

# ASC Farm Standard: Criterion 2.7 – Water Quality

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Aquaculture Stewardship Council  
[www.asc-aqua.org](http://www.asc-aqua.org)



Seabream, Croatia



# Timeline



# Background information: Current issues

ASC's species-specific Standards contain requirements on Water Quality (WQ). However, they:

- Vary considerably in language and approach - even when the standards cover similar production systems
- Focus predominantly on individual farm sites, without considering impacts of other farms that may operate on the same water bodies → lack of an *Area-based Approach*

Due to the above-mentioned issues, ASC decided to revise the WQ requirements as part of the ASC Farm Standard development. The objective for Criterion 2.7 is to define indicators that collectively address impacts on water quality in all major production systems sited in or discharging into all different water types.

The revision is carried out with support from an expert [Technical Working Group \(TWG\)](#).

# Stakeholder consultation: Objective

## Criterion 2.7

The Public Consultation of March-April 2022 resulted in a “recommended approach” for Criterion 2.7 about WQ. The TWG has now developed a proposal for indicators requirements for Criterion 2.7.

ASC seeks to gather stakeholders' comments, information and perspectives regarding the proposal for Criterion 2.7:

- Indicators and their sequence
- Metrics
- Clarity (criterion and annexes)
- Implementation
- Auditability

# Water quality proposal

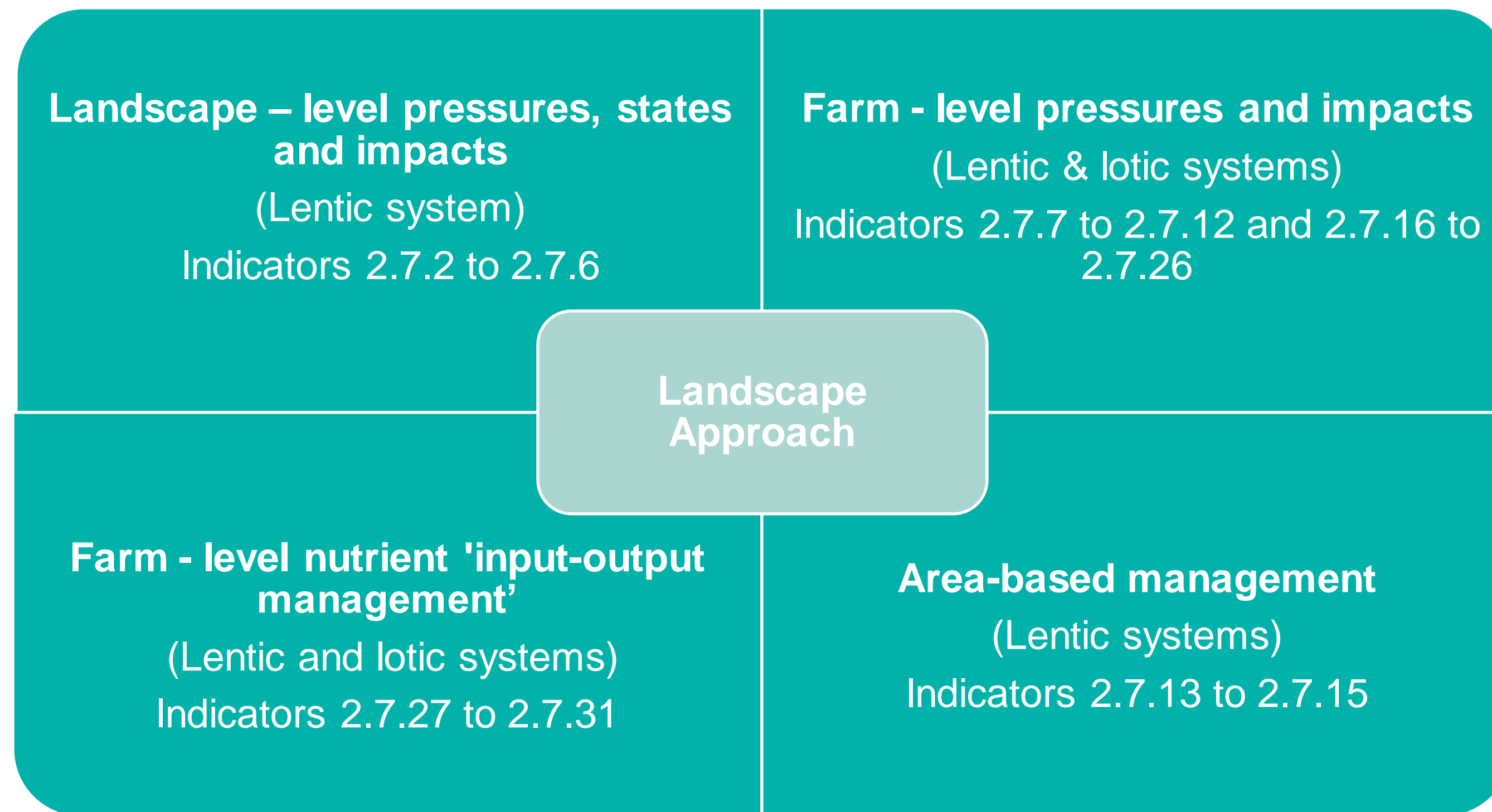
- Indicators within the proposal have been developed to identify:
  - The nutrient retention capacity of the receiving waterbody (categorisation: lentic/lotic)
  - The susceptibility of at-risk water bodies to additional nutrient inputs (risk-based approach)

LENTIC	LOTIC
Still/slower flowing water (Hydraulic Retention Time >5 days)	Faster flowing water (Hydraulic Retention Time ≤5 days)

Where relevant, additional **assimilative capacity assessment** and **coordinated area management actions** are required to reduce the rate of change in the trophic status and prevent eutrophication of a waterbody

# Water quality proposal

- The TWG developed the proposals in four sub-criteria to consider both the farm and landscape scale of impacts and their management.



# Indicators and relevant questions



# General question

The water quality proposal uses innovative approaches to address previous issues in ASC standard, specifically by:

- Separating the requirements by lentic and lotic systems;
- Creating responsive feedback loops (as opposed to separate siloed indicators) as well as indicators that seek to identify risks before a negative impact happens;
- Creating meaningful landscape level measures;
- Focusing on the rate of change as well as specific limits.

***Are you aware of any evidence and practical examples that would help farms to implement these approaches successfully?***



# Landscape level pressures, states, and impacts

## Indicators 2.2.2-2.7.6 (lentic systems)

**Objective:** To address cumulative sectoral aquaculture eutrophication pressures and impacts based on the trophic status and assimilative capacity of lentic water bodies with higher nutrient retention characteristics

Elements (Lentic)	Remarks
Identification of a waterbody Unit of Management (WUM) (2.7.2)	Coherent characteristics in terms of natural processes and land use
Initial baseline survey characterising the WUM (2.7.3)	SD, chl-a, limiting nutrients, trophic status, DO, T <sup>o</sup> depth profile, zone of anoxia and history
Demonstration that there are no upward transition of trophic status compared with the initial WUM baseline survey (2.7.4)	Limiting nutrient(s), SD and chl-a
Demonstration that there is not an upward rate of change of limiting nutrients nor chl-a of > 30% compared with the previous 24-month WUM monitoring survey (2.7.5)	Limiting nutrient(s) and chl-a
Identification of whether the zone of oxygen depletion or anoxia indicates a decrease in depth of > 10% compared with the previous 24-month WUM monitoring survey (2.7.6)	DO

# Landscape level pressures, states, and impacts

## Indicator 2.7.1

The UoC shall identify the receiving water (RW) body as lentic (e.g., lake or reservoir) or lotic (e.g., flowing river); for those with a mean current velocity of  $<0.1$  m/sec, the UoC shall demonstrate that the hydraulic residence time of the RW is  $<5$  days in order to classify as lotic, following the method outlined in Annex 1.

Q: The indicator requires farms to categorise the receiving waters according to their nutrient retention capacity based on hydraulic residence time, differentiating between still/slower flowing ('lentic') and faster flowing ('lotic') systems with the aim of focusing on the susceptibility of at-risk water bodies to additional nutrient inputs. In that context, do you agree that categorising receiving waters according to their nutrient retention capacity based on hydraulic residence time (lentic/lotic) is adequate for addressing potential water quality impacts from aquaculture on those receiving waters?

If you disagree / strongly disagree, please indicate why:

*Question target: Producers, Academia*



# Landscape level pressures, states, and impacts

## Indicator 2.7.2

The UoC shall identify a Waterbody Unit of Management (WUM), with coherent characteristics in terms of natural processes and land use, using the methodology outlined in Annex 2; unless the RW is determined a hydrodynamically isolated embayment (HIE) (Annex 2), in which case the WUM equates to the entire HIE by default.

Q: Do you perceive any challenges with identifying the Waterbody Unit of Management (WUM) as required by the indicator?

If yes, why?

*Question target: Producers, CABs*

# Landscape level pressures, states, and impacts

## Indicator 2.7.3

The UoC shall present a 24-month initial baseline survey characterising its WUM, using the methodology outlined in Annex 3, for the following:

- secchi disk (SD), chl-a levels and limiting nutrient(s): N-, P- or co-limited (Annexes 3.2 & 3.3 & 4.1)
- trophic status based on limiting nutrient(s) and chl-a: hyper-eutrophic, eutrophic, mesotrophic, oligotrophic, or ultra-oligotrophic (Annex 3.2)
- DO and temperature depth profiles, including the depth of the zone of oxygen depletion i.e.,  $DO \leq 4\text{mg/l}$  and anoxia i.e.,  $DO \leq 2\text{mg/l}$  (Annex 3.2)
- history of adverse turnover events over the last 10 years (Annex 3.4)

Q: Do you perceive any challenges with collecting the initial baseline survey data requested by the indicator requirement during the 24 months period?

If yes, why?

*Question target: Producers, CABs*



# Landscape level pressures, states, and impacts

## Indicator 2.7.4

At the WUM-level, the UoC shall annually demonstrate, through quarterly monitoring of the limiting nutrient(s), SD and chl-a over the past 24 months, using the methodology outlined in Annex 4.2, that there is no upward transition of trophic status compared with the initial WUM baseline survey characterisation (2.7.3).

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed 24 months period to be considered when assessing trophic status shift?

*Question target: Producers, Academia, NGOs*

# Landscape level pressures, states, and impacts

## Indicator 2.7.5

At the WUM-level, the UoC shall annually demonstrate, through quarterly monitoring of TN, TP and chl-a over the past 24 months (Annex 4.3), that neither the limiting nutrient(s) nor chl-a indicates an upward rate of change of > 30% compared with the previous 24-month WUM monitoring survey.

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage limit of the rate of change of TN, TP and chl-a (> 30% ) imposed by the indicator requirement?

*Question target: Producers, Academia*



# Landscape level pressures, states, and impacts

## Indicator 2.7.6

At the WUM-level, the UoC shall annually identify, through quarterly monitoring of DO over the past 24 months (Annex 4.4), whether the zone of oxygen depletion or anoxia indicates a decrease in depth of  $> 10\%$  compared with the previous 24-month WUM monitoring survey.

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage of the decrease in depth of the zone of oxygen depletion or anoxia ( $> 10\%$ ) referred to by the indicator requirement?

*Question target: Producers, Academia*

# Farm-level pressures and impacts

## Indicators 2.7.7-2.7.12 (lentic and lotic systems)

**Objective:** To address more localised eutrophication pressures and impacts at farm-level in lentic and lotic water bodies

Elements (Lentic)	Remarks
Demonstration that there are no upward transition of trophic status compared with the initial WUM baseline survey characterization (2.7.7)	Limiting nutrients and chl-a
Demonstration that there is not an upward rate of change of limiting nutrients nor chl-a of > 30% compared with the previous 24-month WUM monitoring survey (2.7.8)	Limiting nutrients and chl-a
Identification of whether the zone of oxygen depletion or anoxia indicates a decrease in depth of > 25% compared with the previous 24-month WUM monitoring survey (2.7.9)	DO
Demonstration of weekly average of daily DO saturation is $\geq 65\%$ in freshwater and $\geq 70\%$ in seawater (2.7.10)	Diffuse effluent release only
Demonstration that $\leq 5\%$ of the weekly averages of daily DO concentrations are $< 2\text{mg/l}$ (2.7.11)	Diffuse effluent release only
Maintenance of open culture systems in water that is at least twice the cage depth or where the bottom of the cage is $\geq 10\text{m}$ above the waterbody bed, whichever is less (2.7.12)	Cages only



# Farm-level pressures and impacts

## Indicator 2.7.8

At the farm level, the UoC shall annually demonstrate, through quarterly monitoring of TN, TP and chl-a over the past 24 months (Annex 4.3), that neither the limiting nutrient(s) nor chl-a indicates a rate of change of > 30% compared with the previous 24 month farm-level monitoring survey.

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage limit of the rate of change of TN, TP and chl-a (> 30%) imposed by the indicator requirement?

*Question target: Producers, Academia*

# Farm-level pressures and impacts

## Indicator 2.7.9

At the farm level, the UoC shall annually identify, through monthly monitoring of DO immediately downstream of the farm over the past 24 months (Annex 4.4), whether the zone of oxygen depletion or anoxia indicates a decrease in depth of > 25% compared with the previous 24-month farm-level monitoring survey.

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage of the decrease in depth of the zone of oxygen depletion or anoxia (> 25%) referred to by the indicator requirement?

*Question target: Producers, Academia*

# Farm-level pressures and impacts

## Indicator 2.7.10

Indicator scope: diffuse effluent release only

The UoC shall demonstrate, through daily monitoring of DO concentration and saturation on farm, using the methodology outlined in Annex 3, that the weekly average of daily DO saturation is  $\geq 65\%$  in freshwater and  $\geq 70\%$  in seawater.

Q: Do you agree with the weekly average percentage of daily DO saturation in freshwater ( $\geq 65\%$ ) and seawater ( $\geq 70\%$ ) imposed by the indicator requirement?

If you disagree / strongly disagree, please indicate why:

*Question target: Producers, Academia*



# Farm-level pressures and impacts

## Indicator 2.7.12

Indicator scope: cages

The UoC shall maintain open culture systems in water that is at least twice the cage depth or where the bottom of the cage is  $\geq 10\text{m}$  above the waterbody bed, whichever is less.

Q: Do you perceive any challenges with implementing this indicator requirement?

If yes, why?

*Question target: Producers*

# Farm-level pressures and impacts

## Indicators 2.7.16-2.7.27 (lentic and lotic systems)

Elements (Lotic)	Remarks
Estimation of the percentage "farm effluent volumetric flow rate (Q)" contribution to the receiving water (2.7.16 -2.7.17)	Point source effluent release only
Estimation of RW Q, TN, TP and TSS at RWFI and RWFE, if the percentage "farm effluent Q" contribution to the "RW Q" estimated in 2.7.17 is > 10%, (2.7.18)	Point source effluent release only
Demonstration that TN, TP or TSS measured over the previous 12 months indicates <25% increase between concentrations measured at RWFI and concentrations modelled at RWFA (2.7.19)	Point source effluent release only
Demonstration that TN, TP or TSS measured over the previous 12 months indicates <25% increase between concentrations measured immediately upstream and downstream of the farm (2.7.20)	Diffuse effluent release only
Demonstration that the weekly average of daily DO saturation at RWFE is $\geq 65\%$ in freshwater and $\geq 70\%$ in seawater (2.7.21)	Point source effluent release only
Demonstration that the weekly average of daily DO saturation is $\geq 65\%$ in freshwater and $\geq 70\%$ in seawater (2.7.22)	Diffuse effluent release only
Demonstration that $\leq 5\%$ of the weekly averages of daily DO concentrations are <2mg/l (2.7.23-2.7.24)	Point source and diffuse effluent release
Demonstration that daily diurnal DO (DDDO) fluctuation is $\leq 65\%$ (2.7.25)	Point source effluent release only
Maintenance of open culture systems in water that is at least twice the cage depth (2.7.26)	Cages only

# Farm-level pressures and impacts

## Indicator 2.7.19

Indicator scope: point source effluent release only

If TN, TP and TSS monitoring is required under 2.7.18, the UoC shall annually demonstrate that TN, TP or TSS measured over the previous 12 months indicates <25% increase between concentrations measured at RWFI and concentrations modelled at RWFA (Annex 7.3).

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage limit of increase of TN, TP and TSS (<25%) between concentrations measured at RWFI and concentrations modelled at RWFA imposed by the indicator requirement?

*Question target: Producers, Academia*



# Farm-level pressures and impacts

## Indicator 2.7.20

Indicator scope: diffuse effluent release only

The UoC shall annually demonstrate that TN, TP or TSS measured over the previous 12 months indicates <25% increase between concentrations measured immediately upstream (Annex 7.2) and modelled immediately downstream of the farm (Annex 7.3), unless the RW flow rate is > 1000m<sup>3</sup>/s or TSS load is >20mg/l at low flow (Annex 7.1).

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage limit of increase of TN, TP or TSS (<25%) between concentrations measured immediately upstream and immediately downstream of the farm?

*Question target: Producers, Academia*

# Farm-level pressures and impacts

## Indicator 2.7.21

Indicator scope: point source effluent release only

The UoC shall demonstrate, through daily monitoring of DO concentration and saturation at RWFE, using the methodology outlined in Annex 3.2, that the weekly average of daily DO saturation is  $\geq 65\%$  in freshwater and  $\geq 70\%$  in seawater.

Q: Do you agree with the weekly average percentage of daily DO saturation in freshwater ( $\geq 65\%$ ) and seawater ( $\geq 70\%$ ) imposed by the indicator requirement?

If you disagree / strongly disagree, please indicate why.

*Question target: Producers, Academia*

# Farm-level pressures and impacts

## Indicator 2.7.26

Indicator scope: cages

The UoC shall maintain open culture systems in water that is at least twice the cage depth.

Q: Do you perceive any challenges with implementing this indicator requirement?

If yes, why?

*Question target: Producers*



# Farm-level nutrient 'input-output management'

## Indicators 2.7.27-2.7.31 (lentic and lotic systems)

Elements (Lentic & Lotic)	Remarks
Not releasing or disposing nutrients containing materials e.g., sludge and sediments to public waterways, wetlands or other natural ecosystems (2.7.27)	Point source effluent release only
Assurance that feed fed contains < 1% fines (2.7.28)	Current requirement
Adherence to species-specific limits on annual TN and TP load per ton of production (2.7.29)	Current species specific limits
Assurance that all water released goes through a treatment system, and concentrations of settleable solids in effluent water is <3.3ml/L (2.7.30)	Point source effluent release only
Assurance that all water released goes through a treatment system, capturing ≥65% of suspended solids originating from feed or fertiliser used (2.7.31)	Point source effluent release only

# Farm-level nutrient 'input-output management'

## Indicator 2.7.28

The UoC shall ensure feed fed contains <1% fines, using the methodology outlined in Annex 8.

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed percentage of allowed fines in the feed?

*Question target: Producers, Academia, NGOs, CABs*

# Farm-level nutrient 'input-output management'

## Indicator 2.7.29

The UoC shall adhere to species-specific limits on annual TN and TP load per ton of production (Annexes 9.1 & 9.2).

Q: Do you have any information or scientific references that ASC can review to support or refine the proposed species-specific limits on annual TN and TP load per ton of production imposed by the indicator requirement?

*Question target: Producers, Academia, NGOs, CABs*



# Farm-level nutrient 'input-output management'

## Indicator 2.7.31

Indicator scope: point source effluent release only

The UoC shall ensure that all water released goes through a treatment system, capturing  $\geq 65\%$  of suspended solids originating from feed or fertiliser used, if any of the following apply (Annex 9.4):

- using aeration over  $>90\%$  of the production cycle
- exchanging  $>10\%$  of water per day
- exchanging water once per week or more during peak biomass
- using stocking densities  $>2\text{kg}/\text{m}^3$

Q: Do you perceive any challenges with implementing this indicator requirement?

If yes, why?

*Question target: Producers, Academia, CABs*

# Area-based management

## Indicators 2.7.27-2.7.31 (lentic systems)

**Objective:** To achieve collective sectoral responses to cumulative pressures and impacts at landscape (WUM) level

Elements (Lentic)	Remarks
Modeling of the total aquaculture sectoral contribution of limiting nutrient(s) load to the WUM over the previous 24-months (2.7.13)	Using a source apportionment methodology
Modeling the aquaculture sector BOD (2.7.14)	If modeling of the total aquaculture sectoral contribution is required
Participation in an Area Management Agreement, if the aquaculture sectoral contribution is >30% (2.7.15)	<ul style="list-style-type: none"> <li>- sharing of WUM- and farm-level water quality data</li> <li>- sharing of relevant modelling outcome</li> <li>- coordinated management efforts, including a commitment to increase nutrient loading efficiency limits, in order to reduce the rate of change and prevent an upward transition of trophic status</li> </ul>

# Area-based management

## Indicator 2.7.13

The UoC shall, using the source apportionment methodology outlined in Annexes 5.1 - 5.3, present modelling of the total aquaculture sectoral contribution of limiting nutrient(s) load to the WUM over the previous 24-months, if the WUM is  $\leq 5$  index points below a TSI limiting nutrient or chl-a breakpoint, indicating an approaching upward transition of trophic status i.e., approaching the assimilative capacity limit of the waterbody, OR modelled limiting nutrient(s) or chl-a concentration increase  $>20\%$  (2.7.5 and 2.7.8), OR the depth of the zone of oxygen depletion or anoxia has decreased by  $\geq 25\%$  (2.7.6 and 2.7.9), OR there has been  $>1$  adverse turnover event in 10 years (2.7.3).

Q: Do you perceive any challenges with implementing this indicator requirement?

If yes, why?

*Question target: Producers, Academia, CABs*

# Area-based management

## Indicator 2.7.15

If the aquaculture sectoral contribution (2.7.14) is >30%, the UoC shall participate in an Area Management Agreement (AMA), including the following and using the methodology outlined in Annex 6:

- sharing of WUM- and farm-level water quality data
- sharing of relevant modelling outcome
- coordinated management efforts, including a commitment to increase nutrient loading efficiency limits, in order to reduce the rate of change and prevent an upward transition of trophic status.

Q: Do you perceive any challenges with implementing this indicator requirement?

If yes, why?

*Question target: Producers, Academia, CABs*



# General question

Q: Do you agree with the following statement "The indicator requirements included in the criterion successfully achieve the aim of developing a method for water quality management that focuses strongly on cumulative impacts and the carrying capacity of a waterbody and they will strengthen the position of ASC farms when addressing water quality impacts"?

If you disagree / strongly disagree, please indicate why.

*Question target: Producers, Academia, NGOs, CABs, Regulators*

# Additional Resources

## Slides

English  
Japanese  
Spanish  
Vietnamese

## Water Quality criterion draft

English  
Japanese  
Spanish  
Vietnamese

## Water Quality criterion annexes

English  
Japanese  
Spanish  
Vietnamese

## Consultation questions

English  
Japanese  
Spanish  
Vietnamese

## Survey (English only)

[Link](#)

## FAQ (English only)

[Link](#)

## Introduction podcast (English only)

[Link](#)

## Public workshops (English only)

29 March (13:30 –  
15:00 UTC)  
4 April (01:00-  
02:30 UTC)



Salmon Farming, Chile

Thank you

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