Humane Farm Animal Care
Welfare Standards
Edition 2025

FARMED ATLANTIC SALMON

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PO Box 82, Middleburg, VA – 20118.

HUMANE FARM ANIMAL CARE

Humane Farm Animal Care is a 501(c)3 non-profit organization whose mission is to improve the lives of farm animals being raised for food and to assure consumers that certified products meet our welfare standards.

Our initial set of standards were adapted from the RSPCA Assured program published by Royal Society for the Prevention of Cruelty to Animals in the United Kingdom. Since then, the Humane Farm Animal Care standards have been refined to provide standards for the rearing, handling, transport, and slaughter of food animals (along with Chain of Custody management for further processed products) under the Certified Humane® program and now applicable worldwide. These dynamic documents are always informed and kept updated based on scientific research*, veterinary advice, and the practical experience of the farming industry.

Animal welfare is improved when livestock managers adhere to the following:

- Access to wholesome and nutritious feed
- Appropriate environmental design
- Caring and responsible planning and management
- Skilled, knowledgeable, and conscientious animal care
- Considerate handling, transport, and slaughter

**HUMANE FARM ANIMAL CARE'S SCIENTIFIC COMMITTEE*

Since the introduction of the Certified Humane® program in 2003, leading animal scientists, veterinarians, and producers have worked tirelessly with Humane Farm Animal Care not only to develop but continually update all the Animal Care Standards as advancements in science dictate. An up-to-date listing of these industry notables (our essential partners) is always available on our website at: https://certifiedhumane.org/scientific-committee/

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PART 1: INTRODUCTION

A. The Certified Humane® Label

The Certified Humane® program was developed to certify products derived from animals raised on farms that adhere to these standards. Upon satisfactory completion of the application and inspection process, farmers and ranchers are certified and given authorization to use the Certified Humane® trademarked logo. Program participants are inspected and monitored by Humane Farm Animal Care annually. Charges levied are to cover inspections and program costs.

Humane Farm Animal Care expects their certified farmers, ranchers and producers to adhere to all regional or national regulations governing husbandry, food production and environmental management as well as the Certified Humane® standards. If at times there is a conflict, the relevant rules set by the local or national authority will take precedence.

B. Guide to the Use of the Animal Care Standards

- The broad objectives of the standard are described at the beginning of each section.
- The numbered requirements are the standards. Compliance with all the standards is mandatory, except where a standard is deemed not applicable (these standards are written to cover facilities in varying geographic and temperate regions, and facilities using different systems; therefore, not all sections in these standards will apply to each facility).
- Boxed sections provide additional information or may highlight areas where the standards will be reviewed in the future.
- At minimum, HFAC requires compliance with any local, state, provincial, or national regulations for salmon production that affect the environment or safety of their product, as well as the veterinary protocols for their jurisdiction. Producers must meet both HFAC standards and the above regulations. If there is any overlap, the more stringent rule must be followed.

PART 2: FEEDING

OBJECTIVES: Fish need to have freedom from hunger and malnutrition by ready access to a high-quality diet that is appropriate to their species and allows full health to be maintained. Feed needs to be distributed in such a way that fish can eat without undue competition.

A. Feed

F 1: Wholesome, nutritious feed

a. Fish must be fed a wholesome diet that is:
   1. Appropriate for their species, age, and stage of production;
   2. Fed in sufficient quantity to maintain good health; and
   3. Formulated or assessed to satisfy their nutritional requirements.
b. All feed must be manufactured from constituents that are free from active parasites and known fish pathogens and contamination.
c. Krill-based components in salmon feed must be from certified sustainable sources.
d. Managers must be aware of nutrient deficiencies and excesses on sites (freshwater and sea) and correct these as appropriate.

F 2: Free access to feed

Fish must have free access to nutritious feed each day, except when directed otherwise by an attending veterinarian.

F 3: Feed records

a. Producers must have written records and/or labels of the feed constituents, the inclusion rate and constituents of compound feeds, and feed supplements, including those records from the feed mill or supplier.
b. Feed records must be retained for at least one year.
c. Feed records must be available to the Humane Farm Animal Care Inspector during the inspection and upon request.

F 4: Substances prohibited in feed

a. No feedstuffs containing growth regulators or hormones is permitted.
b. The use of veterinary medicinal products in fish feed is prohibited, except for essential therapeutic use (a disease outbreak or where welfare will otherwise be compromised as advised by a veterinary).
c. All feeds must be produced in accordance with all relevant legislation.

F 5: Provision of feed

a. Feed must be dispensed and distributed in a way that fish can eat without undue competition.
b. Fish must be observed at least once a day during feeding.
c. Fish on the periphery of the tank or enclosure must receive adequate amounts of feed.
d. Stale or moldy feed must not be provided to fish.

Feedback systems in seawater enclosures are encouraged to prevent overfeeding.

F 6: Avoiding changes in feed

Efforts must be made to avoid sudden changes in the type and quantity of feed, except under the direction of a veterinarian.

F 7: Clean feeding equipment

a. Manual or automatic systems must be kept clean.
b. Feeding equipment must be designed, constructed, placed, and maintained so that contamination of the feed is minimized.
c. Automatic feed delivery systems must be maintained in good working order.

F 8: Fasting

a. For harvest fish, fasting period up to slaughter must be kept to a minimum and not exceed 168 hours or 70-degree days, whichever comes first.
b. Prior handling, fasting must be kept to a minimum and not exceed 48 hours for freshwater cycle and 72 hours for seawater cycle.
c. Fasting protocol must be written in the Veterinary Health and Welfare Plan (VHWP - see HH 1).
d. After any period of fasting, feed must be reintroduced to:
    1. encourage the fish to resume feeding;
    2. minimize waste;
    3. allow easy access to feed and prevent undo competition.
e. Records of the period fish were fasted must be kept, and where applicable, the time that the feed was reintroduced.
f. Fasting period must not exceed 48 hours for freshwater fish and 72 hours for seawater fish prior to culling.

Although salmon may not feed for prolonged periods in the wild, fasting farmed fish that is used to feed regularly can have an adverse effect on its welfare if not well managed. Studies with Atlantic salmon have shown that fasting for more than 14 days has negative animal welfare implications. Feeding during transport in wellboats is not possible, as it worsens water quality and harms salmon welfare. Therefore, this topic is in constant evaluation by HFAC that will follow new scientific evidence for fasting Atlantic salmon.

PART 3: ENVIRONMENT

OBJECTIVES: The environment, including all the infrastructure in which fish are kept must support their welfare needs, be designed to protect them from fear, distress, and physical or physiological discomfort, distress and injury, and allow them to perform natural behaviors. The farm needs to be operated with respect to the natural environment and employees need to recognize their duty to care for the wider environment. All reasonable steps need to be taken to minimize the ecological impact of the farming system.

A. Equipment

Where management systems, designs, or layout of infrastructures not covered in the HFAC Animal Care Standards are being employed or considered, these must be referred to and discussed with the HFAC staff before they can be considered for certification.

E 1: Environment for fish

The tanks, sited normally in land with fresh water, and enclosures, which usually are sited in the sea, must be considered to fish welfare, personnel safety and minimize adverse effects to the environment.

E 2: Tanks

a. Tanks must be designed, constructed, sited and maintained free from sharp edges and protrusions that may injure the fish.
b. Inlets and outlets must prevent fish from escaping and as entrance to wild animals.
c. Lids, covers, barriers or nettings must be placed over the tanks to prevent fish escaping.
d. If nets are used, they must be of a suitable size to prevent escaping and entangling fish in the tank.
e. All tanks must have individual nets for removing dead or moribund fish.
f. The water flow rate must be suitable for fish to hold their position in the water column.
g. Tanks over five meters in diameter must be fitted with oxygen and water level alarms.

E 3: Maintenance of enclosures and netting

a. The location of enclosures in the sea must allow an adequate flow of clean water.
b. Enclosures in the sea must be protected from extreme climate conditions that may damage them.
c. The water current must not be too strong that prevents fish from holding their position in the water column.
d. They must be easily accessed from the shore for daily inspections.
e. Enclosures must have a minimum depth of 5 m.
f. Netting used in the enclosure construction must be smooth and provide a non-abrasive surface to prevent injuries to the snout, fins and scales of fish.
g. Biofouling must not be allowed to build up on the enclosure nets.
h. Enclosure nets must be regularly checked for holes and fouling and maintained accordingly.
i. Nets must be adequately tensioned and weighted to prevent distortion.

Properly tensioned netting is important to ensure that the full area of the pen is available to maintain the stocking density, and to act as a deterrent to predators.

j. Net cleaning process must not compromise the welfare of the fish from either use of the equipment itself, or from the dirt/detritus that is released because of the cleaning.
k. Frequency of net cleaning should be increased to mitigate the size and quantity of potential detritus.

B. Environmental Quality

E 4: External water quality (freshwater and seawater)

a. Water quality composition must be monitored frequently, if necessary daily, depending on the system, time of year and lifecycle stage of stock.
b. Water quality assessment procedure must be detailed in the VHWP (see HH 1).
c. If water quality departs from the acceptable range, immediate action must be taken to identify the problems and rectify the situation promptly. Records of the action taken must be kept in an auditable format.
d. Deterioration of water quality due to fouled nets or overfeed must be avoided.

E 5: Contingency plan in recirculation systems

A contingency plan must be implemented for recirculation systems detailing the course of action to be undertaken should unexpected issues arise.

E 6: Lighting

a. Lighting provides to fish must be maintained at a level suitable for each stage of development.
b. Fish must be protected from distress caused by high levels of UV light or sudden changes in lighting levels.
c. Tanks must be uncovered before transferring fish to sea to habituate them to brighter light.
d. Enclosures must be of adequate depth (minimum of 5 m) to prevent damage from ultraviolet radiation.

E 7: Sufficient light in sites

Adequate lighting must be available at any time for use when inspecting fish and equipment.

C. Environmental Impact

E 8: Environmental Impact Plan

The site must develop and implement a written Environmental Impact Plan applicable to the site or the to the region, which must be updated accordingly compliant to local regulations.

E 9: Environmental regulations

a. All relevant legislation, official guidelines and Codes of Practice must be strictly followed and understood for use of water and land.

b. A review of environmental protection policies must take place according to local regulations.

E 10: Environmental impact

a. The potential for therapeutic agents to affect the environment, both locally and globally, must be given full consideration and its use must be oriented by legislation.
b. All farms must have a written pharmaceutical waste policy.

E 11: Escapees

Fish farms must have a site-specific containment plan in place for preventing fish escaping and for recapturing them.

Farmed fish that may escape can have an adverse ecological impact and are likely to experience welfare problems. It is therefore essential that all possible reasonable measures are being taken to prevent farmed fish escaping.

E 12: Extraneous species

Extraneous species must be treated in accordance with the relevant legislation and local regulations.

E 13: Fallowing

Fallowing of enclosures must be detailed in the Environmental Impact Plan to allow recovery of the benthos and help to reduce sea lice populations.

E 14: Aesthetic

Sites must be kept organized and tidy, and all waste must be disposed of by an approved method; burning plastics is prohibited.

PART 4: PRODUCTION STAGES

OBJECTIVES: The freshwater phase of the Atlantic salmon lifecycle involves several separate stages, ranging from the egg through to the fully smolted fish, where each requires detailed standards to ensure the welfare of the fish. These standards also need to ensure that the fish are fully prepared for the seawater phase of their lives.

The seawater stage of the salmon lifecycle contains several critical control points (CCPs), such as wellboat transportation to harvest. These standards are designed to address these CCPs to ensure that the welfare of the fish is not compromised during the seawater-based processes.

A. Freshwater (Pre-Smoltification) / Juvenile Fish

These standards relate to both recirculation and flow through systems and the following definitions apply:

- ***Ova – Eyed eggs -*** *Eggs that have reached the stage of development where the black spot of the eye is clearly visible. Approximately from 220 to 250 degree-days post-spawn.*
- ***Alevins -*** *Hatched eggs not yet ready for first feeding.*
- ***Fry -*** *Starting from first feeding up to 1 gram.*
- ***Parr -*** *Greater than 1 gram and up to the start of smoltification.*
- ***Pre-smolt -*** *The final production period when fish undergo smoltification from parr to smolt.*
- ***Smolts -*** *Fully smolted.*

There are areas of ongoing research on the welfare of eggs and fish at this stage of their lifecycle. Some of this research may challenge what is at present deemed as the established practice. If any new scientific evidence outcomes promote positive effects on these or any other stage of production, HFAC will seek to incorporate information into the standards.

PS 1: Eggs and juvenile fish

a. Eggs and juvenile fish must be produced either in-house or obtained from another Certified Humane approved supplier.
b. All eggs must be tested for fish pathogens as required under the relevant legislation.
c. Eggs and juvenile fish supplied by third parties must be accompanied by full health documentation and records of the parent stock, as well as the eggs and juvenile fish themselves.

PS 2: Water supply

Supply of water must:

a. Be of high quality (see PS 4).
b. Be frequently tested for quality parameters.
c. If necessary, be filtered or treated with ultraviolet radiation.

PS 3: Freshwater stocking density

a. The following maximum stocking densities must not be exceeded:

1. Hatchery - 15,000 eggs per California basket/tray;
2. Multi-level - 20,000 eggs per tray;
3. First feeding tank - 10,000/m2;
4. Freshwater production tank:

Liveweight (mean)	Stocking density (kg/m^3)
Up to 1 gm	10
> 1 – 5 gm	25
> 5 – 30	35
> 30 – 50	50
> 50	60

b. The site stocking plan must demonstrate that the facilities can maintain and service the requirements of the stocking densities as defined above.

PS 4: Freshwater quality parameters

a. The following ideal water quality parameters must comply with:

Parameter	Ova	Alevins	Fry	Parr/Smolt
Min Oxygen (O_2) mg/l	7.0	7.0	7.0	7.0
Oxygen (O_2) % saturation in exit water	min: 90 max:110	min: 70 max:110	min: 70 max:110	min: 70 max:110
Free Ammonia (NH3) mg/l*	< 0.025	< 0.025	< 0.025	< 0.025
Carbon dioxide (CO_2) mg/l	< 6	< 6	< 15	< 15
Max temp °C	8.0	10.0	14.0	n/a
pH in the inlet water	5.5 to 8.0	5.5 to 8.0	5.5 to 8.0	5.5 to 8.0
Nitrite mg/l *	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate mg/l *, **	n/a	< 50.0	< 150.0	< 150.0
Total Suspended Solids (Turbidity)	<15 mg/l	<15 mg/l	<15 mg/l	< 15 mg/l

* Not applicable to flow-through systems.
** HFAC acknowledges that, for fully functioning recirculation systems, nitrate levels may be above 50 mg/l.

b. Water management must prevent super-saturation.
c. Water constituents (e.g. minerals) may be added to the fish environment to achieve the ideal water quality parameters.
d. In flow-through systems, the total water volume must be renewed at least once per hour.
e. In flow-through systems, the maximum water temperature acceptable for fry is 20-21° C during a summer cycle, and a minimum of 76% oxygen saturation. Under this condition, an action plan must be written and implemented to manage and mitigate any potential risk for fish thermal stress.
f. Records for water quality parameters and treatment must be available to the HFAC Inspector during the inspection and upon request.

PS 5: Ova

a. Shocking onto a dry surface is prohibited.
b. The hatching environment must minimize movement of the eggs.
c. All eggs must be disinfected prior to entry to any new facility.
d. Eggs must be water-hardened before being exposed to disinfectants or transportation.
e. Eggs being transported must be carried twice the volume of water than eggs.
f. Water flow and incubator design must be such that ‘dead spots’ within the incubator do not occur, i.e. it must be sufficient to provide oxygen and remove waste products.

g. Eggs must be placed into the hatching environment to ensure maximum survival rates and be accessible for picking; records for survival rates must be available.
h. The transportation of eyed eggs must be done using purpose-built boxes.
i. Eyed eggs must not be transported at a depth greater than 4cm.
j. After placement, green eggs must remain undisturbed (other than for picking) for 250-degree days and must not be shocked before 250-degree days or after 370-degree days.
k. Where picking is practiced, dead/unviable eggs must be removed as needed, but with minimum disturbance.
l. Regular inspections must be made to ensure the earliest detection of fungal infections.

PS 6: Hatchery

a. All equipment used in hatcheries must be:
   1. maintained in full working order;
   2. serviced and repaired as required.
b. Records must be kept of equipment services.
c. At a minimum there must be an alarm for dissolved oxygen and water level.
d. All alarms must be checked weekly and records kept.
e. There must be a screen to prevent the blocking of inlet valves that must be checked at least daily.
f. Hatching environment must be hygienic and free from any rough edges that could cause damage to the eggs.
g. Where multi-layer systems such as buckets are used, water hygiene and the integrity of the eggs must be maintained.
h. There must be no cross contamination of water from one container to another.
i. The shocking method must be identified and must not be such that it causes excessive mortality.
j. Training records must be available which identify those who are competent to perform shocking.
k. A suitable tray substrate must be in place before hatching.

To maintain moisture levels, ice may be placed above the eggs to cool the water and drip it through them.

PS 7: Multi-level hatchery systems

a. The maximum stocking density in each tray must not exceed 20,000 eggs/tray (approx. tray size of 55 x 53 cm) with eggs at no more than three tiers deep.
b. Each tray must have its own water supply.
c. Trays must be easily accessible to perform tasks such as removing the dead eggs without disturbing the other trays.
d. The flow in each tray must be visible and/or measurable and must be monitored to ensure maximum survival of the eggs; records for survival rates must be available.
e. If intending to stock above 15,000 eggs/tray, records from the previous year must indicate that mortality levels are below 5%.

PS 8: Alevins

a. The hatching substrate must provide a secure environment for the alevins without encouraging bunching.
b. All alevins must be inspected daily, and any dead ones removed.
c. The siphoning of alevins is allowed, but nets must not be used to transfer them when they weigh under 0.5 grams.
d. A lighting program must be available and no abrupt changes in light levels must be carried out.
e. Where water temperature manipulation is practiced, fluctuation in temperature and temperature gradient must be kept to a minimum.
f. Feeding must start no later than when 90% of the alevins have lost their yolk sac.

PS 9: Fry

a. Fish must have access to sufficient feed to maintain them in full health and vigor.
    1. Feed must be provided to satiate the fish and spread at regular intervals daily.
b. Light levels must be such that they allow all fish in the water column to visualize the feed at all times.
c. The load of suspended solids must allow visibility to the bottom of the tank.
d. The water depth must be appropriate to the tank for optimum water quality levels.
e. As the fish leave the bottom of the tank, water depth must be adjusted to allow natural behavior.

PS 10: Parr

a. Parr must only be crowded for a maximum of two hours and any procedure that leads to crowding must be recorded.
b. Grading must only start when most fish weigh a minimum of 1.3 grams.
c. The grader must be suitable for the size and type of fish.
d. When dealing with more than individual fish below 5 grams in weight that require culling, they must be put into an anesthetic mixture as prescribed by the attending veterinarian; record must be kept.

PS 11: Smoltification

a. All fish must be fully smolted before following to the next production phase.
b. The smoltification process (silvering, swim pattern, shape) must be monitored during the period and records kept (see HH 1).
c. The weekly ATPase test records from the current and the last cycle must be available for the auditor.
d. The use of hypertonic water (above 35 parts/1000) for smolt survival testing is prohibited.

As a guide, the following smolt scoring system may be used:

Score Appearance

1 Parr marks clear, light-colored back, flanks green, belly yellow, no silvering.
2 Parr marks fading, back and fins light, flanks starting to silver, belly yellow.
3 Parr marks faint, back and fins darkening, flanks silver, belly whitening.
4 Parr marks very faint, dark back, yellow only around fin bases and operculum, flanks silver.
5 Parr marks gone, back dark, dark margin to fin edges, flanks silver, belly white, silvering color dominant.

B. Post Smolt

PS 12: Post smolt sites

a. All fish arriving at these facilities must be fully smoltified, according to PS 11.
b. Supply water must:
   1. be of high quality;
   2. if necessary, be filtered or treated with ultraviolet radiation.
c. Grading procedures are not allowed after the arrival of the fish into the sites.
d. All handling procedures must be kept to a minimum.
e. Handling fish twice or more within 24 hours is not allowed.
f. Maximum stocking density must not exceed 60 kg/m^3.
g. Vaccination is not recommended but, if carried out, must follow all indications described for vaccination.
h. Tanks over five meters in diameter must have oxygen and/or water level alarms fitted.
i. Flow and/or oxygen alarms must be fitted to all water intakes of the rearing units.
j. All alarms must be checked weekly, and records kept.
k. Where the level of fish mortality exceeds 1,5 % weekly this must be recorded and reported to Certified humane within 72 hours.
l. Mortality must be removed from the tanks one time per day as minimum.

C. Seawater

PS 13: Seawater stocking density

All fish must be sourced from a Certified Humane approved population, including any fish that may have spent part of its life on another freshwater site prior to transfer to the present site.

a. The following maximum stocking densities must not be exceeded:
   1. Seawater enclosure: 17 kg/m^3 in proven well managed and favorable health and environmental conditions, enclosure stocking density may be up to 21 kg/m^3.
   2. Overall seawater site enclosure: 17 kg/m^3.
b. Management measures that prevent exceeding maximum stocking density allowed and compromising salmon welfare must be written and adopted (e.g. alternative diet, feeding regime, anticipated harvest).

PS 14: Seawater enclosure design

a. The depth of the net must be such that there is a gap of at least 5 m from the base of the net to the seabed.
b. Whichever net design is used, the proportion of the cone considered in the stocking density calculations must permit a minimum of a 5 m diameter swim circle. This includes all types of coned net: circle with coned base, square with coned base and fully coned nets.

PART 5: MANAGEMENT

OBJECTIVES: A high degree of caring and responsible management is vital to good animal welfare. Managers and caretakers for both freshwater or sea water facilities must be thoroughly trained, skilled and competent in animal husbandry and HFAC Animal Care Standards.

A. Managers and Stock-keeper Training

M 1: Understanding the standards

Managers must ensure that:

a. All personnel involved in husbandry practices have access to a copy of the current *Animal Care Standards for Farmed Salmon;*
b. They and all personnel involved in husbandry practices are familiar with the standards and apply their content.

M 2: Training

a. Site managers must:
   1. be able to demonstrate that staff with responsibility for animal care are trained and competent in aspects of fish husbandry and welfare, relevant to their duties. When deficiencies are noted, managers must provide appropriate training to ensure that all stockkeepers have the required skills;
   2. make sure that all third-party staff being used for the husbandry, handling, procedures and process on sites (i.e., crowding, harvesting, treating, vaccination, transportation) have proper training to ensure fish welfare.
b. Written records of managers and staff training (including third-party staff) must be maintained.
c. Stock-keepers and all personnel involved in husbandry practices must be able to:
   1. demonstrate their proficiency in procedures that have the potential to cause pain or distress including netting or other handling, crowding and euthanasia;
   2. recognize indicators of poor welfare in fish including abnormal behavior, physical injury and symptoms of disease;
   3. understand the needs of the fish and be aware of any risks involved and the procedures to address those risks;
   4. recognize visual indicators of poor fish water quality (e.g. gasping, increased aggression);
   5. recognize fish behavioral indicators of poor water quality or any other abnormal behavior.
d. An adequate number of experienced staff must be available to deal sufficiently quickly with any problems that arise.

M 3: Emergency management

Managers must:

a. Develop and implement plans and precautions with the procedures to be followed in emergencies such as fire, leaks, disease outbreaks, extreme climate conditions, problems

with transportation, and any other catastrophic events that may adversely affect water quality, such as algal or jellyfish blooms.

b. Provide an emergency action note, sited in an easily accessible location, highlighting the appropriate emergency contact numbers and a map grid reference for the location of the unit.
c. Ensure that all relevant staff members are fully conversant with the procedures which must be implemented if there is a fish escape incident, including the plans for the recapture of escaped fish.

B. Inspection and Records

M 4: Operation records

Operation records must be kept up-to-date and presented in a auditable format to the HFAC inspector. These records include, at a minimum:

a. details of origin of stock, allowing traceability
b. control of any extraneous/non-target fish
c. crowding and grading records
d. calibration records
e. numbers, age and weights/uniformity of fish in each tank/enclosure
f. estimated current stocking densities in each tank/enclosure
g. where appropriate, target age and weight at which fish will be transferred to sea or slaughtered (in order to predict final stocking densities)
h. details of fish and equipment inspects
i. daily and cumulative mortality expressed as a percentage (reasons stated)
j. daily and cumulative culling expressed as a percentage (reasons stated)
k. feed consumption
l. details of any health problems
m. details of any medication/vaccinations applied
n. records of smoltification monitoring
o. records of regulatory correspondence (SERNAPESCA, SUBPESCA, SAG, etc.)
p. records of water quality tests as appropriate to the system
q. records of net inspections and maintenance
r. training records
s. full details of fish movements, , allowing traceability

M 5: Monitoring fish

a. Fish must be inspected at regular intervals, at least twice daily, weather permitting.
b. Any welfare problems seen during an inspection by the stockkeeper must be dealt appropriately and without delay.
c. If problems are identified during an inspection, the stockkeeper must act promptly to discover the cause and take remedial action, in consultation with a veterinary when necessary.
d. Full records must be maintained of inspections, including:
   1. the time and date of inspection;
   2. identification of the person(s) conducting the inspection for each group of animals;

3. details of any problems identified and any actions taken including those relating to moribund/injured/damaged fish, where the reason for the problem must be recorded.

M 6: Dead/moribund fish

a. Removal of dead/moribund fish from the surface or the mortality removal system must occur as frequently as is necessary and, in any case:
   1. at least twice a week, unless adverse weather conditions put at risk personnel;
   2. at least daily for land-based systems.
b. The known causes of death must be classified, and veterinary advice should be sought if the cause of death is not clear according to the criteria identified in the VHWP (HH 1).
c. Relevant staff must demonstrate competence in interpretation of mortality records.

M 7: Equipment

a. Any equipment defects must be immediately rectified or, if this is not possible, alternative measures must be taken to safeguard fish welfare.
b. Alternative measures must be written in the Emergency and Contingency Action Plan section of the VHWP (see HH 1) and all staff must be made aware of them.

M 8: Complaints to Operators

a. To be certified, an Operation must maintain systems for receiving, responding to, and documenting complaints alleging the Operation's failure to comply with *Humane Farm Animal Care* standards.
b. Whenever an Operator receives a complaint, the Operator must record:
   1. Date
   2. Complaint format (written or verbal)
   3. Complainant
   4. Description of complaint
   5. Action taken to resolve the complaint
   6. Results of action taken
   7. Supervisor initials
c. Operators must notify *Humane Farm Animal Care* if an adverse ruling (such as suspension or revocation of certification, fine, or sanction) related to the Operation's humane management practices is levied against the Operation by another certifier or by a governmental program which regulates the industry.

PART 6: HEALTH AND HUSBANDRY PRACTICES

OBJECTIVES: Fish must be protected from pain, injury and disease. The environment in which they are raised must be conducive to supporting good health. All producers must develop a health plan in consultation with their veterinarian. Animals need to be handled in a considerate and skilled manner.

A. Health Care Practices

HH 1: Veterinary Health and Welfare Plan (VHWP)

a. A site-specific Veterinary Health and Welfare Plan (VHWP) must be drawn up for both fresh or sea water facilities, reviewed and regularly updated in consultation with a veterinarian:
   1. at the start of every production cycle or on an annual basis;
   2. by those with responsibility for the health and welfare of the fish, which may include the vet, health manager, stockpersons, nutritionist and other relevant personnel;
   3. and details of the review must be made available on request.
b. The VHWP must include future husbandry plans, risk assessment, monitoring and control of fish health and diseases.
c. The VHWP must be treated as a live document and therefore if a problem is identified, it must be revised without delay to ensure that the welfare of the fish is not compromised.
d. The VHWP must establish a methodology for monitoring salmon welfare indicators (SWIs), including but not limited to eye abnormalities (exophthalmia, hemorrhaging), opercular damage, emaciation state, vertebral deformity, other deformities, skin lesions, scale loss, sea lice infestation, fin damage and sexual maturity.

HH 2: Notifiable diseases

All relevant legislation regarding notifiable diseases must be understood and adhered to.

HH 3: Preventing injuries

a. There must be no recurring physical damage occurring on fish attributable to features of their environment, husbandry procedures or unrecognized disease challenge.

Recurring physical damage is that observed on a number of fish and with sufficient similarity to suggest a common cause, body lesions due to, for example, poor tank or enclosure design, methods of handling or a husbandry procedure. Different types of physical damage may also suggest a common cause.

b. Fish condition must be continuously monitored for signs of disease or problems with the environment or handling practices.

HH 4: Care of sick and injured animals

Any fish suffering from overt physical damage, or disease symptoms, must be:
a. Segregated.
b. Treated and/or humanely euthanized without delay.

HH 5: Casualty slaughter

a. Any seriously sick or injured fish, or fish found not to be recovering, must be humanely killed without delay. Records of this must be made available on request.
b. During the seawater stage, in addition to anesthetic overdose, the following are permitted for the emergency killing of fish:
    1. a priest of appropriate size for the fish;
    2. a mechanical percussive device.
c. Use of the emergency killing methods listed under HH 5.b must result in a non-recoverable percussive blow to the head of the fish to render it immediately insensible.
d. Under no circumstances must seriously injured or sick fish be left to die in air.
e. Culling sick or injured fish must only be conducted by suitably trained and competent people.

HH 6: Biosecurity

High standards of biosecurity must be maintained to avoid the spread of diseases between different populations of fish, as specified in a written policy, contained within the VHWP (see HH 1).

B. Handling

HH 7: Handling

a. Removal of fish from water and handling must only be carried out when absolutely necessary.
b. If fish must be handled:
    1. adequate support must be given to the fish´s body;
    2. live fish must never be held by the tail only or thrown over solid objects.
c. Time out of water must:
    1. be kept to the minimum possible;
    2. never exceed 15 seconds for a live fish (unless anaesthetized).
d. Fish must not be left to die in air.
e. Fish must not be crowded for more than two hours.

HH 8: Pumps / Pipes / Hand nets

a. Where pumps and pipes are used these must:
    1. not unnecessarily stress fish;
    2. be appropriate for the size of the fish being pumped to avoid injury;
    3. be free from sharp protrusions, joints, kinks, bends or rough inner edges that are likely to injure fish.
b. Wherever pipes are used, there must be a humane method in place to ensure that all fish have been removed from the pipe at the end of the operation or if equipment fails during the process.
c. The drop from the end of any pipe must be such that it:
    1. avoids injuring the fish;
    2. allows fish to disperse without others landing on top of them.
d. When hand nets are used they must be:
    1. of a suitable size;

2. designed to avoid the occurrence of physical damage;
3. kept clean, in good repair and disinfected before use with different fish populations.

C. Treatment and Vaccination

HH 9: Injection procedures

a. Any injection delivery to fish at freshwater or sea site must be described in the VHWP.
b. All injection procedures must be continuously monitored to ensure the welfare of fish is not compromised.
c. Mortality checks must be recorded within 48 hours after injection administration.
d. Drugs administered via injection must be used according to manufacturers' instructions.
e. Fish must not be crowded for more than two hours, and no enclosure must be crowded more than twice in any one week or three times in any month, unless required otherwise by the attending veterinarian.
f. After transferring to sea, smolts must not be handled for at least 120 days, for example not crowded, except for veterinary treatments or sampling required by the competent authorities.
g. Operators must regularly inspect needles and replace them if necessary, according to manufacturers' instructions.
h. Audit sampled fish must only be culled by trained/competent personnel.
i. The appointed supervisor/injection team leader must check at the beginning of the process, and at regular intervals during the day to ensure that the procedure is being done correctly. Records of these checks must be made.
j. The injection procedure must be subject to a third-party audit.

HH 10: Anesthesia procedure

a. All fish must be properly anesthetized before being injected and the procedure must be carried out by trained, competent personnel.
b. Anesthetics must be used according to manufacturers' instructions and must:
    1. be on site before vaccination commences;
    2. only be administered to fish by suitably trained staff.
c. Following injection, any gradients from the injection table to the recovery tank/pen must be such that the fish are not at risk of hitting the bottom of the tank/pen or other fish.
d. Care must be taken when returning the recovering fish to the tank/pen following the anesthetic/injection process.
e. There must be a team member with responsibility for:
    1. monitoring regularly the oxygen levels at a minimum of 7mg/L in the anesthetic bath and at the recovery tank to ensure that they are recovering from the anesthetic process;
    2. check the depth and flow of water to ensure that returning fish are not returned to water that is either too shallow, or at an incorrect flow rate, depth or quality.
    3. rectify and record any issues.

HH 11: Treatments

a. The medication for treatment must only be administered to fish:
    1. by suitably trained staff;

2. strictly in accordance with the instructions prescribed, which must be on site before the treatment commences.
3. when advised by the attending veterinarian and in accordance with current legislation for use in Atlantic salmon.

b. In exceptional circumstances, on the advice of the designated veterinary, specific products licensed for use in other farmed species can be administered as detailed in the VHWP, providing that a valid discharge consent is held from the appropriate government body.
c. Veterinary medicine withdrawal periods must be strictly met.
d. Veterinary products must be properly labelled and stored.
e. Records must be kept of all treatments.
f. Any treatments that have clearly not worked or had an adverse reaction must be:
   1. recorded in the medicine record book;
   2. reported to the farm veterinary and health manager.

HH 12: Non-medicinal treatments for sea lice

a. The treatment record must include:
   1. The non-medicinal method and reason for treatment;
   2. The average weight and number of fish treated per enclosure and site;
   3. The location of fish populations both pre- and post-treatment, when applicable;
   4. The fasting period pre-treatment which must not exceed 48 hours for physical delousing or 72 hours for freshwater bathing;
   5. The health status post-treatment;
b. In exceptional circumstances, on the advice of the designated veterinary, specific products licensed for use in other farmed species can be administered as detailed in the VHWP, providing that a valid discharge consent is held from the appropriate government body.
c. Veterinary and non-medical products must be properly labelled and stored; withdrawal period must be observed.
d. When salmon are bathed in freshwater on a wellboat, the maximum stocking density in the well must be in accordance with standard T5.
e. For freshwater bathing, the water quality parameters must be maintained at all times in accordance with T35.
f. Thermal delousers must adhere to the following limits:
   1. Maximum water temperature must not exceed 34 ºC;
   2. Maximum delta temperature must not exceed 22 ºC;
   3. Maximum length of time fish are exposed to the thermal treatment is 35 seconds.
g. Fish must not be subjected to more than one non-medicinal treatment within a 28-day period, unless approved by a veterinarian.
h. In the event of obvious and serious welfare concerns being identified during the treatment, the treatment must be stopped.
i. After the completion of the treatment for a site, a post-treatment report must be completed within 14 days, indicating at minimum:
   1. mortality for each enclosure and for the site;
   2. efficacy of lice removal (where applicable)
   3. results of welfare outcome assessments (for pre- versus post-treatment)

j. An action plan developed to avoid/improve where any issues have been identified relating to increased mortality, less than expected lice removal, and/or increased welfare scores,
k. Any treatments that have clearly not worked or had an adverse reaction must be:
    1. recorded in the medicine record book;
    2. reported to the farm veterinary and health manager.

HH 13: Freshwater vaccination

a. The VHWP must have a detailed vaccination program.
b. Vaccination by immersion method only is allowed for fish with 1-gram liveweight.
c. Prior to vaccination, there must be a vaccination plan in place, which must:
    1. be agreed and signed by the vaccination team leader and site appointed supervisor;
    2. include the number and weight of the fish to be vaccinated;
    3. detail the expected timeframe of the process.
d. Vaccination teams must ensure that all staff working with stock are trained and competent in the aspects of the vaccination process to which they are assigned;
e. Site staff must ensure that all fish have been pre-graded before they are vaccinated.
f. Vaccines must be used according to manufacturers' instructions.
g. Vaccines and anesthetics must:
    1. be on site before vaccination commences;
    2. only be administered to fish by suitably trained staff.
h. Water temperature for vaccination must be according to manufacturers' instructions.
i. All fish must be suitably anesthetized before being vaccinated.
j. Where fish are humanely dispatched at the freshwater stage this must be undertaken through an overdose of a suitable anesthetic.
k. At the end of the process there must be a reconciliation between the amount of vaccine used and the number of fish which have been vaccinated. This must be recorded.

HH 14: Freshwater automated vaccination

a. All fish must have been pre-graded before they are vaccinated.
b. An assessment of fish condition must be made before the grading process begins, to ensure that they are robust enough to endure the grading procedure, where machines simultaneously grade fish at vaccination.
c. The equipment must:
    1. be thoroughly checked after transportation for any damage/broken parts which may halt the vaccination process;
    2. be calibrated according to the size of the fish, taking into account the vaccination depth, position, angle and dosage of the vaccine;
    3. be checked for the correct calibration at least once per hour during the vaccination process.
d. A sample of fish must be vaccinated to check equipment calibration before the process is started. A sample fish may be humanely culled for confirming vaccination accuracy.
e. All fish must be anesthetized before being vaccinated.
f. There must be continual monitoring for any fish trapped in the pipes and these checks must be recorded.

i. Needles must be inspected at least every two hours and replaced according to manufacturer's guidelines.
j. After transportation, the machine must be thoroughly checked to ensure that any working parts have not been damaged during the transportation process.
k. At the end of the process there must be a reconciliation between the amount of vaccination used and the number of fish which have been vaccinated. This must be recorded.

D. Mortality, Mutilations, Genetic Selection

HH 15: Mortality recording and reporting

a. Where the level of fish mortality exceeds the threshold indicators shown below, this must be recorded and reported to HFAC within 72 hours:
   1. Freshwater:
      - Egg to 1st feed: 6% weekly
      - From 1st feed to 5g: 3% weekly
      - From 5g to smolting: 1.5% weekly
   2. Seawater:
      - Accumulated mortality for 30 days after transference to seawater site: < 1.5%
      - Daily mortality: <0.03%
b. Where the level of mortality exceeds the above:
   1. an investigation must take place relating to the cause of the mortality;
   2. a plan must be put in place to address the issue.

HH 16: Mutilations

a. Any mutilation involving the removal of sensitive tissue is prohibited.
b. Marking methods that cause distress or injury to fish must not be used.

HH 17: Generic selection and modification

a. Genetic selection techniques are prohibited.
b. Fish must not have been produced by breeding techniques that result in health or welfare problems for any of the animals involved.
c. Breeding procedures that adversely affect the welfare if the fish are prohibited.

E. Grading/Crowding at Freshwater Enclosures and Seawater Sites

Optimizing husbandry practices and farming environments can significantly reduce the creation of size hierarchies within populations, and therefore also reduce the requirement to grade. For example, evidence shows that feed distribution and ration size are extremely important, as is knowing how many fish and of what size are present in the population. Underfeeding quickly results in the development of a hierarchy which, if allowed to prevail, can be the cause of welfare problems for some fish.

Lighting strategies can also reduce or eliminate the need to grade maturing populations.

HH 18: Grading plan

a. Grading must only be performed when absolutely necessary.

b. A written grading plan must be agreed between farm management and site staff and/or grading operator prior to operations commencing. This plan must become a part of the VHWP (see HH 1).
c. The grading plan must include:
    1. the reason for the need to grade;
    2. a pre-grade risk assessment;
    3. the number of fish to be graded per day;
    4. the location of fish populations both pre- and post- grade;
    5. the pre-grade fasting period;
    6. the health status of the fish;
    7. the equipment to be used, including the type of grader;
    8. expected timetable for completion of the grade;
    9. the required number of staff and duties to be performed;
    10. the physical characteristics of the site such as water temperature, tides and weather conditions;
    11. the training records of the grading team;
    12. the requirement for a post grading health check;
    13. post grading mortality records;
    14. the agreement and signatures of the site manager and the person in charge of the grading equipment.

HH 19: Grading equipment

a. All grading equipment must be designed and maintained to prevent damaging or causing stress to the fish.
b. Sweep nets must be of knotless material, of optimal design for the enclosure, and of an appropriate mesh size for the fish.
c. Sweep nets must be used to crowd a portion of the population rather than crowding the whole enclosure.
d. Enclosure nets must be kept clean to avoid water quality problems during crowding.
e. All equipment must be thoroughly cleaned and disinfected before use and between sites.

HH 20: Grading process

a. Only healthy fish must be subjected to the grading process.
b. Grading all populations into new enclosures is preferable to optimize fish welfare.
c. Prior to grading, fish must be fasted for the minimum period required in order not to compromise their welfare (see F8).
d. If fish are being returned to their original enclosure, it must be large enough to ensure the welfare of both the original and returning populations.
e. The grade must be completed in one continuous operation.
f. No enclosure must be crowded more than twice in any one week or three times in any month, unless this is required by the designated veterinary for fish welfare reasons.
g. Grading operations must not take place if adverse weather conditions are likely to compromise fish welfare.

HH 21: Monitoring fish

a. Producers must:

1. humanely cull any extraneous/non-target fish that are present in the tanks or enclosures;
2. be aware of, and adhere to, any legislation relating to protected species.

b. Fish must be monitored throughout the operation by a designated person properly trained and competent, and whose responsibility is to recognize welfare issues and take appropriate action if necessary.
c. Mortality checks must be recorded as soon as possible after grading.

HH 22: Oxygen levels

a. Oxygen levels in the water must:
   1. be monitored and recorded throughout all crowding operations (e.g. grading, vaccinating and treating);
   2. not fall below 7mg/l, with appropriate action taken should this occur.
b. Supplementary oxygen and/or aeration must be available for the duration of the crowding procedure.

HH 23: Passive grading

a. Where passive grading is used, the size and design of the grading panel must be appropriate for the size of fish that are to be graded, and the enclosure they are contained within. Passive grading must be carried out where possible and practical.
b. The grading panels must be pre-checked for signs of wear before grading commences.

HH 24: Manual grading

a. Pumps must be able to push the required distance.
b. The operator must be able to control the speed of the pump.
c. All pipes must be:
   1. smooth with swept bends;
   2. of a diameter which is appropriate for the size of the fish, including when they pass through the couplings.
d. Water must always flow through the pipework to minimize the incidence of scaling.
e. The grading table must be smooth, with no sharp edges.
f. Where counters are used, they must be in working order and be fit for purpose.
g. The sweep net/crowding device must:
   1. be of an appropriate size;
   2. have sufficient floatation;
   3. be constructed of knotless mesh.
h. No fish must be kept out of the water for more than 15 seconds unless anesthetized.

HH 25: Wellboat grading

a. All wellboat crew involved in the grading process must have received the appropriate welfare training in addition to their maritime responsibilities.
b. There must be a nominated person who is responsible for the care of the fish during the time that they are on board.
c. All equipment must be checked to ensure that it is working and fit for purpose before pumping commences.
d. Extreme care must be taken when pumping the fish.

e. The grader must be positioned so that the crew member operating the pumps can clearly see the fish.
f. Graders must have safe personnel access around them to facilitate routine inspection.
g. Returning pipes must:
    1. be fully supported;
    2. have minimal joins;
    3. be of sufficient length to safely return graded populations away from the edge of the enclosure.
h. Before leaving the site, careful inspection and disinfection of the equipment must be carried out as appropriate.

Vacuum pumping fish twice within 24 hours is not optimal welfare practice. Consideration and preference should be given to the use of wellboats with 'over-pressure' (reverse siphon) discharge capability where possible.

i. Any fish that are placed in the hold after grading must be subjected to an additional welfare risk assessment. Any additional fasting period must be authorized by the veterinary or health manager and must be recorded in the VHWP (see HH 1).
j. Discharges which do not entail the use of moving bulkheads must have the ability to trim the wellboat during the final stages of the discharge to prevent compromising the welfare of the last fish.
k. There must be a site grading plan for inspection.

HH 26: Pushing / towing enclosures

a. The speed of pushing must be suitable for the size of the fish.
b. There must be a designated person on the enclosure who is responsible for maintaining the welfare of the fish.
c. There must be clear communication between the skipper and the designated person on the enclosure.
d. The speed of pushing must not be faster than the speed of the swimming fish.

F. Sea Lice

The problems involved with the availability of effective treatments for sea lice infestations are recognized. The welfare and environmental impact of treatments must be given full consideration. HFAC will monitor the situation and review new technology and research as they develop and are published.

HH 27: Sea lice

a. Farms must take all reasonable steps to minimize the gravid lice population, as per the requirements of local regulation.
b. Stock-keepers must be able to recognize symptoms of lice infestation.
c. Separation of year classes and fallowing of sites must be practiced for helping control sea lice populations, as detailed in the Environmental Impact Plan.

d. The producer must, through documented evidence, demonstrate that any co-operative management schemes between operations in the same seawater area aimed at reducing sea lice populations have been entered.
e. Sea lice prevention and treatment programs must be drawn up with the designated veterinary and fully detailed in the VHWP.
f. Sea lice damage to fish must be recorded during lice counts. This must include:
    1. condition of fish – good/thin;
    2. site of lesions;
    3. skin condition;
    4. fish behavior – lively/moribund.
g. Any fish with severe physical damage caused by sea lice grazing must be removed and culled humanely without delay.
h. Non-medicinal sea lice removal technologies must be risk assessed against the impact they may have on the welfare of the fish, prior to each use of technology.
i. The requirement to complete the lice removal risk assessment must be included in the VHWP and made available upon request.
j. There must be a designated person responsible for the welfare of the fish during the lice removing process.

G. Protection from Other Animals

HH 28: Precautions and protection from other animals

a. Humane precautions must be taken to protect salmon from other animals that could cause them harm, including bringing in diseases.
b. Methods used to protect the fish must be written in the Predator Control Plan.
c. The primary means of protecting the fish must be through physical exclusion, by denying other animals access to tanks and enclosures.
d. If the fish have been attacked, they must be checked for signs of any injury without delay from the time the attack became apparent.

HH 29: Wild animals trapped in enclosure nets

a. The following details of all wild animals removed from nets must be recorded:
    1. species;
    2. date of removal;
    3. whether the animal was dead or alive on removal.
b. Enclosures must be:
    1. protected using visible top nets that are secured to prevent the ingress of predators into the enclosure;
    2. of a mesh size that does not ensnare birds.

HH 30: Predator-proof nets

a. Predator-proof netting must be considered for deployment at high-risk sites during the high-risk periods, and at all other times if there is a risk of attack.
b. Where predator-proof nets cannot be deployed for animal welfare reasons, the precise nature of the animal welfare reasons must be documented and recorded.
c. Shooting of sea lions is not permitted.

HH 31: Acoustic devices

a. Acoustic Deterrent Devices/Acoustic Startle Devices (ADDs/ASDs) may only be used in accordance with any required licensing requirements, legislation, codes and/or guidelines.
b. If ADDs/ASDs are used, they must be:
    1. models which operate in a way that do not negatively impact non-target species;
    2. effective in deterring seal depredation;
    3. regularly serviced and maintained to ensure that they are in full working order.
c. If ADDs/ASDs are deployed:
    1. the ongoing operating status of ADD/ASDs must be recorded as part of the daily site checks;
    2. the date of deployment of the devices must be recorded in the VHWP.

PART 7: TRANSPORTATION

Objectives: Transport systems need to be designed and operated to ensure that fish are not caused unnecessary distress or discomfort. The transport and handling of fish must be kept to an absolute minimum. Those involved in fish transport need to be thoroughly trained and competent to carry out the required tasks.

A. General Transport

T 1: Transport suppliers allowed

All suppliers of different modes of transport (road/helicopter/wellboat), used for fish from Certified Humane approved sites, must be previously approved by HFAC.

T 2: Training and awareness of welfare

a. All people involved in the transportation of fish must be familiar with, and transport fish in accordance with all relevant legislation.
b. Transport operators must ensure that all people involved in the transportation of the fish have a copy of the current version of the 'HFAC Welfare Standards for Farmed Atlantic Salmon' at each site or vehicle and:
    1. are familiar with its content;
    2. understand and apply its content;
c. All staff working with, or handling fish must be:
    1. trained and competent;
    2. aware of their duties;
    3. aware of any welfare risks involved;
d. Records of staff training must be kept and made available during the HFAC inspection and upon request.

T 3: Transport planning

There must be proper planning and orderly communication between all of those involved in transporting/harvesting/grading fish to avoid potential or actual delays and welfare issues. Planning records must include:

a. Number of fish to be transported;
b. Size range of the fish;
c. Weight of the fish;
d. Current health status of the fish.

T 4: Handling

Any handling of fish prior and during to transport must:

a. Be kept at minimum;
b. Be conducted in such a way as to prevent any unnecessary distress to the fish;
c. Not result in fish being out of water for more than 15 seconds (unless anesthetized).

T 5: Water quality and stocking density

a. Changes in water temperature and pH must be avoided, kept as close as possible to that from which the fish came.
b. Water must be free from contaminants which may be detrimental to the welfare of the fish.
c. The maximum stocking density in the well must be based on the liveweight of the fish as follows:

Liveweight of fish (kg)	Maximum stocking density (kg/m^3)
5.0	125
4.0	110
3.5	100
3.0	90
2.0	75
1.0	60

d. The water quality, husbandry, biosecurity and records kept must conform to those as per the wellboat harvesting and transporting standards.

B. Site Staff Responsible for Moving Fish

T 6: Transport plan

a. All journeys to which fish is subjected to must have a transport plan that covers important aspects such as:
   1. journey times;
   2. water qualities;
   3. identity of those responsible for fish welfare.
b. Site managers must ensure that all staff, including transport staff, are aware of this transport plan.

T 7: Fish fit for transport

a. Only healthy, undamaged fish must be transported.
b. Care must be taken to ensure dead fish are not loaded for transport.
c. Sick or seriously injured fish must:
   1. not be transported;
   2. be humanely destroyed.

T 8: Monitoring and records

a. There must be a named member of staff responsible for monitoring the welfare of the fish during loading, transport and unloading.
b. Records of procedures relating to loading, transport and unloading must be maintained and include details of any casualties or compromises to the welfare of the fish.
c. The following records must be kept:
   1. time since last handling;
   2. time since vaccination;
   3. time since last treatment (including anesthetic);
   4. feed withdrawal period;
   5. date of full smoltification;
   6. any clinical signs of disease;

7. crowding records;
8. oxygen levels during crowding;
9. numbers of fish in each tank to be transported;
10. stocking densities of tanks being used for transport.

T 9: Fasting

Pre-transport fasting must:

a. Never exceed 48 hours for freshwater fish and 72 hours for sea fish, unless specified otherwise by a veterinarian.
b. Be recorded in the VHWP where it exceeds the time limits mentioned above with related causes.

T 10: Bath treatments

Any bath treatment must be:

a. Completed at a minimum of 14 days before transport, unless stated otherwise by veterinary advice, and;
b. Recorded as part of the VHWP.

T 11: Nets for transport

a. Hand nets must:
   1. be of a correct size so that they can be easily lifted and the fish at the bottom of the net are not injured;
   2. have a suitable mesh size for the size of the fish which prevents fish escaping;
   3. not be overfilled.
b. Fish must not be netted before they are ready to be received at the transport tanks/helicopter buckets.
c. The netting of the last fish in any tank must be undertaken with a great deal of caution and care so as not to injure any fish.

C. Transport Staff

T 12: Equipment inspection

a. All equipment that the fish rely on for life support must be inspected at least every 4,5 hours.
b. If any faults are found in the equipment:
   1. any fish in transit must be inspected;
   2. any problems must be corrected immediately.

T 13: Management of oxygen, water temperature and pH

a. Supplementary oxygen or aeration must be available during all transportation, which is sufficient to last at least 50% longer than the anticipated journey length.
b. Oxygen levels must be:
   1. monitored throughout the journey (including for any internal journeys);
   2. maintained at a minimum of 80% saturation and/or a minimum of 7mg/liter.

T 14: Records of dead or injured fish

a. Any fish which died during transportation must be separated from live fish immediately upon arrival.
b. Records must be kept of any deaths or injuries that occur during transportation.

T 15: Cleaning and disinfection

Transport containers and equipment must be cleaned and disinfected after each consignment, to prevent the spread of disease to fish.

D. Fry Transport

T 16: Fry transport

a. Calculation of stocking densities of the floor area of tanks must consider the tendency of fry to crowd together on the bottom of the tank.
b. The oxygen supply to the bottom of the tank must concern the nature of fry crowding behavior.
c. If a hose is used to flush the tank out at the end of a discharge, it must not be aimed at the fish, but at the side of the tank to avoid injuring the fish.
d. Oxygen levels must be:
    1. continuously monitored;
    2. maintained at a minimum of 7mg/liter.
e. Air sausages must be securely attached to avoid damaging the fish.
f. Ferries must be pre-booked prior to sailing.

E. Road Transport

T 17: Driver´s responsibilities

a. The driver of the vehicle must:
    1. be fully aware of the transport regulations relating to the fish;
    2. understand the needs of the fish being transported;
    3. drive in a manner which will not compromise the welfare of the fish.
    4. Be properly trained for this duty.
b. Before leaving the site, the driver must:
    1. perform a visual check of the oxygen levels and rates of aeration into the tanks;
    2. record the oxygen levels on the record sheet.
c. During the journey, if oxygen levels become unstable, the driver must:
    1. be able to visually check the fish for signs of stress;
    2. be able to identify the cause of the oxygen instability;
    3. take appropriate action to ensure the welfare of the fish.
d. Drivers must be able to gain access below deck during the journey to monitor the welfare of the fish.
e. When arriving at the discharge site, the driver must:
    1. have been aware of the biosecurity/environmental requirements before arrival on site;
    2. ensure compliance with any biosecurity/environmental requirements.

T 18: Transport tanks and openings

a. Tank insulation must be such that it allows the water to remain at a constant temperature at approximately ±1.5 °C from the start of the journey.
b. All transport tanks and life support systems must:
    3. be fit for purpose;
    4. fully inspected before loading;
    5. be without leaks, chips or cracks.
c. All lids, outlets and any other openings must be fully secured before departure.

T 19: Stocking density and water quality

a. Tanks must contain water of adequate quality, with temperature and oxygen levels monitored and maintained according to PS 4.
b. The maximum stocking density must be set so that water quality is maintained for the duration of the journey.
c. Diffused oxygen must be spread around the water column using an oil free compressor.
d. There must be sufficient aeration to avoid dead spots inside the tanks.

T 20: Ferries

a. If a journey requires the use of a ro-ro ferry, procedures must be in place to ensure the welfare of the fish during the journey.
b. Any ferries used must be pre-booked before sailing.

T 21: Unloading

a. After arriving on site, discharge must take place without undue delay.
b. The lorry must be sited to ensure that all tanks can be fully emptied, considering any cambers which may be apparent in the ground.
c. Valves must be suitable for more than one fish to pass through at any one time.
d. All pipes must be securely attached to prevent fish from escaping during the unloading process.
e. All unloading must be through valves rather than netting fish from the tanks.
f. Any pipes must be able to be adjusted to account for any rise and fall in the tide.
g. Water must always be in the tanks during unloading to avoid the last fish becoming dry and without oxygen.
h. There must be a system for flushing the tanks at the end of unloading to ensure that the last fish is removed without compromising their welfare.
i. Tank design must facilitate the discharge of the last fish by having sloping floors which guide them to the outlet.

F. Helicopter Transfer

T 22: Crew involved

a. Pilots and ground crew must be trained and competent in the welfare consequences of how they handle fish.
b. There must be staff available at each site receiving fish who are aware of the necessary procedures to safeguard welfare.
c. Site staff must be able to communicate with the loading site and the helicopter crew.

T 23: Preparations

a. All receiving enclosures must be clearly identified, e.g. with marker buoys.
b. Helicopter buckets and other ancillary equipment must be:
    1. fully maintained;
    2. clean;
    3. fit for purpose.
c. There must be sufficient buckets to ensure that the time that fish must wait for transportation does not compromise their welfare.
d. The planned maximum journey time to the discharge site with fish on board must be no longer than 15 minutes.
e. A sample weight of fish must be known before loading commences.
f. There must be a contingency plan in place for:
    1. bad weather;
    2. if a bucket will not open.

T 24: Loading

a. The fish must be transferred from the tanks/rearing enclosures without causing injury to fish.
b. The loading of the fish into the buckets must coincide with the arrival of the helicopter.
c. The helicopter bucket must contain approximately two thirds water before any fish are loaded into it.
d. The life support system of the bucket must be switched on and working before the fish are put in.
e. Helicopter buckets must have their own independent supply of oxygen.
f. The oxygen levels in the bucket must be:
    1. the same as that of the tanks from where the fish came from;
    2. maintained at a minimum of 7mg/liter.
g. The maximum stocking density in the bucket must be no greater than 400kg/m³.

T 25: Unloading

a. The helicopter bucket must be lowered gently into the water for unloading the fish to avoid injuring them.
b. The helicopter bucket must be allowed to empty completely before moving off.

G. Wellboat Transport (Smolts) and Seawater Site Staff (Receiving)

T 26: Requirements for wellboats and planning

a. Wellboats arriving in Chile to work within Chilean waters must carry a valid certificate of disinfection from their site of origin.
b. Only wellboats with the ability to run on closed valves are permitted.
c. The journey must be planned to ensure that arrivals at the loading and unloading sites are such that they avoid delays in moving the fish.
d. There must be enough light in the well to enable easy inspection of the fish.
e. If necessary, during the transport of smolts in the wellboat, the water can be gradually chilled by a maximum of 1.5° C every 4 hours to match the temperature of the seawater site.

T 27: Competent staff

All staff responsible for receiving fish and all vessel crew members must be trained and competent to preserve the welfare of the animals, recognize and solve eventual problems promptly.

T 28: Stocking density and fish counting equipment

a. Maximum stocking densities must:
   1. be within 40–50kg/m³ (depending on water quality and size of smolts);
   2. be set so that water quality can be maintained over the length of the journey.
b. If fish counting equipment is in place, it must:
   1. be over a de-waterer;
   2. be fully maintained;
   3. be regularly calibrated to maintain accuracy;
   4. be of a design not likely to cause damage or injury to the fish.
c. The number of fish to be loaded must be known to be able to verify compliance with the stocking density.
d. A system must be in place to ensure that the numbers of fish to be discharged into each receiving enclosure is pre-planned and reported to well boat staff before discharge begins.

T 29: Pumps, pipes and discharge

a. The unloading of fish must not take place if adverse weather conditions are likely to compromise the welfare of the fish.
b. Adjustments must be made to the trim/balance of the wellboat to ensure fish are aligned with the discharge point.
c. Pumps and pipes used for unloading must be positioned to minimize the height and distance that the fish have to be pumped.
d. The pipe layout angle and drop must:
   1. lead to good distribution into the enclosure;
   2. minimize the risk of collisions between fish.
e. Pumps and pipes must be free of any rough edges which might damage the fish.
f. There must be a method in place to ensure that no fish are left in the pipes after pumping, or during a breakdown.
g. Water flow through the wells at discharge must:
   1. be sufficient to facilitate movement of the fish;
   2. not be so strong as to cause the fish injury.
h. A humane process must be in place to safeguard fish welfare when removing the last fish from the well.
i. The nets at the reception enclosure must:
   1. be set at sufficient depth to permit visual inspection;
   2. not be so shallow that fish are stressed by strong sunlight.

T 30: Mortality records

a. The fish must be given humane protection from birds and marine predators.
b. Producers must be able to demonstrate that they have done everything possible to ensure maximum survival when smolts are transferred to sea.
c. Dead and moribund fish must be disposed of humanely and hygienically.

d. Records of all dead and moribund fish must:
   1. be kept;
   2. include the cause of death where possible and any other information relating to the health and welfare of the fish;

H. Harvest Wellboats

T 31: Requirements for wellboats and planning

a. Wellboats arriving in Chile to work within Chilean waters must carry a valid certificate of disinfection from their site of origin.
b. Wellboat cleaning procedures must comply with local disinfection guidelines .
c. Multi-site collections are prohibited (collections of fish from different sites from different disease control areas are prohibited).
d. Intra-site collections and collections from neighboring sites of the same year class are allowed, but these must be recorded.
e. The wellboat must be able to monitor and record the numbers of fish loaded in each well.
f. All crowding, loading and unloading of fish must be recorded using CCTV and video footage must be kept for at least 14 days.

T 32: Competent staff

All vessel crew members must be trained and competent to preserve the welfare of the animals, recognize and solve eventual problems promptly.

T 33: Wellboat equipment and systems

a. The wellboat must be fitted with moveable bulkheads or other systems used for unloading fish which do not compromise their welfare.
b. There must be sufficient natural or artificial lighting to enable continuous inspection/monitoring of the fish throughout the well.
c. All wellboats registered to operate in Chilean waters must be fitted with auto-logging systems which can:
   1. record their position;
   2. determine whether all inlet, outlet and bottom valves are either open or closed at any one time;
   3. enable the information to be available in real time and retrospectively;
   4. kept for a period of at least 14 days.
d. Where systems are reliant on automatic monitoring equipment, this equipment must be alarmed and underpinned by fully operational manual back-up systems (e.g. water quality control methods, such as oxygenators/aerators and carbon dioxide strippers).
e. Weekly checks must be made and recorded for the calibration accuracy on automatic equipment.
f. Where calibration is not possible, there must be a demonstrable way of ensuring that the equipment is working properly.
g. All auto-logging systems must have been certified as being accurate and fit for purpose by a competent independent expert.
h. Wellboats must be equipped with water quality monitoring and maintenance equipment, which must be calibrated so it is always working and fit for its purpose.

i. Weekly checks must be made and recorded for the calibration accuracy on automatic equipment, ensuring that it is working properly.
j. Any onboard/onshore water treatment/filtration methods must be recorded and made available to HFAC inspector.
k. All new harvest vessels operating under the Certified Humane program must have an effective lice filtration system in place.

T 34: Wellboat water parameters

a. Water must be chilled at a maximum 1.5°C per hour down to a minimum of 50% of ambient water temperature, ideally between 5-18 ºC.
b. The pH of the well water must always be between 6.8 and 8.0.
c. Oxygen levels must be:
    1. continuously monitored;
    2. maintained at a minimum of 7 mg/liter
d. Carbon dioxide must be kept below a level that is demonstrably not harmful to the welfare of the fish (as a guide, this must be no higher than 20 mg/liter).
e. The level of ammonia (NH3) must be no higher than 0.012 mg/liter (unionized).
f. Only disinfected water can be discharged upstream of another site.

T 35: Harvesting activities and records

a. There must be no unnecessary delays in unloading the fish once the vessel has docked.
b. Pumping of the fish from the well or the holding pen to the slaughter plant must be done in a way that:
    1. Does not demonstrably compromise fish welfare;
    2. Ensures that slaughter personnel can maintain an efficient stunning and bleeding procedure.
c. There must be a procedure in place to ensure the last fish is removed humanely from the pipe at the end of unloading, which must not be injurious to the fish.
d. Extraneous species must be treated in accordance with the relevant legislation (see E 9 for further information).
e. The following records must be kept for inspection, and be available on request:
    1. Wellboat movements;
    2. Fish movements;
    3. Times of fish movements;
    4. Disinfection logs;
    5. Number of fish loaded;
    6. Fish size distribution;
    7. Route covered during transport;
    8. Water quality records;
    9. Timing of open and closed valve operations.

I. Cage Side Harvest

T 36: Wellboats cleaning and disinfection

a. Wellboats arriving in Chile to work within Chilean waters must carry a valid certificate of disinfection from their site of origin.

b. Inter-site movement of vessels must be kept to a minimum.
c. The cleaning and disinfection procedures for wellboats as set out in the current version of local disinfection guidelines according to SERNAPESCA must be adhered to, and a checklist signed by the skipper upon completion.

T 37: Equipment

a. All equipment must be checked regularly and maintained in accordance with manufacturers or in-house maintenance schedules.
b. All equipment must be maintained in clean, hygienic conditions and must be thoroughly disinfected and rinsed after use.
c. All storage facilities must
    1. be bunded;
    2. be wind and water tight;
    3. protected against other animals.

T 38: Waste materials

a. Any visible surface mortalities or obviously moribund fish on the surface must be removed before further operations begin.
b. All solid and liquid waste materials must be stored and disposed of appropriately and in accordance with relevant legislation.
c. Cage-side harvest wellboats must not discharge remedial blood water within 5km of any fish farm.
d. In the case of any remedial blood water that is discharged at sea:
    1. this must be rendered inert and disinfected;
    2. the treatment methods must be recorded and made available to HFAC inspector.

T 39: Competent staff

All vessel crew members must be trained and competent to preserve the welfare of the animals, recognize and solve eventual problems promptly.

T 40: Record keeping

a. All crowding and loading of the fish must be recorded using CCTV and footage kept for at least 14 days.
b. The following records must be kept for inspection and be available on request:
    1. Wellboat movements;
    2. Fish movements;
    3. Times of fish movements;
    4. Disinfection logs;
    5. Numbers of fish loaded/fish size distribution;
    6. Route covered during transport;
c. Extraneous species must be dealt with according to the local legislation (see E 9).

PART 8: STUNNING AND SLAUGHTER

OBJECTIVES: The system must ensure sufficient current passes through the body of the fish for a sufficient duration to render the fish immediately insensible until death supervenes. Fish need to be killed humanely without any unnecessary distress or discomfort. Pre-slaughter crowding and handling must be kept to an absolute minimum. Personnel involved in slaughter need to be thoroughly trained and competent to carry out the required tasks.

A. Pre-Slaughter Management

S 1: Holding Pens

When using pens before slaughter:

a. Total fasting period from harvesting to slaughter must not exceed 168 hours or 70-degree days, whichever comes first.
b. Maximum stocking density in the holding pens must not exceed 22 kg/m^3.
c. Water quality parameters must be according to T 34.
d. At arrival and prior to pumping to the slaughterhouse, moribund fish must be humanely killed without delay.
e. Keep records of mortality from arrival until the pen is emptied and all the fish have been transferred to the processing plant.
f. Weekly mortality above 1% must be recorded and investigated, and a prevention strategy should be considered in the VHWP.
g. No more than one handling procedure of fish can be carried out in a period shorter than 24 hours.
h. Salmon may be kept at maximum 96 h (4 days) in the holding pen and management must demonstrate that this time is kept to a minimum.
i. There must be continual monitoring to check for any fish which may have become trapped in the pipes. These checks must be recorded.
j. There must be no unnecessary delays in unloading the fish once the vessel has docked.
k. The maximum dwell time in the pipe must be no more than 20 minutes. However, when this time exceeds 10 minutes, water quality must be at minimum oxygen level of 7 mg/l, measured at the pipe exit.
l. Pumping fish from the holding pen to the slaughter plant must be done in a way that:
    1. does not demonstrably compromise fish welfare.
    2. ensures that slaughter personnel can maintain an efficient stunning and bleeding procedure.
m. There must be a procedure in place to ensure the last fish is removed humanely from the pipe at the end of unloading, which must not be injurious to the fish.

S 2: Water quality in the pipes

a. Crowding and handling prior to killing must be kept to an absolute minimum.
b. For both percussion and electrical systems, water at the end of the outflow pipe leading into the slaughter plant must be continuously monitored and recorded for:
    1. oxygen;
    2. temperature;

3. pH

c. If the water quality in the pipe falls below a 20% threshold of well water or seawater enclosure, then immediate remedial action must be taken to make the necessary improvements.

B. Stunning Followed by Bleeding

S 3: Competent staff

a. All relevant personnel must be trained and competent to:
   1. identify signs of an effective stun;
   2. operate the stunning/killing system safely.

b. There must be a named person responsible for fish welfare throughout the killing process who has been trained in humane killing of fish.

S 4: Methods for humane slaughter

Farmed Atlantic salmon must be humanely killed using a method that renders them immediately insensible and is effective until death occurs. Humane mechanical devices must be used in preference to a manual percussive blow (except for emergency culling).

a. The use of mechanical devices must be monitored to ensure that they are working properly and that they are delivering the stun at the correct location.
b. One blow must be delivered to the top of the head just behind the eyes, of sufficient force to cause immediate loss of consciousness that lasts until death.
c. Use of manual devices is limited to 70 fish per operator per day.
d. A priest or secondary stunner must be available throughout the slaughter process to allow a percussive blow to be administered immediately in the event of a fish not being effectively stunned.
e. All blood, scales and mucus from the operations must be contained and disposed properly.
f. Processors must always:
   1. Humanely destroy any extraneous/non-target fish present in the tanks;
   2. Be aware of, and adhere to, any legislation relating to protected species.
g. The following methods for slaughtering fish are prohibited:
   1. Live chilling;
   2. Live chilling with ice and CO_2 in holding water;
   3. Hypothermia;
   4. Carbon dioxide (CO_2) in holding water;
   5. Salt or ammonia baths;
   6. Asphyxiation by removal from water;
   7. Electro-immobilization.

HFAC is following all new developments associated with the humane killing of farmed fish. If any of these methods are shown not to compromise the welfare of the fish involved, then consideration will be given to incorporating them in the HFAC standards in the future.

S 5: Stunning equipment

a. All equipment must be operated in accordance with the manufacturer's recommendations or relevant internal protocols.

b. Equipment must be fitted with a visible means of checking that the correct current is being administered throughout the process.
c. All equipment must be:
    1. Cleaned and maintained regularly and, in any case, at least in accordance with the manufacturer's instructions;
    2. Fit for purpose at all times.
d. The flow of fish into the stunning system must be of an appropriate speed as to:
    1. Allow operators to handle individual fish with care, and;
    2. Ensure only one fish at a time pass through the stunner.
e. Contingency plans must be in place to ensure fish welfare is not compromised should there be any equipment or material failure, including an interruption in the electricity supply, loss of water, or breakdown of the water pump.

S 6: Electrical stunning

a. Whatever electrical process is used (batch, continuous flow etc.) it must be ensured that:
    1. Insensibility of the fish is achieved immediately;
    2. There are no pre-stun shocks;
    3. The stun is maintained until the fish dies or is insensible to percussive stunning.
b. Fish must be presented to the stunner in a way that prevents it from missing stunning.
c. There must be a humane process in place to ensure no fish are left in the system at the end of the procedure.

S 7: Stunning effectiveness

a. The stun efficiency must be checked for all fish at the exit of the stunner, during bleeding and before processing for absence of any eye rolling, breathing, response to tail pinch, or voluntary movements.
b. There must be sufficient time after stunning, and safeguards in place, to:
    1. Assess the effectiveness of the stun in all fish;
    2. Re-stun immediately fish that have not been effectively stunned and records must be kept in an auditable format.
c. If stunning efficiency falls below 90%, operation must halt immediately, and stunning parameters must be adjusted. This incident and action taken must be recorded in an auditable format. Efforts must be made to maintain stunning efficiency as near to 100% as possible.
d. A Standard Operating Procedure must be in place to detail the procedure for dealing with fish that have not been effectively stunned.
e. CCTV must be installed to provide clear footage of the back-up stun process which must be stored for a minimum of 14 days.

S 8: Bleeding

a. All fish must be bled (exsanguinated) by the cut of the gills or aorta.
b. Bleeding must follow within 15 seconds of electrical stunning, and within 20 seconds of mechanical stunning.
c. All fish must be unconscious during bleeding and dead prior to further processing.
d. All personnel responsible for stunning and bleeding must be trained and competent to identify signs of an effective stun and operate the stunning system.

Part 9: PROCESSING SALMON PRODUCTS

P 1: Selling Atlantic salmon with the Certified Humane® logo

a. All processing systems must be inspected by *HFAC* for traceability to ensure that:
   1. There is no commingling with non-certified fish meat or meat products;
   2. That the Certified Humane® logo is only being used on fish meat and by-products from Certified Humane® farms.

b. The HFAC will also audit the slaughter plant for traceability according to the Policy Manual to ensure that all the products must be labeled with the Certified Humane® logo originate from Certified Humane® farms. All standards and guidelines can be found at **www.certifiedhumane.org**.

c. Annual mass balance information must be recorded in an auditable format for products labeled with the Certified Humane® logo.

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REVISION SINCE THE LAST PUBLICATION

Standard Number	Salmon Edition 2024	Salmon Edition 2025
F 1c.		**New standard** The use of krill in Atlantic salmon feed is allowed when from a certified sustainable source.
F 8 a.	For harvest fish, fasting period until the slaughter must not exceed 120 hours or 50-degree days, whichever comes first.	**Text edited** For harvest fish, fasting period up to slaughter must be kept to a minimum and not exceed 168 hours or 70-degree days, whichever comes first.
F 8 b.		**New text** Prior handling, fasting must be kept to a minimum and not exceed 48 hours for freshwater cycle and 72 hours for seawater cycle.
F 8 f.		**New text** Fasting periods must not exceed 48 hours for freshwater fish and 72 hours for seawater fish prior to culling.
PS 3 a.4	Freshwater production tank: Live weight > 1 – 5 gm – Stocking density of 20 kg/m3 Live weight > 5 – 30 - Stocking density of 30 kg/m3	**Text edited** Freshwater production tank: Live weight > 1 – 5 gm – Stocking density of 25 kg/m3 Live weight > 5 – 30 - Stocking density of 35 kg/m3
PS 4	Table with Water quality parameters For ova: >90 O_2 saturation in % exit water For all Other stages: >70 O_2 saturation in % exit water	**Text edited** Table with Water quality parameters For ova: min: 90% and max:110% saturation in exit water For all Other stages: min: 90% and max:110% saturation in exit water
PS 4		**New text** d. In flow-through systems the total water volume must be renewed at least once per hour. e. In flow-through systems, the maximum water temperature acceptable for fry is 20-21° C during summer, and a minimum of 76% oxygen saturation. Under this condition, an action plan must be written and implemented to manage and mitigate any potential risk for fish thermal stress.
PS 10		**Text Deleted** ~~a. The water temperature must not be above 16°C, unless required by a veterinary.~~

<table>
<tr><td></td><td></td><td>~~b. Feed withdrawal period prior to grading must not exceed 48 hours.~~</td></tr>
<tr><td>PS 13 a.</td><td>b. The following maximum stocking densities must not be exceeded:
1. Seawater enclosure: 17 kg/m³
2. Seawater enclosure site maximum: 15 kg/m³</td><td>Text edited
a. The following maximum stocking densities must not be exceeded:
1. Seawater enclosure: 17 kg/m³ maximum; in proven well managed and favorable health and environmental conditions, enclosure stocking density may be up to 21 kg/m³.
2. Overall seawater site enclosure: 17 kg/m³; and never exceed the biomass production by cycle allowed by competent authorities.</td></tr>
<tr><td>M 7 b.</td><td>Alternative measures must be written into the Emergency Action Plan section of the VHWP (see HH 1) and all staff must be made aware of them.</td><td>Text edited
Alternative measures must be written in the Emergency and Contingency Action Plan section of the VHWP (see HH 1) and all staff must be made aware of them.</td></tr>
<tr><td>HH 1.</td><td></td><td>New standard
d. The VHWP must establish a methodology for monitoring salmon welfare indicators (SWIs), including but not limited to eye abnormalities (exophthalmia, hemorrhaging), opercular damage, emaciation state, vertebral deformity, other deformities, skin lesions, scale loss, sea lice infestation, fin damage and sexual maturity.</td></tr>
<tr><td>HH 12.</td><td></td><td>New standard
Non-medicinal treatments for sea lice</td></tr>
<tr><td>HH 15.</td><td><table><tr><th>Site average weight (g)</th><th>Max. weekly mortality (%)</th><th>Max. 5-week cumulative mortality (%)</th></tr><tr><td>Under 750</td><td>1.5</td><td>6</td></tr><tr><td>750+</td><td>1.0</td><td>4</td></tr></table></td><td>Text edited
Mortality recording and reporting:
Table replaced by text.
2. Seawater:
• Accumulated mortality for 30 days after transference to seawater site: < 1.5%
• Daily mortality: <0.03%</td></tr>
<tr><td>T 5 c. and d.</td><td>Water quality table</td><td>Text edited/new
Water quality and stocking density
c. The maximum stocking density in the well must be based on the liveweight of the fish as follows:
Liveweight of fish (kg) Maximum stocking density (kg/m3)
5.0 125
4.0 110
3.5 100
3.0 90
2.0 75
1.0 60
d. The water quality, husbandry, biosecurity and records kept must conform to those as per the wellboat harvesting and transporting standards.</td></tr>
</table>

T 19 a.	Tanks must be filled to the top with good quality water (see PS 4) from a known source once stocking density has been reached.	**Text edited** Tanks must contain water of adequate quality, with temperature and oxygen levels monitored (see PS 4)
T 26 e.		**New standard** If necessary, during the transport of smolts in the wellboat, the water can be gradually chilled by a maximum of 1.5°C every 4 hours to match the temperature of the seawater site.
S 1 a.	Total fasting period from harvesting to slaughter must not exceed 120 hours or 50-degree days, whichever comes first.	**Text edited** Total fasting period from harvesting to slaughter must not exceed 168 hours or 70-degree days, whichever comes first.
S 1 b.	Maximum stocking density must not exceed 15 kg/m^3	**Text edited** Maximum stocking density must not exceed 22 kg/m^3
S 1 c.	Water quality parameters such as temperature and dissolved oxygen (mg/l) must be recorded	**Text edited** Water quality parameters must be according to T 34.
S 1 h.		**New standard** Salmon may be kept at maximum 96 h (4 days) in the holding pen and management must demonstrate that this time is kept to a minimum.
S 4		**New standard** **S 4: Methods for humane slaughter** a. Farmed Atlantic salmon must be humanely killed using a method that renders them immediately insensible and remains effective until death occurs. Humane mechanical devices must be used in preference to a manual percussive blow (except for emergency culling). g. The following methods for slaughtering the fish are prohibited: 1. Live chilling; 2. Live chilling with ice and CO_2 in holding water; 3. Hypothermia; 4. Carbon dioxide (CO_2) in holding water; 5. Salt or ammonia baths; 6. Asphyxiation by removal from water; 7. Electro-immobilization.
		Text box added.
S 5 d.		**New standard** The flow of fish into the stunning system must be of an appropriate speed as to:

		1. Allow operators to handle individual fish with care through the stunning system, or; 2. Ensure only one fish at a time must pass through the stunner.
S 7	Previous S7	**Text edited** Stunning effectiveness
S 8	Previous S8	**Text edited** Bleeding including aorta
Part 9 P 1		**New standard** Selling Atlantic salmon with the Certified Humane® logo

Humane Farm Animal Care
Standards for Farmed Atlantic Salmon
Edition 2025

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