

**RSPCA** 



**RSPCA standards justification**

# **Farmed Atlantic salmon**

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# Introduction

This document provides the rationale underpinning the setting of certain, key standards within the RSPCA Welfare Standards for farmed Atlantic salmon. As such, this document provides the justification behind the setting of such standards.

Not all standards are covered within this document, as either further explanation is not required, e.g. the justification is clear within the standard itself, or the standard is based on a legal requirement. However, those standards that go above legal minimum requirements and could be set at a range of levels are generally included.

Justifications are not exhaustive, but are typically representative of the evidence base (where this exists) for that issue.

In some cases, a summary of the full standard wording has been provided. Therefore, please refer to the RSPCA Welfare Standards for farmed Atlantic salmon for the full standard wording.

References to legal requirements relate to domestic legislation.

# Management

## Inspection and records

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- **Moribund removal: Tanks and enclosures are inspected daily for moribund fish. If found, they are removed promptly and humanely culled.**

This standard was introduced in its current format in the 2024 version of the standards, having previously been attached to mortality removal. Moribund fish are those fish that are likely significantly suffering and/or nearing death. Their prompt removal from the tank/enclosure is essential to minimise their suffering and to reduce the potential spread of pathogens, including sea lice, to healthy fish. These fish must be humanely culled according to an appropriate method after removal from the tank/enclosure.

# Health

## General

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- **Veterinary Health and Welfare Plans (VHWPs):** Site specific VHWPs must be drawn up at the start of each production cycle or annually. They must include future husbandry plans, risk assessments, and monitoring and control plans for fish health and diseases. The VHWP must be treated as a live document and updated without delay when a problem is identified.

VHWPs are an invaluable tool for tracking fish health and welfare on a site, as well as providing a framework for measures to prevent potential or reoccurring health and welfare issues. As such, they need to be updated either annually or before a new production cycle starts so the previous cycle can be reflected on and learnings made and recorded in the VHWP. During production, health and welfare problems (along with their causes, treatment or mitigation and outcomes) must be recorded in the VHWP as soon as practically possible.

## Casualty killing

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- **Approved methods:** For freshwater - anaesthetic overdose, electrical stun-to-kill and percussive blow (for fish over 5g). For seawater - a percussive blow and anaesthetic overdose.

The above methods are the only permitted methods of casualty killing on farms for fish that require euthanasia. Any other method is not permitted as it either causes suffering and is inhumane (e.g. asphyxiation, bleeding without prior stunning) or has not been investigated and approved by the RSPCA.

## Medicinal products

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- **Antibiotic use and review:** Antibiotics must be used in accordance with UK legislation and must not be used prophylactically or without good reason. The use of antibiotics must be reviewed annually or at the end of a production cycle and a written action plan produced to reduce the use of antibiotics through improvements in husbandry.

Antibiotics must not be used unless there is a diagnosis or strong suspicion of a bacterial infection. From 2024, all farms must complete an antibiotic review plan, even if no antibiotics were used. The findings must then be used to identify any husbandry practices that can be implemented to reduce any potential future use of antibiotics.

## Mortality recording and reporting

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- **Reporting thresholds and timeframes:** Any weekly mortality over the specified thresholds must be reported to RSPCA Assured within the specified timeframe (72 hours of the end of the reporting period).

Reporting any mortality that breaches the threshold is important as it allows the certification scheme assessing against these standards to undertake specific visits or obtain further information if there is a concern for the welfare of the fish. It also provides valuable information to the RSPCA of the main mortality drivers that are currently affecting the industry. Further, prompt reporting allows rapid action to be taken as required.

## Welfare Outcome Assessment

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- **The role of welfare outcome assessments: WOAs to be performed in both freshwater and seawater according to protocols outlined in standards. Any welfare issues highlighted through assessments to be recorded in VHWP.**

In order to continue to improve salmon welfare, there needs to be a robust system of measuring and quantifying welfare. The most feasible current method is to use operational welfare indicators, scored on a regular basis from fish netted and subsequently anaesthetised from their tank/enclosure. These fish must be scored for fin malformation, eye loss/damage, jaw deformity, spine deformity, snout injury, scale loss and skin damage, physical wounds and lesions, operculum damage, and sea lice damage (seawater only). The intention is to identify potential welfare issues that require further investigation.

# Husbandry practices

## Crowding

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- **Time in crowd: Fish must not be crowded for more than 2 hours.**

Regardless of the situation, crowding of fish must not last longer than 2 hours. Crowding is stressful for fish and can lead to injury or mortality if prolonged. Two hours was considered to be an appropriate maximum amount of time when the standards were first introduced and there is no evidence to suggest amending this requirement.

## Non-medicinal treatments for sea lice and amoebic gill disease - pre-treatment

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- **Frequency of treatments: Fish must not receive more than 1 treatment within a 28 day period.**

Studies have demonstrated that the negative impacts of non-medicinal treatments are exacerbated by repeated handling within a 3 week time period (Moltumyr *et al.*, 2022). Repeated handling in a short period of time also suggests a potential failure to control sea lice or levels of amoebic gill disease (AGD), which may be considered a welfare issue.

- **Thermal treatments parameters: In thermal delousers, the treatment water temperature must not exceed 34°C and fish must not be exposed for longer than 35 seconds.**

Studies have shown that, statistically, there is no increase in the number of lesions or welfare indicator scores when the water is heated to 34°C for 30 seconds (Moltumyr *et al.*, 2021). However, there is no evidence above these thresholds, hence why these limits are set. 35 seconds allows for the realistic scenario that some fish might not pass through as quickly as others.

## Non-medicinal treatments for sea lice and amoebic gill disease - post-treatment

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- **Post-treatment report: A post-treatment report must be created and included within the VHWP within 14 days. It must include details on mortality (per enclosure and for the farm), efficacy of lice removal (where applicable), results of WOAs and whether any issues occurred during the treatment and an action plan to remedy these issues.**

Reviewing non-medicinal treatments in thorough detail is the most appropriate way to assess the welfare impact of the treatment and to create actions for further improvements to the treatment process. Failure to do so can lead to repeated failures, which is a significant welfare concern.

## Enrichment

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- **Environmental enrichment role (information box only) - The RSPCA encourages further commercial research and trial work into environmental enrichment to determine appropriate forms to benefit salmon welfare.**

Environmental enrichment has been shown to positively benefit animal welfare in terrestrial farm animal species. Data from a small-scale trial shows that it can confer similar benefits for fish in captivity (Arechavala-Lopez *et al.*, 2022). However, as yet, there have been no full-scale commercial trials for Atlantic salmon. Until the benefits and potential challenges of providing enrichment have been investigated, the RSPCA remains committed to exploring how to progress the provision of environmental enrichment within the RSPCA welfare standards.

# Equipment

## Enclosures

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- **Current speed: The current speed must not be too strong so that fish cannot hold their position in the water column.**

The current in open water used for pens (in either fresh- or seawater) must not overwhelm or cause fish to be unable to hold their position in the water, remembering they need to be able to rest on a daily basis. The current must also not be so strong as to cause fish to be pushed against the netting as this can cause physical damage.



# Freshwater (pre-smoltification / juvenile fish)

## General

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- **Freshwater stocking densities: Maximum stocking densities for various weight bands or life stages are set.**

The freshwater maximum stocking densities set in the standards are based on research that was undertaken by the University of Stirling and various producers in the early 2000s. These are set at levels to avoid the negative impacts of overstocking (loss of space to move, too much contact with con-specifics) but also to avoid any potential negative impacts of understocking (aggression, formation of dominance hierarchies) and to remain commercially viable.

## Multi-level hatchery systems

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- **Egg stocking limits in trays: If farms want to stock more than 15,000 eggs in a tray, they must be able to demonstrate that mortality was below 5% in the previous year.**

Standard incubation trays can comfortably hold 15,000 unhatched eggs. Producers wishing to stock above that (up to ~19,000) must be able to prove that the site's water quality, husbandry practices and other conditions have not caused excess mortality (above 5%) in the previous year to demonstrate eggs can be safely hatched.

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- **Production plans: Production plans must be in place to reduce the potential need for culling of healthy, viable fish.**

While the culling of sick or injured fish may be required for welfare reasons, there should be no need to cull fish that are in good health and viable for on-growing. Production plans must show that there is no purposeful overproduction based on the planned requirements of other sites. This standard was introduced in the 2024 version of the standards.

## Seawater stocking density

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- **Stocking density in sea pens:** The maximum stocking density on sea farms is 17kg/m<sup>3</sup> for a pen and 15kg/m<sup>3</sup> for the site.

This limit was first proposed by the Farm Animal Welfare Council (now the Animal Welfare Committee) in 1996. In a commercial trial in Scotland in 2000 (Turnbull, 2005), it was found that salmon welfare is negatively impacted above 22kg/m<sup>3</sup>, so the limit set in the standards allows for a buffer zone below that. Other countries and assurance schemes permit a higher stocking density. For example, in Norway the limit is often 25kg/m<sup>3</sup> and in the eastern US, it is set at 30kg/m<sup>3</sup>.\*

*\*<https://www.fishfarmingexpert.com/cooke-aquaculture-us-maine-oceana/cooke-praises-maines-science-based-approach-to-stocking-density/1537706>*

# Transport

## General transport

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- **Overseeing transport operations: There must be an agreed person/s present to oversee transport operations and who is deemed responsible. This is a person agreed by the supplier, the receiver and the transporter.**

Having a defined person/s present that has overall responsibility for the transport operations means that a quick and decisive decision to protect fish welfare can be made when necessary. This can be multiple people to cover different stages of the journey, but their roles and cross-over should be clearly defined.

## Harvest wellboats

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- **Carbon dioxide (CO<sub>2</sub>) levels: The CO<sub>2</sub> level must not exceed 40mg/l during transport of fish for harvest**

CO<sub>2</sub> levels up to 40mg/l are unlikely to cause physiological stress or damage to fish during the short transport time involved in harvest transportation. CO<sub>2</sub> levels are likely to be higher during harvest transports as wellboats often run on closed wells (water circulation/reuse only) due to biosecurity reasons, so allowing up to 40mg/l can be positive for salmon welfare. CO<sub>2</sub> narcosis can start above this limit, often above 60mg/l. CO<sub>2</sub> narcosis has been shown to cause an adverse stress response in salmon (and is a prohibited method of slaughter) so levels must be kept well below this to prevent any potential stress response in salmon. This standard was introduced at 40mg/l in the 2024 version of the standards.

## Slaughter / killing including cage-side harvest

- **Prohibited methods: Bleeding or decapitation without prior stunning, asphyxia, evisceration, live chilling, ice slurry or bath and carbon dioxide narcosis are all prohibited methods of slaughter.**

All of the above methods of slaughter are considered to be inhumane and can cause an immense degree of suffering for rainbow trout. They are not permitted under any circumstances. Many are legally prohibited in other countries like Norway. These methods were expressly prohibited in the 2024 version of the standards.

- **Re-stunning of salmon: Salmon that have not been effectively stunned must be re-stunned immediately. Each re-stun must be reported to the person in charge with action taken to rectify any issues which may have caused the ineffective stun.**

An ineffectively stunned salmon is likely to be suffering and its welfare will very likely be compromised. An immediate and effective re-stun will end its suffering so it is vital it is performed quickly and correctly. Reporting each re-stun will allow the person in charge to monitor the number of fish needing re-stunning and the potential reasons that stuns are being ineffective. Actions must be taken as needed to stop further fish being ineffectively stunned.

- **Bleeding of salmon: All fish must be bled/exsanguinated.**

Regardless of the stunning method, all salmon must be bled/exsanguinated. This is to ensure that all fish are killed while stunned to prevent the chance of recovery.

## **Slaughter / killing including cage-side harvest - Closed Circuit Television (CCTV)**

- **Use of CCTV: CCTV must be in place to cover the stunning and killing process. It must show a clear view of each process and must be recording whenever salmon are undergoing the processes outlined in the standard. The footage must be stored for at least 3 months.**

The use of CCTV in slaughter facilities (including on vessels) is a vital tool for monitoring and enforcement of standards during the stunning and slaughter processes. It can also be useful for training purposes and for providing records to assurance scheme assessors, inspectors and other interested parties. Together, this helps to protect salmon welfare at the time of killing and as such, is an important component of the welfare standards. All CCTV standards were first introduced in the 2024 version of the standards.

## Electrical stunning (electronarcosis) followed by bleeding

- **Requirements when using electrical stunning: When using any form of electrical stunning, it must be ensured that fish are rendered insensible within 1 second, do not suffer any pre-stun shocks and that the shock is maintained until salmon dies or is insensible to a percussive stun. Regular assessments of stunning efficacy are required, including assessing eye movement, opercular movement, muscle twitches and reaction to tail pinch.**

The use of electricity can be an effective stunning mechanism for salmon but it is vital that the correct procedures are in place to stop any avoidable suffering. Individual salmon must receive an immediate and full electric shock that renders them immediately insensible. There must be no prior shocks as these can cause pain while the fish is fully conscious. The shock must be sufficient so that there is no suffering before death occurs (even if further stunning is to take place). Salmon must be assessed regularly to ensure that the stun is being correctly applied.

## Handling of cleanerfish in the pen: wild and hatchery reared wrasse and lumpfish

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- **Removal of cleanerfish: Cleanerfish are to be removed from the pen or prevented from participating in the crowd of a handling event that requires the removal of salmon from the pen.**

Introduced in the 2024 version of the standards, for implementation from the 1st May 2025, cleanerfish must be removed from the pen prior to the removal of salmon from the pen. Being physically handled or crowded with salmon is likely to cause significant welfare issues for cleanerfish, potentially even causing significant mortality.

- **Cleanerfish and non-medicinal treatments: Exposing cleanerfish to any non-medicinal treatments intended for the treatment of salmon must be risk-assessed. They must not be exposed to any non-medicinal treatments which will cause injury or suffering as identified by the risk assessment. If cleanerfish do undergo a non-medicinal treatment, the welfare impacts must be recorded.**

Recent on-farm experience and data from countries that use cleanerfish in Atlantic salmon production has found that some non-medicinal treatments can cause significant welfare issues to cleanerfish, including mortality. Farms must risk-assess these treatments and the impact on cleanerfish welfare before any cleanerfish undergo treatments. There is a zero tolerance if the risk assessment finds there is a risk of injury or suffering. Several countries have prohibited cleanerfish undergoing lice treatments using non-medicinal treatments\* and the RSPCA will keep this under review. The reason for the prohibition is that sea lice do not generally attach to cleanerfish so treating an animal for a disease they don't have is a violation of their animal welfare laws.

\*<https://ilaks.no/i-strid-med-dyrevelferdsloven-a-la-rensefisk-gjennomga-lakselusbehandling/>

## Vaccination of farmed cleanerfish

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- **Lumpfish handling: If lumpfish are vaccinated without the use of anaesthetic, they must be kept in flowing water, that is deep enough to submerge them, on the vaccination table. NB wrasse must be anaesthetised before vaccination.**

Due to the behaviour and physiology of lumpfish, it may be in their welfare interest not to anaesthetise them before vaccination. If no anaesthetic is used, the vaccination table should have running water that can submerge the lumpfish. This ensures that the lumpfish experience minimal stress by remaining in water (rather than out of water as would be the case on standard vaccination tables) and experience no issues with water quality which may occur if the water was stagnant.

## References

- Arechavala-Lopez, P., Cabrera-Alvarez, M., Maia, C. & Saraiva, J., 2022. Environmental enrichment in fish aquaculture: A review of fundamental and practical aspects. *Reviews in Aquaculture*, 14(2), pp.704-728
- Erikson, U., 2011. Assessment of different stunning methods and recovery of farmed Atlantic salmon (*Salmo salar*): isoeugenol, nitrogen and three levels of carbon dioxide. *Animal Welfare*, 20, pp365-375
- Moltumyr, L., Gismervik, K., Gu, J., Gåsnes, S., Kristiansen, T., Rønnestad, I., Nilsson, J. & Stien, L., 2021. Does the thermal component of warm water treatment inflict acute lesions on Atlantic salmon (*Salmo salar*)? *Aquaculture*, <https://doi.org/10.1016/j.aquaculture.2020.736048>
- Moltumyr, L., Nilsson, J., Madaro, A., Seternes, T., Agerup Winger, F., Rønnestad, I. & Stien, L., 2022. Long-term welfare effects of repeated warm water treatments of Atlantic salmon (*Salmo salar*). *Aquaculture*, <https://doi.org/10.1016/j.aquaculture.2021.737670>
- Turnbull, J., Bell, A., Adams, C., Bron, J. & Huntingford, F., 2005. Stocking density and welfare of cage farmed Atlantic salmon: application of a multivariate analysis. *Aquaculture*, 243, pp.121-132





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