in the ABM scheme, fallowing should be a mandatory requirement and fallow length needs to be long enough to break the sea lice cycle. Similarly, ABM areas should be large enough to take into account the dispersal area of sea lice mobile stages.
	3.1.3		Under 3.1.3, we suggest adding into the short list of potential research priorities a reference to regional analysis and definition of high conservation value areas.
	3.1.4	The intent of this standard is somewhat unclear. If this is an attempt to address cumulative impact, it might be best to consider changing this to be a maximum cumulative infection pressure risk. By setting this standard as an average by farm, the issue of density of farms or intensity of production is not being addressed.	
	3.1.7	The levels proposed here (0.5 mature lice per fish or 3 total sea lice is Norwegian law during sensitive outmigration times). In Norway, it has become clear that this level alone is not sufficient to protect wild salmon stocks. From a conservation perspective, it is the total lice load in a region that is the issue, not necessarily a per-farm load. General Norwegian law is that at certain times of the year, can have 0.5 mature	• Continue to consult with experts regarding an appropriate on-farm lice level to be held under this standard. • Combine a standard such as this one with standards that will help to minimize total load of sea lice (e.g. on-farm density, density of farms in a regions)

		female lice between Jan 1 and August 31, for the rest of the year it is no more than 1 mature female lice. BUT since there are resistance problems cropping up, they have a new regulation requiring synchronized treatment in the spring of 0.1 lice per fish… so there are three different levels are different times of year, with the lowest at the most sensitive time for wild salmon (which varies every year). The Norwegian regulations are focused on protection of wild salmon, not sea trout. WWF concerned.	
	3.3		• For clarification purposes, edit indicator to read "production or use of transgenic…". • For clarification purposes, edit last sentence of footnote 15 to read "sterile or all female fish that were developed using non-transgenic technologies are not included under this definition and are allowable for use under the standard.
	3.2.1	Some of the terms within 3.2.1 need to be more clearly defined. Under bullet A) --- WWF needs to see clarification of "or impact" in this standard. This definition should be linked to the impact that relates specifically due to it being a non-native species. We also note that impact is being addressed to some degree within the stringent escapes standards. Questions have been raised about whether use of probiotics poses a risk in terms of introduction of exotic bacteria, which could have poorly understood effects.	• We recommend looking at the FTAD standard 2.3.1 for definitions of "widely used", "evidence", and "establishment". There is also a need to define the term "locally" • We recommend looking into whether probiotics pose a risk in terms of introduction of exotic bacteria and to adjust the standard accordingly. • We recommend the SAD take a closer look at options A and B to ensure that the two aren't contradictory.
	3.4.1	As written, this can be misinterpreted. It	

		needs to be clear that "other known causes" excludes escapes.	
Principle 4		As a conservation organization, our top priority here is to ensure the health of the marine environment including the wild fish populations. WWF seeks that feed fisheries operate in a sustainable manner, leaving target species in abundance and with limited impact on the ecosystem.WWF promotes fisheries improvement plans to achieve functioning ecosystem management of all feed fisheries. The two key issues are overfishing of target stocks and ecosystem effects of removing large quantities of fish. WWF would like to use the SAD standard as a means to encourage forage fisheries to move quickly to review their fisheries management schemes, improve them as needed, and apply for ISEAL-accredited certification, which at this point in time for wild fisheries is only MSC certification. Although we support the use of other certification schemes for reasons of traceability and as a stepping stone towards MSC, we do not feel that other existing schemes are currently sufficient to ensure that the stock is ecologically sustainable. MSC has been undertaking a review of their standards as they can be applied to forage fisheries, and are editing the standard to better take into account the ecosystem role of these fisheries. WWF supports the continuous improvement of these standards, which is one of the reasons that we support the ISEAL process. Therefore, the SAD feed standards should act as a rapid driver towards MSC as well as a driver towards alternatives to fish meal	

		and oil in the longer term. WWF supports the continued development of alternatives to FM and FO, such as microalgal supplements that provide DHA and EPA without reliance on wild fish populations, which will face increasing pressure as demand from a range of sources increases.	
	4.4.2	WWF supports the inclusion of the standard to require documentation and disclosure of GM (transgenic) ingredients in feed. We believe it is critically important that this stays in the final standard. This is important so that it will be possible to have product that meets these standards and that is also GMO free for certain markets.	
	4.7.2	4.7 in general: Encourage a move away in the future from copper-based antifoulants, encourage development of new technologies, etc.	Clarify effluent treatment --- can't treat away copper per se, but treatment and proper disposal of contaminated waste.
	4.3	WWF is aware that there is an ongoing effort to encourage alignment across the Dialogue standards on feed standards, and we strongly support these efforts to develop alignment	
	4.3.1	Edits need to be made to clarify intent here, which is that both FM and FO come from a certified fishery. The word "or" in the first line of the indicator can be misinterpreted	Change the word "or" to "and" in the first line of the indicator.
	4.3.2	Given the relationship between FishSource scores and the MSC scoring system, WWF recognizes that a FishSource score of 8 or above in all categories is what is needed to ensure these conditions are met. This is consistent with standard 5.3.1 requiring certification, within a defined number of	

		years, for fishmeal and fish oil used in feeds under the standard. In the interim, we are willing to negotiate a FishSource score in standard 5.3.2 that is consistent with a "conditional" certification under MSC and will push for improvement within those fisheries. Such a compromise can only be made because it is an interim measure rather than a long term goal.	
	4.3.4	WWF supports the maximum use of fishmeal and fish oil from trimmings and by-products. Simultaneously, we support the inclusion of this standard to ensure that trimmings from threatened populations are not used, and support the addition of a clarification that trimmings from any IUU catch are not used in salmon feeds under the standard.	Add to this mention of no trimmings from IUU
	4.4	WWF supports adding some mention of RTRS to the SAD standards now that the RTRS standard is available. WWF recommends that we evaluate when and at what volumes that product will be available, that this purchasing of certified soy be built into the SAD standard in a manner similar to the ISEAL compliant certification of fisheries.	
	4.7		Suggest removing standards 4.7.1, .3, and .4 – and not allowing use of copper-based antifoulants
	4.7.3		
Principle 5	5.1.2	Do we need to add in some detail about what should be done on these site visits? Need to more clearly define fish health professional.	
	5.1.5	For auditability and environmental reasons, there is a need to clarify disposal to be "proper" disposal, which will need to be	

		better defined.	
	5.2.2	The use, and potential impact to the marine environment, of chemicals and therapeutants in salmon production is an important issue for WWF. The current move back to sea lice chemicals that had been phased out, and which can have serious environmental impacts, is of particular concern. It is important that chemicals and therapeutants used are measured in the environment. Alternately, the SAD could set maximum allowable use of key chemicals and therapeutants to address the same issue.	
	5.3	Not all methods of treatment are the same in terms of environmental impact.	Add a new standard under 5.3 or a requirement to the area management plan for treatment of sea lice in a manner that is known to prevent release of those chemicals into the broader environment. (E.g., in a closed bag or other technology to prevent release of chemicals into the environment (no skirt with open bottom)).
	5.4.4	We support standard 5.4.4 as written, prohibiting the use of antibiotics that are critically important for human health at operations certified against the SAD standard.	
	5.5.3	We support a standard requiring that 100% of fish being transferred to slaughter are in a closed wellboat or one with discharge treatment and disinfection. We also recommend developing standards related to cases where slaughter happens at the site.	
Principle 6		WWF recognizes that there is some overlap between standards under Principle 6 and the law in many countries. (e.g., no forced or bonded labor). Some concern has been expressed to WWF by other stakeholders that the inclusion of some of the standards	

		under Principle 6 somehow imply that producers are breaking these laws. We don't believe that is implied in the standard, and that it is important to include the basic ILO principles in the SAD standards even for issues that have not been flagged as being a problem in salmon farming.	
General comments		The standards in the first draft for public comment cover the main topics that WWF is interested in addressing through quantitative performance standards. The fundamental issues we want to see addressed in the standards are all there, though some areas need significant work. Generally it is moving in the right direction, and we encourage staying focused on key impacts and issues. We also support the highlighting of areas where we would like to see improvement in the future, as well as specific areas where we see a particular need for consideration when the standards are revised 3-5 years after their release. WWF encourages the use of Integrated multi-trophic approaches to minimising some of the environmental impacts of salmon farming. We would support an effort to find a way to encourage such systems within the SAD standard. AZE is a concept used in several standards across the document. WWF recommends considering a more flexible definition of AZE that can be altered if detailed modeling has been undertaken to identify the AZE. More generally, we wonder if it is possible to integrate a standard related to water flow, depth and suggest looking to organic standards for their minimum water flows	

		and depth requirements.	

COMMENTS ON STANDARDS FOR SMOLT PRODUCTION

Principle	**Criteria/Indicator /Standard (e.g., 2.1.2)**	**Comment(s)**	**Proposed solution or amendment**
Principle 1			
Principle 2			
Principle 3			
Principle 4			
Principle 5			
Principle 6			
Principle 7			
General comments		Freshwater ecosystems and species around the world are under increasing threat from a wide range of impacts, including those associated with aquaculture. Ultimately, WWF would like to see all open smolt production systems phased out from the industry, not just producers who are meeting these standards. A recent report commissioned by WWF Chile (available on the website) concludes that moving from open, net pen, smolt production systems to recirculating smolt production systems has both environmental, sanitary, social and economic benefits. Additionally, the	

		analysis showed that such a transition can be economically viable, as is also demonstrated by the success of existing recirculating smolt systems. Under this standard, which is intended to highlight better environmental performance among salmon producers, WWF believes it is important require a shift to these closed systems, or equal environmental performance. Such a standard is consistent with a rigorous interpretation of the EU Water Framework Directive and with Norwegian regulation which states that permission to operate shall not be granted if the facility is to be operated in a freshwater location based on sea-cages (see regulation relating to allocation, establishment, operation, and disease-prevention measures at fish hatcheries for salmonids and other freshwater fish, Section 4 on conditions for permission). As an active SC member, WWF will work to help ensure that appropriate experts are consulted prior to the release of the second draft of the standards in order for that draft to contain a robust set of standards for smolt production.	