

Criterion 2.14a – Fish Health and Welfare

Justification for key changes

The indicators in this criterion represent an alignment of the fish health and welfare requirements included in the current species-specific standards. The aligned criterion maintains the focus on prevention and on proactively ensuring adequate health management on farms to minimise the risk of disease transfer to other marine organisms in adjacent ecosystems. In addition, new content developed under the Fish Welfare Project has been added onto this criterion. The revised indicators provide more clarity to farms on what is required to be implemented in order to comply with the fish health and welfare requirements.

Key considerations

The proposal aligns on-farm biosecurity, disease monitoring, welfare monitoring, limits to mortality rates (including viral-related mortalities), requirements for OIE-notifiable diseases, and veterinary oversight and disclosure. The proposal puts special emphasis on the key role of a site-specific Fish Health and Welfare Management System (FHWMS) to outline, mitigate and manage risks.

The welfare indicators proposed within the criterion focus on finfish. Crustaceans (therefore eyestalk ablation), bivalves and abalone, will be included in future revisions of the standard, starting with crustaceans. Health and welfare of cleaner fish will also be included in the next revision. This will allow for a more detailed review of these topics by a TWG.

Scope Criterion 2.14a – Every UoC unless stated otherwise within the indicator.

Rationale – Animal health and welfare are highly interrelated concepts. For the purpose of this criterion, good health is understood as the lack of disease or injury, and the ability of an animal to perform its physiological functions at normal levels. Welfare is the physical and mental state of an animal in relation to the conditions in which it lives and dies and its capacity to cope with the environment. In this sense, it is important to highlight that welfare is not just the freedom from certain noxious stimuli, but the exposure to positive ones that improve experiences for fish.

If certain farming principles are not met, the commercial rearing of animals can jeopardize their health and welfare (e.g., poor health, the inability to express important natural behaviour, and unnecessary suffering) as well as that of wild species living in the vicinity of the farm (e.g., via disease transmission – covered in criteria 2.14a and 2.14b), and the actual environment where the farm is set (e.g., overuse of chemicals – covered in criteria 2.14a and 2.14c).

Good health and welfare can be supported if responsible farming practices are followed at all times. These include husbandry methods that encourage the monitoring of health and welfare, the application of site-specific biosecurity plans, implementation of disease prevention schemes, adherence to good welfare practices, and responsible use of veterinary therapeutants when needed, amongst other requirements.

ASC is providing a fish health and welfare framework that enables farmers to continuously monitor and evaluate their farming systems and their stocks. Rather than setting generic metric limits that may not reflect multiple and varied production realities, ASC is establishing a series of requirements that cover the main health and welfare practices, upon which farms can build and create their own robust site-specific fish health and welfare management systems with the supervision of a veterinarian.

These management systems are living documents and working tools that assist farmers in managing the health and welfare of their animals on a day-to-day basis.

A relevant example of how management systems can be used to actively manage health and welfare is the case of stocking density. In this version of the Standard, ASC is promoting the assessment of stocking density through the use of various relevant operational welfare indicators (OWIs) (morphological scoring, behavioural scoring, water quality and mortality) that can be used as proxies. If a downward trend is observed on these indicators, then the farmer should be assessing his/her farming operations, including stocking density, and modifying them accordingly. This approach is deemed more suitable than setting a metric limit, due to the fact that accurate and reliable density figures are hard to obtain in aquaculture, density requirements vary between species, life stage and farming systems, and literature is scarce and inconsistent when it comes to describing adequate stocking densities in commercial farming set ups.

Intent – To ensure that farms maintain good health and welfare so that detrimental effects on the environment, wildlife and cultured animals are minimal.

Indicators

Indicators highlighted in red are new and related to welfare.

Indicators	
Indicator 2.14a.1	The UoC shall ensure that all employees are informed and aware of the importance of fish health and welfare, and that employees involved in fish husbandry and handling operations are trained and maintain qualifications on fish health and welfare, according to Annex xyz – Fish Health and Welfare Training.
Indicator 2.14a.2	<i>Indicator scope: finfish only</i> The UoC shall vaccinate finfish for all regionally-relevant diseases for which an effective vaccine exists.
Indicator 2.14a.3	<i>Indicator scope: salmonids in marine water only</i> The UoC shall, when stocking an individual site, only stock single year class fish.
Indicator 2.14a.4	<i>Indicator scope: all except bivalves</i> The UoC shall regularly remove mortalities ¹ , daily for finfish and when spotted for shrimp and abalone, and dispose of mortalities responsibly; responsible disposal mechanisms are listed in 2.12 Material use, Waste and Pollution.
Indicator 2.14a.5	<i>Indicator scope: finfish and shrimp</i> The UoC shall daily remove moribund ² finfish and stun and kill them responsibly; responsible methods are listed in 2.14c. Moribund shrimp shall be regularly removed when spotted.
Indicator 2.14a.6	The UoC shall adhere to species-specific metrics on mortality, survival and recovery rates as per Annex 1.

¹ The UoC shall keep record of the situation when daily removal was not possible. Possible causes that would justify no daily removal of mortality are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans.

² The UoC shall keep record of the situation when daily removal was not possible. Possible causes that would justify no daily removal of moribunds are severe bad weather or a major equipment failure that does not respond to poor maintenance or poor contingency plans.

Indicator 2.14a.7	The UoC shall test ³ 100% of fish groups for selected diseases of regional concern prior to entering the grow-out phase on farm ⁴ .
Indicator 2.14a.8	The UoC shall, if an OIE-notifiable disease is confirmed, immediately cull the batch of animals in which the disease was detected, using responsible stunning and killing methods (2.14c), unless the disease is classified as endemic.
Indicator 2.14a.9	The UoC shall have a designated veterinarian ⁵ or a fish health manager ⁶ , who performs regular site visits, at least annually as well as in cases of fish health or welfare concerns.
Indicator 2.14a.10	The UoC shall maintain prescriptions for each application of therapeutants ⁷ , including the following minimum information: <ul style="list-style-type: none"> – diagnosis – etiology – purpose of use – product name, active ingredient and species to be treated – life stage of species to be vaccinated/treated – dose – duration or repetition of vaccination – administration method – minimum withdrawal period – categorisation of active ingredient according to the WHO List of Critically Important Antimicrobials for Human Medicine
Indicator 2.14a.11	The UoC shall, for all antimicrobial prescriptions, maintain the following: <ul style="list-style-type: none"> – antimicrobial susceptibility test results, either prior or as post-treatment – alternative strategies explored to the prescribed antimicrobial treatment
Indicator 2.14a.12	<i>Indicator scope: every UoC using feed</i> The UoC shall feed animals a diet that is formulated in accordance with species and life-stage specific nutritional requirements, based on feed manufacturer specification, unless such diets are not available. If not available, the UoC shall feed a diet suitable for animals with similar nutritional needs, and actively collaborate with feed manufacturers to work towards the development of a species/life-stage-specific diet.
Indicator 2.14a.13	<i>Indicator scope: every UoC using feed</i>

³ Testing is understood as the application of diagnostic techniques scientifically recognised as valid to diagnose the disease of interest. Such techniques might include histopathology, microbiology, molecular technology or veterinary inspection (only in the case of pathognomonic diseases).

⁴ Suitable measures must be in place to ensure that hatchery-raised seed are free from relevant/important pathogens before stocking for grow-out. This includes addressing on farm disease and parasite transfer (such as the ability to quarantine diseased stocks, separating equipment) as well as between the facility and natural fauna (such as disinfection of effluents for diseased stocks, fallowing). The approach should be relevant to the species, production system, scale of production, and legal requirements. Appropriate procedures or systems should include specific requirements or actions defined by the aquaculture facility through a suitable risk assessment or other evidence such as local or national regulations. Appropriate management measures in these cases could include treatment trigger levels of parasite numbers on the farm-facility or siting requirements that require that the aquaculture facility is located at suitable distances from wild populations.

⁵ A designated veterinarian is a person with the relevant veterinary accreditation or authority to carry out formal activities associated with aquatic animal health including prescription of medications, approval of fish health plans and signature of official documentary requirements. Other professionals can have equivalent qualifications that enable them with these same capacities, this would be the case for example, of the fish health biologists in Norway, who would be equivalent to a veterinarian for the purposes of this standard.

⁶ A fish health manager is someone with professional expertise in managing fish health, who may work for a farming company or for a veterinarian, but who does not necessarily have the authority to prescribe medicines, approve fish health plans or sign official documents.

⁷ This includes applications of antibiotics, parasiticides, antifungal, antiviral, hormones, anaesthetics, and vaccines.

	The UoC shall not use feed which has expired or is spoiled.
Indicator 2.14a.14	<p><i>Indicator scope: every UoC using feed</i></p> <p>The UoC shall develop and implement a feeding plan, including at least the following parameters:</p> <ul style="list-style-type: none"> - time and frequency of feeding - feed rations - feeding adaptation to fit different life stages - feeding adaptation to fit different ambient conditions
Indicator 2.14a.15	<p><i>Indicator scope: finfish only</i></p> <p>The UoC shall use feeding methods that ensure feed is accessible to all fish and well distributed in the production unit, in order to minimise any competitive dominance.</p>

Requirement for a site-specific Fish Health and Welfare Management System:

Indicator 2.14a.16 MS symbol	<p><i>Sub-indicator scope a) – e): every UoC</i></p> <p>The UoC shall assess site-specific characteristics and develop a Fish Health and Welfare Management System (FHWMS) accordingly. The UoC implements and monitors the FHWMS for its effectiveness, with the objective of preventing disease outbreaks and ensuring good health and welfare of farmed animals. The UoC includes at least the following in the FHWMS:</p> <ol style="list-style-type: none"> a) a site-specific disease monitoring, response mechanisms and reporting requirements (including reporting OIE-notifiable disease to authorities). b) a site-specific biosecurity procedure to identify and minimise spreading of disease, including risk pathways into/out of and within the farm. c) a list of potential predators and any predator control measures needed, to avoid compromising the integrity of the containment system and the health and welfare of the fish. d) FHWMS overseen and signed-off by a veterinarian. e) a review and where needed a revision of the FHWMS when changes in farming activities or changes in external factors occur, following each production cycle⁸, or upon the direction of the veterinarian. <hr/> <p><i>Sub-indicator scope f) – p): finfish only</i></p> <ol style="list-style-type: none"> f) a monitoring process of water quality, including at least the following: <ul style="list-style-type: none"> o Monitoring frequency⁹ (including minimum frequencies as per Table 1) o Monitoring parameters (including parameters as per Table 1) o Species-specific limits and monitoring requirements for water quality parameters (Annex 1).
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⁸ For farms with production cycles shorter than one-year or using continuous stocking/cropping methods – review annually. For farms with production cycles longer than one-year or using all-in-all-out stocking/cropping methods (e.g., salmon) – review following each production cycle.

⁹ A deviation from indicated frequency of monitoring is justified on the following grounds (reason for exemption must be documented):

- o During specific environmental events that prevent sampling.

- g) a monitoring process for morphological scoring on live fish, unless the species does not cope with or allow being sampled¹⁰, including at least the following:
 - Monitoring frequency: site-appropriate frequency, being at least once a month¹¹.
 - Morphological scoring parameters:
 - Eye damage
 - Operculum damage
 - Skin damage
 - Fin damage
 - Deformities
 - Change of colouration
 - Emaciation
- h) a monitoring process for behavioural scoring on live fish, including at least the following:
 - Monitoring frequency: daily¹²
 - Behavioural scoring parameters: site-appropriate types of abnormal behaviour to look out for.
- i) a monitoring process for mortality:
 - Monitoring frequency: daily
 - Monitoring parameters:
 - Classify all recovered mortalities
 - Carry out a post-mortem analysis for each mortality event¹³
 - Investigate mortality events which remain unexplained or unattributed to fish health
- j) a traffic light system for water quality, morphological scoring, behavioural scoring, and mortality, identifying ranges of acceptable levels (green), warning levels (amber), and unacceptable levels (red) of health and/or welfare.
- k) increased monitoring for the event of transgressing into the amber and red ranges for water quality, morphological scoring, behavioural scoring and mortality.
- l) mortality reporting requirements:
 - Report to the veterinarian or fish health manager all mortality events with daily mortality above average
 - Report to the veterinarian or fish health manager if a welfare problem is suspected during mortality classification e.g., observation of physical damage on the fish
 - if an OIE-notifiable disease is confirmed:

¹⁰ Justifiable reasons for not sampling live fish for morphological scoring are restricted to situations where the intrinsic nature of the species being farmed does not cope with or allow being sampled. Until further notice, the UoC may apply this to the following species: seabass.

¹¹ A deviation from monthly monitoring is justified on the following grounds (reason for exemption must be documented):

- 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, algal bloom.

¹² A deviation from daily monitoring is justified on the following grounds (reason for exemption must be documented):

- During specific weather events that prevent access to the site.

¹³ If on-site diagnosis is inconclusive, this standard requires off-site laboratory diagnosis. A qualified professional must conduct all diagnosis. One hundred percent of mortality events shall receive a post-mortem analysis, not necessarily every fish. A statistically relevant number of fish from the mortality event shall be analysed.

	<ul style="list-style-type: none"> a. increase disease-testing/monitoring in other batches of animals b. coordinate oversight by the veterinarian or animal health specialist c. report to authorities <p>m) corrective measures for the event of transgressing into the amber and red ranges for water quality, morphological scoring, behavioural scoring and mortality.</p> <p>n) a mechanism for trend analysis to determine declining and improving health or welfare over time, including drivers of such trends, based on the following data:</p> <ul style="list-style-type: none"> o water quality monitoring outcome (2.14a.16 f)), o morphological scoring of live fish (2.14a.16 g)), o behavioural scoring of live fish (2.14a.16 h)), o mortality classification, post-mortem analysis result for mortality events, outcome of investigations carried out to clarify unexplained mortality events/events unattributed to fish health (2.14a.16 i)), o feedback from processing plant <p>o) long-term fish health and welfare improvement measures¹⁴ as well as short-term mitigation measures to react to situations of declining health or welfare identified in 2.14a.16 j) and k).</p> <p>p) a mortality reduction program which outlines specific measures to reduce annual/production cycle mortality and includes defined annual targets for reductions in both total and unexplained mortality; this plan shall include a target upon which further increases in survival are not realistic.</p>
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Requirements on disclosure and reporting:	
Indicator 2.14a.17 Disclosure symbol	The UoC shall, if an OIE-notifiable disease is confirmed, publicly ¹⁵ disclose findings within 14 days.
Indicator 2.14a.18 Disclosure symbol	The UoC shall, if an unidentifiable transmissible agent is suspected or if it experiences unexplained increased mortality, publicly ¹⁶ disclose findings within 14 days.
Indicator 2.14a.19 Reporting symbol	The UoC shall report to ASC the ranges of stocking densities used during production, according to Annex 2 and using the template provided on the ASC website.

¹⁴ This shall include considering the adjustment of stocking densities, modification of the feeding system, improvement of water quality, improvement of handling, modification of enclosure characteristics, providing environmental enrichment, amongst others.

¹⁵ Via the website of the UoC.

¹⁶ Via the website of the UoC.

Table 1 of Criterion 2.14a: Water quality parameters and their monitoring frequency, per type of culture system.

PARAMETERS	TYPE OF CULTURE SYSTEM							
	FRESHWATER				SEAWATER			
	Ponds	RAS	Net pens	Flow-through	Ponds/Lagoons	RAS	Net pens	Flow-through
Temperature	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
Dissolved oxygen	Daily	Daily	Daily	Daily	Daily	Daily	Daily	Daily
Turbidity	Daily (for intensive ¹⁷ systems) Need based ¹⁸ (for semi-intensive and extensive systems)	Daily	Daily	Daily	Daily (for intensive systems) Need based (for semi-intensive and extensive systems)	Daily	Daily	Daily
Carbon dioxide	Biweekly (for intensive systems) Need based (for semi-intensive and extensive systems)	Daily	/	Biweekly	Biweekly (for intensive systems) Need based (for semi-intensive and extensive systems)	Daily	/	Biweekly
pH	Daily	Daily	Daily	Daily	Biweekly (for intensive systems) Need based (for extensive systems)	Daily	Need based	Biweekly
Salinity	/	Daily ¹⁹	/	/	Need based	Daily	Need based	Need based
Ammonia/nitrite/nitrate	Biweekly	Daily	/	Biweekly	Biweekly	Daily	/	Biweekly
Metals	Need based	Need based	/	Need based	Need based	Need based	/	Need based
Water flow/velocity	/	/	Need based	/	/	/	Need based	/
Hydrogen sulphide	Need based	Need based	/	/	Need based	Need based	/	/

¹⁷ FAOs definition of aquaculture systems applies:

- Extensive culture systems receive no intentional nutritional inputs but depend on natural food in the culture facility, including that brought in by water flow e.g., currents and tidal exchange.
- Semi-intensive culture systems depend largely on natural food which is increased over baseline levels by fertilisation and/or use of supplementary feed to complement natural food.
- Intensive culture systems depend on nutritionally complete diets added to the system, either fresh, wild, marine or freshwater fish, or on formulated diets, usually in dry pelleted form.

¹⁸ Need based indicates that farms need to assess on which basis it is relevant for their operations to monitor the parameter in question. For example in the case of metals, freshwater flow through farms might only want to monitor this parameter in the event of heavy rain or forestry works going on in the vicinity of the farm.

¹⁹ Salt can be added in small quantities in RAS salmoniculture to assist with disease prevention and facilitate smoltification. This should in no case contradict what is outlined in requirement 2.10.4.

Criterion 2.14b – Fish Health and Welfare - Handling

Scope Criterion 2.14b – Finfish only.

Rationale – Fish are sentient beings, able to feel and experience pain, stress and anxiety. Handling operations²⁰ have the potential to inflict suffering to the animals being handled if not carried out appropriately and with care. In addition handling operations can have a detrimental impact on the wildlife and the environment surrounding the farm (e.g., through escape). This criterion addresses handling only, namely operations that involve direct physical contact with the fish and/or taking them out of their normal rearing environment, rather than the every day farming practices which are covered in criterion 2.14a.

In order to ensure good health and welfare, ASC is advocating to enable farmers to continuously assess and evaluate their handling operations. Rather than setting generic metric limits that might not reflect the multiple and varied production realities, ASC is establishing a series of requirements that cover all of the main health and welfare practices, upon which farms can build and create their own robust site-specific handling management systems. Careful consideration of all steps, mitigation strategies to be implemented in the event that primary processes break down, as well as conscientious briefing and training of staff (covered in criterion 2.14a) are some of these requirements. Management systems are living documents and working tools that assist farmers in managing the health and welfare of their animals during handling operations.

Intent – The farm has processes (in the form of a Fish Handling Management System) that ensure fish do not endure suffering that compromises their wellbeing during handling operations.

Requirement for a site-specific Fish Handling Management System:

Indicator 2.14b.1	<p>The UoC shall assess site-specific characteristics and develop a Fish Handling Management System (FHMS) accordingly. The UoC implements and monitors the FHMS for its effectiveness with the objective of ensuring good health and welfare of farmed animals. The UoC includes at least the following in the FHMS:</p> <ul style="list-style-type: none">a) separate processes for each type of handling that may occur on the site i.e., live fish transport (including loading, transfer and unloading), vaccination, treatments, and other procedures that may result in crowding.b) contingency plans for processes described in b), including at least the following;<ul style="list-style-type: none">- Immediate emergency response back up for system failure.- Immediate emergency culling response measure following responsible stunning and killing according to 2.14c.c) description of the system²¹ to be used e.g., live fish transport system,d) suitable conditions needed to go ahead with the handling; for example external circumstances such as weather or tidal conditions.e) anesthesia of fish during handling operations that can inflict pain or injury if fish are moving,
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²⁰ Handling operations include grading (active or passive), vaccination (by immersion or injection), application of treatments (therapeutants or physical), any operation involving crowding of the fish, any operation involving removal of the fish from its rearing water.

²¹ System refers to any equipment, tools, or machinery being used during a particular handling operation. In requirement 2.15.1 d) the UoC shall describe the systems so a clear list of what is needed and of which specifications is available to anybody carrying out the procedure. In requirement 2.15.1 b) the UoC shall outline the process it will be carrying out.

- f) health status and fitness assessment of animals within a reasonable period prior to handling; in the case of treatment or transport, the fitness for handling shall be approved by a veterinarian or a fish health manager,
 - g) measures to minimise the duration of crowding as far as possible and carry it out in steps (partial crowding) when possible,
 - h) maximum time fish can be out of water; this shall be signed off by a veterinarian,
 - i) minimum/maximum fasting duration specific to the species being handled, the life stage or size of fish being handled, and the type of handling; this shall be signed off by a veterinarian,
 - j) biosecurity measures specific to the type of handling, following the parameters in 2.14a.16 b), to avoid the transfer of disease,
 - k) predator control measures specific to the type of handling, following the parameters in 2.14a.16 c), to ensure the integrity of fish is maintained,
 - l) escape prevention measures specific to the type of handling and following the parameters in criterion 2.5 escapes,
 - m) water quality monitoring and corrective actions in line with 2.14a.16 f), j), k), m), n), and o), including at least the following:
 - Description of monitoring equipment
 - Monitoring frequency: prior to, during, and post handling. In the case of live fish transport, this means monitoring at the point of departure/arrival and during live fish transport unless this could cause detrimental impact²²
- Monitoring parameters; at a minimum temperature, pH, and oxygen level
- n) visual inspection and corrective actions, in line with 2.14a.16, h), j), k), m), n), and o), including at least the following:
 - visual inspection frequency: during handling
 - visual inspection parameters: abnormal behaviour specific to the type of handling,
 - o) an analysis and feedback mechanism following handling events, providing for a review of handling processes (2.14b.1 a)), based on the following information:
 - Water quality monitoring during handling (m)
 - Visual inspections during handling(n)
 - Post-handling monitoring of fish for:
 - a. abnormal behaviour related to the handling event 2.14a.16 h), j), k), m), n), and o);
 - b. compromised morphological scores related to the handling event 2.14a.16 g), j), k), m), n), and o);
 - c. moribund fish related to the handling event (2.14a.5)
 - d. mortalities related to the handling event (2.14a.4, 2.14a.6 and 2.14a.16 i), j), k), l), m), n), and o),
 - p) a handling log, in the form of a recording template, which captures a)-o) for each handling event.

²² Where monitoring of water parameters would have detrimental impact and would therefore defeat the purpose of ensuring animal welfare, acceptable water quality may be guaranteed on departure instead.

2.14c – Fish Health and Welfare – Slaughter

Scope Criterion 2.14c – Finfish only.

Rationale - Slaughter²³ is an inherently stressful event which can result in pain and suffering if not managed adequately. Harm can result from the absence of or the improper use of stunning, from the use of inadequate killing methods, and from the absence or inadequacy of backup systems to ensure that adequate stunning and killing occur at all times.

Best practices in fish slaughter include the implementation of both stunning (preferably mechanical or electrical) and responsible killing methods, so there is rapid loss of consciousness and this is not regained before killing. In order to promote these methods, ASC has created a step-wise approach to improving slaughter techniques. One step requires farms to eliminate the use of killing methods proven to be highly aversive to fish. The second step makes stunning compulsory. Further, ASC has laid out a series of requirements to guarantee that stunning and slaughter are effective, that backup systems are in place, and that staff are properly trained in welfare and slaughter practices (covered in criterion 2.14a).

Intent - The farms' slaughtering process assures no fish suffer unnecessarily—and good welfare is preserved.

Indicator	Requirement
Indicator 2.14c.1	The UoC shall ensure all fish are stunned ²⁴ prior to killing ²⁵ , using permitted methods only, as of April 2025, including species-specific transition periods, as outlined in Table 1.
Indicator 2.14c.2	The UoC shall ensure fish stunned lose consciousness immediately ²⁶ , and that unconsciousness persists until death sets in, as of April 2025, including species-specific transition periods, as outlined in Table 1.
Indicator 2.14c.3	The UoC shall ensure that fish are stunned effectively ²⁷ as of April 2025 (including species-specific transition periods as outlined in Table 1), assessing stunned fish for the absence of all of the following indicators: opercular (gill) movements, eye movements, body movements ²⁸ , reaction to a painful stimulus (e.g., tail-prick or eye corner tap).

²³ For the purpose of this criteria slaughter refers to the act of stunning and killing, but does not include the pre-slaughter (fasting, crowding, removal from water, transportation) and post-slaughter (processing) stages. Pre-slaughter is covered in 2.14b and post-slaughter is out of the scope of the ASC Farm Standard

²⁴ Stunning methods can be irreversible or reversible. If irreversible, the stunning acts as the killing method at the same time.

²⁵ In other words, pre-slaughter handling must not lead to the death of fish, defeating the intention of using responsible killing methods; only live fish stunned are eligible for ASC certification.

²⁶ Stunning methods are required to induce immediate or rapid (less than 1 second) unconsciousness (Species-specific welfare aspects of the main systems of stunning and killing of farmed fish, Scientific Opinion of the Panel on Animal Health and Welfare, 2009, EFSA).

²⁷ For this version of the standard, ASC considers a stunning efficiency of 98% (i.e., at least 98% of the fish stunned immediately lose consciousness) to be effective.

²⁸ The use of body movement as an indicator for the effectiveness of stunning or killing can be misleading as muscular spasms might occur in unconscious or dead fish. Body movements indicating struggling, a swimming activity or efforts to remain upright or regain equilibrium (adapted from FAWC) are relevant movements to watch out for and that indicate consciousness. Opinion on the Welfare of Farmed Fish at the Time of Killing, Farm Animal Welfare Committee (FAWC), DEFRA, London, May 2014.

Indicator 2.14c.4	The UoC shall not use the following methods to kill fish: <ul style="list-style-type: none"> - asphyxia in air, - CO₂, - salt baths, - ammonia baths, or - evisceration.
Indicator 2.14c.5	The UoC shall ensure fish are killed effectively ²⁹ by monitoring fish for the absence of all of the following indicators opercular (gill) movements, eye movements, body movements ³⁰ , reaction to a painful stimulus (i.e., tail-prick, eye corner tap).
Indicator 2.14c.6	The UoC shall have immediate mitigation measures in place to react to situations of ineffective stunning or killing, including the presence of a back-up system such as manual percussive stunning.
Indicator 2.14c.7	The UoC may, for fish not destined for human consumption ³¹ , use an overdose of anaesthetic to stun and kill fish.

Table 1 of Criterion 2.14c: Permitted methods of stunning and the applicable transition periods from the effective date of the ASC Farm Standard, per species group.

Permitted methods of stunning ³²	Species								
	Salmon	Trout (FW & SW)	Seabass, seabream, meagre	Pangasius	Tilapia	Seriola	Cobia	Flatfish	Marine Tropical
Percussion	✓	✓				✓			
Electrical	✓	✓	✓	✓	✓	✓	✓	✓	✓
Transition period ³³	Immediate	1 year	3 years	3 years	3 years	3 years	3 years	3 years	6 years

²⁹ For this version of the standard, ASC considers a stunning and killing efficiency of 98% (i.e. at least 98% of the fish killed die immediately) to be effective.

³⁰ The use of body movement as an indicator for the effectiveness of stunning or killing can be misleading as muscular spasms might occur in unconscious or dead fish. Body movements indicating struggling, a swimming activity or efforts to remain upright or regain equilibrium (adapted from FAWC) are relevant movements to watch out for and that indicate consciousness. Opinion on the Welfare of Farmed Fish at the Time of Killing, Farm Animal Welfare Committee (FAWC), DEFRA, London, May 2014.

³¹ Fish not destined for human consumption includes casualty culling, killing for diseases control purposes or emergency culling.

³² ASC will review available stunning methods on a yearly basis, to make sure that any new developments that are considered suitable are incorporated onto this list.

³³ The requirement to use permitted methods of stunning only, applies as of April 2025, giving producers a transition period of 1, 3 or 6 years from the effective date of the ASC Farm Standard. For example, as of September 2025, trout shall only be stunned using percussive or electrical stunning.

ANNEX XYZ - FISH HEALTH AND WELFARE TRAINING

This Annex supports indicator 2.14a.1, which covers training required to successfully implement criteria 2.14a, 2.14b, 2.14c, parasites and antibiotics.

ASC believes that fish health and welfare should be promoted through staff training. Trained staff understand the benefits of ensuring good health and welfare and are empowered to implement positive changes. Lack of or insufficient training of staff can result in negative impacts that can affect fish themselves, the environment, and the UoC. Some of the major risks are:

- Fish are not reared appropriately,
- Fish are injured or compromised (potentially resulting in death), especially during handling events,
- Declining fish welfare and health is not identified,
- Mitigation measures are not appropriate/correct,
- The surrounding environment is damaged.

In order to avoid such risks, the UoC must develop a fish health and welfare training programme for its employees. Such training might be developed either by in-house teams of veterinarians and fish health managers, or externally in conjunction with relevant consultants or academia. In any case, the content of the final training programme must be endorsed by a veterinarian who acknowledges the content as accurate, relevant, and appropriate.

ASC is not prescriptive in terms of the exact content that training should include. The aim is that, based on a series of general guidelines, each UoC develops a training programme that covers the suggested topics and adapts them to its farming needs and reality. However, ASC sets specific requirements in terms of:

- who should be trained,
- how often,
- content guidelines,
- format of the training.

These are minimum requirements rather than the perfect scenario. Therefore, UoCs can deviate and expand on content/topic as long as the minimum requirements are met. Table 1 outlines what is required for each criteria as well as its auditability. **Content outlined on Table 1 is normative.**

Table 1 of Annex XYZ: Training requirements.

Destined to	Level	Refers to criteria	Frequency	Content	Format	Auditability
<ul style="list-style-type: none"> All staff 	Basic	2.14a, 2.14b, 2.14c	At least one-off at the time of employment	<u>General fish health and welfare awareness:</u> Employees need to be informed about the importance of fish health and welfare and understand these concepts.	Theory	Certificate of competency (employee understands the concepts and has been adequately informed). Revision of training resources/contents.
<ul style="list-style-type: none"> Site staff Staff handling live fish Production management 	Advanced	2.14a, 2.14b, 2.14c + Parasites + Antibiotics	Annual (refresher shall incorporate advances/developments on the subject of training)	<u>Basic anatomy and physiology</u> of the species being farmed <u>Advanced fish health and welfare assessment:</u> This shall include all operational welfare indicators in the standard (morphological, behavioural, water quality, feeding, stocking density, disease recognition, mortality classification and necropsy forms) <u>Handling</u> <u>Slaughter</u> (harvesting) <u>Biosecurity</u> <u>Data collection, logging and reporting systems</u>	Theory & Practice	Certificate of attendance. Revision of training resources/contents. Certificate of competency (signed off by a relevant person, certifying employee has acquired the knowledge, the skills and the abilities). Observation of real operations.
<ul style="list-style-type: none"> Processing staff Processing management 		2.14c		<u>Capacitation on slaughter process</u> <u>Assessment of stunning and killing effectiveness</u> <u>Data collection, logging and reporting systems</u>		