



Recomendations for a Revised Indicator 3.1.7 to the ASC Salmon Standard

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CONSULTATION DOCUMENT

Recommendation for a Revised ('Sea Lice') Indicator 3.1.7 to the ASC Salmon Standard

March 2021

Table of Contents

BACKGROUND	3
RATIONALES	4
A. LICE SPECIES/LIFE STAGE/GENDER FOR WHICH TO SET A METRIC	4
<i>Recommendation for a revised indicator</i>	<i>4</i>
B. REQUIREMENTS FOR NON-SENSITIVE PERIODS	5
<i>Recommendation for a revised indicator</i>	<i>6</i>
C. REQUIREMENTS ON SAMPLING PROTOCOLS	6
<i>Recommendation for a revised indicator</i>	<i>7</i>
D. REGIONAL APPROACHES TO THE INDICATOR (DURING THE SENSITIVE PERIOD)	8
<i>Setting a regionally relevant lice level</i>	<i>9</i>
APPENDIX 1 - TECHNICAL NOTE: LICE SPECIES FOR WHICH TO SET A METRIC	10
REVISED INDICATOR RECOMMENDATIONS.....	10

Background

Indicator 3.1.7 of the ASC Salmon Standard (v 1.3) deals with “maximum on-farm lice levels during sensitive periods for wild salmonids”. With the support of a Technical Working Group composed of a (core) Technical Group (TG) and a (wider) Technical Consultation Group (TCG), ASC is reviewing and revising this indicator ensuring that it is set at an accurate level and reflects best practice within the global salmon industry. The scope of the revision includes four specific aspects:

- A. Lice species/life stage/gender for which to set a metric.
- B. Requirements for non-sensitive periods.
- C. Requirements on sea lice sampling protocols.
- D. Regional approaches for setting on-farm sea lice levels.

To date, recommendations for a revised indicator were developed for aspects A, B and C above. On the final aspect D, several core elements of a recommended approach have been identified, though the work is still under development. ASC wants to seek stakeholder feedback on the recommendations for aspects A, B and C and the recommended approach for aspect D, through public consultation. The assessment of this feedback will support the development of the final revised sea lice indicator.

The following section details the rationale behind the recommended revisions, followed by a technical note and a summary of recommendations in Table 1.

Rationales

A. Lice species/life stage/gender for which to set a metric

Indicator 3.1.7 sets a maximum mature female lice (*Lepeophtheirus salmonis*) level per fish. In practice, country/region-specific requirements on maximum lice levels differ according to local circumstances and ecosystems and are set for either the number of adult female lice or the number of mobile adult lice. In its implementation of the Salmon Standard to date, ASC has deferred to these local circumstances in three regions (British Columbia - Canada, the Faroe Islands, and Norway) by allowing Variance Requests¹.

Within its deliberation, the TG explored the justification for focusing on other species besides *Lepeophtheirus salmonis* and determined that *Caligus clemensi* in British Columbia (BC), Canada, merits attention, since it shows up significantly on wild fish, including juvenile wild salmonids. The TG wanted to understand better the interplay between wild and farmed fish.

Data and research reviewed show that in some years and/or for certain areas of BC, the generalist *C. clemensi* has higher abundances in wild fish and farmed salmon than *L. salmonis*, suggesting differences in host specificity and transmission dynamics between the two sea lice species. The transmission dynamics of *C. clemensi* among farmed salmon and wild fish, including wild juvenile salmon, are not well documented (**Appendix 1 - Technical Note: Lice species for which to set a metric**).

This situation in BC is unique, given the specific concerns around out-migrating wild salmonids. The TG did not believe that a similar focus on *Caligus* species in other regions with wild salmonids would improve management decisions related to the farms' impact on wild fish. In BC, however, a revised recommended indicator requiring farms in BC to report *C. clemensi* would generate a stream of data that is comparable and provide insight for farm management. The data generated by the revised recommended Indicator will provide the basis for future revisions of the Indicator aiming to decide whether lice management strategies should further consider *C. clemensi*.

Recommendation for a revised indicator

- 1) To include a requirement to publicly report *Caligus* on farms in British Columbia, BC, Canada within 7 days of sampling.

Notes:

- The TG concluded that setting a limit for on-farm *C. clemensi* levels in BC would not align with the suggested approach to regional lice levels described in aspect D below. In addition, the TG did not find sufficient scientific research to determine a specific on-farm *C. clemensi* level in BC.
- Regarding the issue of which life stage/gender of lice, see the suggested regional approach in aspect D below.

¹ A Variance Request is a request to adapt an ASC indicator/performance level to a unique local circumstance that the ASC Standard(s), being global, were not able to, for whatever reason, foresee during the Standard Setting Process. See [VR 88](#), [VR 141](#), [VR 227](#) and [VR 279](#).

B. Requirements for non-sensitive periods

Indicator 3.1.7 of the ASC Salmon Standard (v 1.3) requires farms located in areas of wild salmonids to comply with a maximum on-farm sea lice during the sensitive periods for wild salmonids². The Standard does not include lice level requirements outside of that sensitive period.

The TG acknowledged that most jurisdictions have maximum sea lice levels for sensitive and non-sensitive periods and that the length of the defined sensitive period varies. The TG identified three reasons to have limits during non-sensitive periods:

- 1) Presence of sea trout, that stay near shore;
- 2) Avoiding uncontrollable sea lice outbreaks; and
- 3) Preparing for sensitive periods.

The TG acknowledged that a balance needed to be found between seeking lower lice levels year-round and avoiding to create resistance through repeated and more frequent treatments. A recently published research paper³ showed that, in Norway, an increase in sea lice tolerance coincided with an increasing use of medicines in the period 2000–2015, while sensitivity slowly increased as the use of medicines decreased in subsequent years.

Because of concerns around resistance (also addressed in a separate set of requirements in the ASC Salmon Standard⁴), the TG was reluctant to recommend setting requirements for managing sea lice during non-sensitive periods. In the context of the issues of avoiding uncontrollable sea lice outbreaks and preparing for sensitive periods, the TG viewed these decisions as mainly farm-management decisions that had little connection to wild salmonids.

The presence of sea trout would be the one potentially compelling reason to develop year-round requirements regarding lice levels. The TG heard concerns about sea trout from consulted stakeholder members of the TCG, in particular concerns about the adequacy of regulations in some of the jurisdictions. After careful consideration, TG members concluded that they were not inclined to make a special non-sensitive period requirement for all jurisdictions given the varying lengths of the existing sensitive period, and that some jurisdictions will likely be updating their regulations in the coming years, which ASC will be tracking (and adopting as per regional recommendations on aspect D below).

Setting non-sensitive period requirements present a trade-off between being protective of sea trout's year-round lice exposure, versus incentivising additional treatments on farmed fish and the associated risks of developing resistance or other negative effects. In weighing this balance, the TG recognised that value judgements, in addition to technical analysis, come into play. Given all these variables, the TG concluded to defer to local regulators to set locally relevant requirements that would be protective of sea trout during non-sensitive periods.

² Sensitive periods for migrating salmonids is during juvenile outmigration and approximately one month before.

³ [Myhre Jensen E, Horsberg TE, Sevatdal S, Helgesen KO \(2020\). Trends in de-lousing of Norwegian farmed salmon from 2000–2019— Consumption of medicines, salmon louse resistance and non-medicinal control methods. PLoS ONE 15\(10\): e0240894.](#)

⁴ **Indicator 5.3.1** Bio-assay analysis to determine resistance when two applications of a treatment have not produced the expected effect.

Indicator 5.3.2 When bio-assay tests determine resistance is forming, use of an alternative, permitted treatment, or an immediate harvest of all fish on the site.

Indicator 5.3.3 Specific rotation, providing that the farm has >1 effective medicinal treatment product available, every third treatment must belong to a different family of drugs.

Recommendation for a revised indicator

- 1) To maintain the indicator's focus on sensitive periods.

C. Requirements on sampling protocols

Indicator 3.1.4 of the ASC Salmon Standard (v 1.3) requires weekly on-farm testing for sea lice during and immediately prior to sensitive periods for wild salmonids. Testing must be at least monthly during the rest of the year⁵.

The TG acknowledged that all jurisdictions have specific requirements on sea lice sampling set by regulators (on the frequency and the protocol to follow) and that these vary across regions according to the period (sensitive or non-sensitive period), water temperature, and the number of cages and fish to be sampled.

In this context, the TG examined the sampling protocols that provided the best statistical results and agreed that creating a minimum informative sampling protocol requirement would address the challenges identified within the revision (i.e., lack of consistency when comparing lice levels between farms and regions and when evaluating the effectiveness of sea lice management strategies).

From a statistical standpoint, the TG discussed that it is better to have a procedure that samples “few fish from many cages” as this approach result in a marked improvement in precision when sampling aquatic one-host parasites in cage-based production systems⁶. In addition, the TG agreed that fish welfare should be a consideration when setting sampling protocol requirements.

The key components of the recommended requirement on sampling protocols are (1) frequency, (2) number of cages, and (3) number of fish per cage. The TG also recommended that (4) under certain circumstances detrimental to the fish health and welfare, farms should be exempt on the requirement of sampling, under the direction of the responsible fish health professional.

- (1) Frequency: a weekly sampling frequency during the sensitive period supports on-farm decision-making and provides time to react if the sea lice population is rising. Immediately prior to the sensitive period, a farm needs to demonstrate it is entering the sensitive period below its maximum established sea lice limit.
- (2) Number of cages and number of fish per cage: There is variation in the size and design of farms. Therefore, sampling a proportion of cages, rather than a set number of cages, would take into consideration this variation. The TG believed that sampling at least 50% of cages over a 2-week period seemed reasonable and would give farms a window into the state of individual cages, particularly if a treatment intervention could be applied to one or a number of cages and not to the whole farm. At least 10 fish per cage should be sampled. The TG saw this recommended protocol as supplementary to current local regulations and not in contradiction to them.

⁵ 'Testing' includes both counting and identifying sea lice. The method must follow national or international norms, follows accepted minimum sample size, use random sampling, and record the species and life-stage of the sea lice.

⁶ [Review CW, Hollinger E, Gettinby G, Lees F, Heuch PA \(2007\). Clustering of parasites within cages on Scottish and Norwegian salmon farms: Alternative sampling strategies illustrated using simulation. Preventive Veterinary Medicine 81 \(2007\) 135–147](#)

The TG recognised that under certain circumstances, such as harmful environmental conditions and recently stocked fish, sampling can jeopardise farmed fish health and welfare. The professional responsible for the health and welfare of the farmed fish is best suited to make decisions on whether to sample under those circumstances.

Recommendation for a revised indicator

1) Frequency:

- a. Maintain the current weekly sampling requirement during the sensitive period.
- b. Remove reference to having to conduct weekly sampling immediately prior to sensitive periods (footnote 43 of the Salmon Standard¹) and further revise to read: “Farms shall ensure that the lice levels are below the maximum sea lice limit at the time of the first sampling event within the sensitive period.”

2) Number of cages: At least 50% of cages should be sampled over a 2-week period.

3) Number of fish per cage: A minimum of 10 fish per cage should be sampled.

4) Fish welfare (exemption from sampling): The veterinarian or fish health professional can exempt fish from being sampled during a certain period of time within the sensitive period, if local regulations permit. The reason for the exemption shall be documented. Grounds for exception may include:

- Immediately after smolting and stocking.
- Fish health – undergoing a disease event and/or being treated (including treatment for sea lice). In case the reason for the exemption is related to fish treatment, the maximum duration for the exception shall be 2 weeks.
- During specific environmental events – water temperature, low oxygen, plankton event.

Note on the applicability of this recommendation: The sampling requirements apply only to farms in jurisdictions with wild salmonids, as per the scope (for areas with presence of wild salmonids) of the recommended revised indicator.

D. Regional approaches to the indicator (during the sensitive period)

The TG acknowledged clear rationale for setting sea lice limits on a regional scale. Regional variability result from environmental and biological differences across jurisdictions, including the differences in wild salmonid species, lice species and sub-species, host profiles, water temperatures, as well as the wide diversity around the length set for sensitive periods and the complexity of interactions occurring in various different regional ecosystems.

Area-Based Management (ABM) Scheme – Salmon Standard, Appendix II-1. Attributes and required components of the ABM:

The TG recognised that setting lice limits on an ABM scale would be more aligned with the science behind wild fish interactions than the existing requirements on setting sea lice limits at an individual farm scale. To address this aspect, the TG reviewed the current requirements on ABM in the Salmon Standard (v 1.3):

- **Indicator 3.1.1** requires participation in an ABM scheme for managing disease and resistance to treatments that include coordination of stocking, fallowing, therapeutic treatments and information-sharing. Appendix II-1 of the Standard establishes the attributes and required components of the ABM.
- **Indicator 3.1.3** requires the establishment and annual review of a maximum sea lice load for the entire ABM and for the individual farms. Appendix II-2 establishes the requirements for setting and revising ABM lice loads and on-farm lice levels⁷.
- **Indicator 3.1.6** requires, in areas of wild salmonids, monitoring of sea lice levels on wild out-migrating salmon juveniles or on coastal sea trout or Arctic char, with results made publicly available.

According to Appendix II-2 (of the ASC Salmon Standard v 1.3), for farms located in areas with wild salmonids, the ABM scheme shall demonstrate how the scheme is using the results of wild monitoring required by Indicator 3.1.6, to review and potentially revise the maximum lice load for the area each year and/or production cycle. Adjustments to the area's lice load would lead to corresponding limits on lice levels on individual farms. This feedback loop must be transparent and document how the ABM scheme is being protective of wild fish through the interpretation of wild monitoring data. If wild monitoring reveals that the on-farm sea lice limits are not being protective for wild populations, the farm must set a lower level in subsequent sensitive periods.

TG recommends clarifying the “feedback loop” that needs to happen after the ABM scheme assess the results of wild monitoring required by Indicator 3.1.6:

- Outcomes of the review would include a final recommendation and justification for maintaining or adjusting maximum sea lice loads in an ABM scheme. The goal is that an actual review is done by the participants of the ABM scheme, and a recommendation made based on all available information.

⁷ According to Appendix II-2, an ABM scheme shall initially set this total load figure based on the regulatory obligations of the jurisdiction in which it operates and the results of any wild monitoring done to date. In practice, this would mean that farms in most ABM schemes would take the on-farm lice levels they are required to achieve by regulators, and multiply them times the number of farmed fish in the area. This would be a starting place.

- Documentation of this review will be standardised, transparent, and it would include attendees, minutes, recommendations, actions and justification.

Setting a regionally relevant lice level

The TG acknowledged that the rationale for setting the current level of 0.1 mature female lice in Indicator 3.1.7 followed a precautionary approach on keeping lice levels near zero during the sensitive period. When first established, the 0.1 limit did not have a scientific justification to support that specific level. In addition, TG members noted that counting accuracy at such a low level is a serious challenge.

In practice, ASC has not implemented the 0.1 lice limit globally as farms in three jurisdictions have applied for, and received, variance requests to comply with their local regulatory requirements (see footnote 1 above).

The TG also noted that there is no globally agreed “silver bullet” level for precautionary lice levels on farms, nor is there a globally relevant length for sensitive periods. As the TG strived to develop a revision to the current approach in 3.1.7, it settled on three guiding ideas:

- 1) Local regulators are better positioned than ASC to set, and adapt over time, the precise sea lice trigger levels as well as which gender/life stage to monitor and the length of the sensitive period.
- 2) ASC needs an indicator that will be more protective and rigorous than simply “comply with the law” and that continues to require transparency and public reporting of on-farm sea lice levels.
- 3) ASC needs an approach that reduces the need for Variance Requests.

Based on these guiding ideas, **the TG is recommending a revision that includes the following elements:**

- Rely on local regulators to define trigger levels and sensitive periods.
 - In situations where there are no jurisdictional regulations to enforce, ASC will require the use of regulatory triggers and sensitive periods of the most similar jurisdiction based on the environment and species present.
 - In situations where significant concerns may be raised about the fitness of local regulations to address wild salmonids, ASC should use the lowest trigger level available in those jurisdiction’s sensitive period. For instance, for Scotland - where the TG anticipates regulatory changes based on the findings of the [Salmon Interactions Working Group 2020 Report](#) - this would be 0.5 adult female lice.
 - ASC should annually review trigger levels in the different jurisdictions and update its guidance to auditors accordingly.
- Be more protective than local regulators by having a farm become non-conforming with ASC if it surpasses that trigger level. Local regulators would typically require some kind of management response at the trigger (notification, treatment, or other management action).
- The non-conformity described above would be “major”, and certain conditions could constitute a “critical” non-conformity, that will result in immediate suspension of the farm’s ASC certificate.

The TG plans to ask itself some threshold questions around the regulatory process in each jurisdiction with wild salmonids, to test the TG’s own comfort level with the quality of the regulatory process. The questions would focus on how well data, research, and public input create a real impact on the outcomes of regulatory processes and in achieving its protection goal. The level of transparency around the information provided by regulators will also be reviewed. If concerns emerge in this review, the TG would recommend additional requirements for farms in that jurisdiction.

Appendix 1 - Technical Note: Lice species for which to set a metric

Reviewed published data⁸ from sea lice monitoring on wild fish and farmed salmon during sensitive periods from different areas of British Columbia, CAN, and for different years show that for some years and in some areas, the presence of *C. clemensi* on wild and farmed fish is higher than *L. salmonis*. Other research⁹ on wild fish monitoring reviewed showed similar results and suggested differences in host specialisation and transmission dynamics between louse species. The research concluded that: 1) while salmon farms may well be a source of *C. clemensi* for juvenile Pacific salmon, they are unlikely to be the only source or even the dominant source given their generalist nature and, 2) because both lice infest farmed salmon, but only *C. clemensi* infests Pacific herring (*Clupea pallasii*), conservation science and management regarding sea lice should further consider *C. clemensi* and transmission from farmed salmon and wild fish. Furthermore, research¹⁰ that specifically looked at the Gulf Islands area within the Strait of Georgia, an area with no active fish farms, found high levels of sea lice generally exceeding a prevalence of 60% on all species of juvenile Pacific salmon and on juvenile Pacific herring and that virtually all sea lice were *C. clemensi*, indicating that this is a naturally occurring epizootic of sea lice and demonstrating the generalist nature of this sea lice species.

Revised Indicator Recommendations - Summary

The following Table presents the recommendations for aspects A, B and C and the core elements of the recommended approach for aspect D. The [public consultation survey](#) provides questions specific to these recommendations.

⁸<https://www.cermaq.com/wps/wcm/connect/cermaq-ca/cermaq-canada/Our+Sustainable+Choice/research-and-innovation/>

<https://www.griegseafaoodcanada.com/our-environment/wild-salmon/>

<https://open.canada.ca/data/en/dataset/3cafbe89-c98b-4b44-88f1-594e8d28838d>

⁹ Brookson CB, Krkošek M, Hunt Brian PV, Johnson BT, Rogers LA, Godwin SC. (2020). Canadian Journal of Fisheries and Aquatic Sciences Volume 77, Number 12, December 2020.

¹⁰ Beamish R, Wade J, Pennell W, Gordon E, Jones S, Neville C, Lange K, Sweeting R (2009). A large, natural infection of sea lice on juvenile Pacific salmon in the Gulf Islands area of British Columbia, Canada. Aquaculture 297 (2009) 31–37.

ASC Salmon Standard Sea Lice Indicator 3.1.7 Review - March 2021

Table 1. Summary of recommendations for a revised indicator for aspects A, B and C and core elements of the recommended regional approach for aspect D.

Aspects	Recommendation(s) for a revised indicator	Notes	Question for Public Consultation
A. Lice species/life stage/gender for which to set a metric	1) Besides <i>Lepeophtheirus salmonis</i> , to include a requirement to publicly report <i>Caligus</i> on farms in British Columbia (BC), Canada, within 7 days of sampling.	<ul style="list-style-type: none"> Setting a limit for on-farm <i>Caligus clemensi</i> levels in BC would not align with the suggested approach to setting regional on-farm lice levels described in aspect D below. In addition, within the revision, the TG did not find sufficient scientific research to determine a specific on-farm <i>Caligus clemensi</i> level in BC. Regarding the issue of which life stage/gender of lice, see the suggested regional approach in aspect D below. 	
B. Requirements for non-sensitive periods	1) To maintain the indicator's focus on sensitive periods.	None	<i>Do you have additional information or scientific references that ASC can review to support or refine this recommendation?</i>
C. Requirements on sea lice sampling protocols	1) <u>Frequency</u> : a. Maintain the current weekly sampling requirement during the sensitive period. b. Remove reference to having to conduct weekly sampling immediately prior to sensitive periods (footnote 43 of the Salmon Standard) and further revise to read: "Farms shall ensure that the lice levels are below the maximum sea lice limit at the time of the first sampling event within the sensitive period." 2) <u>Number of cages</u> : At least 50% of cages should be sampled over a 2-week period. 3) <u>Number of fish per cage</u> : A minimum of 10 fish per cage should be sampled. 4) <u>Fish welfare (exemption from sampling)</u> : The veterinarian or fish health professional can exempt fish from being sampled during a certain period of time within the sensitive period, if local regulations permit. The reason for the exemption shall be documented. Grounds for exception may include: <ul style="list-style-type: none"> Immediately after smolting and stocking. Fish health – undergoing a disease event and/or being treated (including treatment for sea lice). In case the reason for the exemption is related to fish treatment, the maximum duration for the exception shall be 2 weeks. 	<ul style="list-style-type: none"> The sampling requirements applies only to farms in jurisdictions with wild salmonids, as per the scope (for areas with presence of wild salmonids) of the recommended revised indicator. 	<i>Do you have additional information or scientific references that ASC can review to support or refine this recommendation?</i>

	<ul style="list-style-type: none"> • During specific environmental events – water temperature, low oxygen, plankton event 		
<p>D. Regional approaches for setting on-farm sea lice levels (during the sensitive period)</p>	<p>On Area-Based Management (ABM) Scheme – Salmon Standard, Appendix II-1. Attributes and required components of the ABM:</p> <p>1) To clarify the “feedback loop” that needs to happen after the ABM scheme assess the results of wild monitoring required by Indicator 3.1.6:</p> <ul style="list-style-type: none"> • Outcomes of the review shall include a final recommendation and justification for maintaining or adjusting maximum sea lice loads in an ABM. The goal is that an actual review is done, and a recommendation made based on all available information. • Documentation of this review will be standardised, transparent, and it shall include attendees, minutes, recommendations, actions and justification. <p>On setting a regionally relevant lice level:</p> <p>The TG is recommending a revision that includes the following elements:</p> <p>1) Rely on local regulators to define trigger levels and sensitive periods.</p> <ul style="list-style-type: none"> • In situations where there are no jurisdictional regulations to enforce, ASC will require the use of regulatory triggers and sensitive periods of the most similar jurisdiction based on the environment and species present. • In situations where more than one trigger level exist, ASC should use the lowest trigger level available in the jurisdiction’s sensitive period (i.e. Scotland). • ASC should annually review trigger levels in the different jurisdictions and update its guidance to producers and auditors accordingly. <p>2) Be more protective than local regulators by having a farm become non-conforming with ASC if it surpasses that trigger level. Local regulators would typically require some kind of management response at the trigger (notification, treatment, or other management action).</p> <ul style="list-style-type: none"> • The non-conformity described above would be “major”, and certain conditions could constitute a “critical” non-conformity, that will result in immediate suspension of the farm’s ASC certificate. <p>3) The TG plans to ask itself some threshold questions around the regulatory process in each jurisdiction with wild salmonids, to test the TG’s own comfort level with the quality of the regulatory process. The questions would focus on how well data, research, and public input create a real impact on the outcomes of regulatory processes and in achieving its protection goal. The level of transparency around the information provided by regulators will also be reviewed. If concerns emerge in this review, the ASC would design additional requirements for farms in that jurisdiction.</p>	<p>These are not a final recommendation but identified core elements of a recommended approach. Work is still under development. A second consultation round will be used to solicit feedback on the detailed proposal.</p>	<p><i>What suggestions do you have to improve the general outlines of this approach, which seeks to solve the challenge of regionally relevant maximum lice levels?</i></p>

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