RSPCA Australia Standard

# Farmed Atlantic Salmon

November 2024

RSPCA

RSPCA AUSTRALIA STANDARD

# FARMED ATLANTIC SALMON

November 2024

This *RSPCA Australia Standard — Farmed Atlantic Salmon* applies to eligible systems that produce farmed Atlantic salmon in Australia through a combination of both land and sea-based systems. This Standard includes mandatory animal welfare requirements and production practices, as well as non-mandatory guidelines that indicate the direction of change which may be made with future Standard revisions to continue improving the welfare of farmed Atlantic salmon under the Scheme.

This Standard must be read in conjunction with the RSPCA Certified Operations Manual which contains information about processes and operations of the Scheme.

This Standard has been developed by RSPCA Australia in accordance with our Standards Development Document to achieve a balanced approach having regard, among other things for the RSPCA's policies and the extent to which it is possible and practical to implement such policies in a commercial production system.

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# THE STANDARD

## 1 Management

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

### Training and competency

1.01 Persons responsible for the management and/or handling of fish must be appropriately trained and **competent** in their tasks as they relate to the requirements of the Standard at each stage of development, including, as relevant to their role:

a) observing fish and identifying normal and abnormal fish appearance and behaviour
b) recognising signs of ill health
c) appropriate care and/or treatment of injury, disease or distress
d) anaesthesia of fish (including observing signs of unconsciousness and recovery)
e) vaccination of fish
f) **euthanasia** of fish (including observing signs of death)
g) maintaining fish environment
h) general management and husbandry
i) wildlife management
j) handling of fish (including non-target fish)
k) loading, transport, and unloading of fish
l) slaughter of fish (including observing signs of an effective stun and bleed)
m) accurate record keeping.

1.02 Records of staff training must be maintained.

1.03 Staff must be available to respond **promptly** to problems that arise, including after hours.

### Internal assessment

1.04 All **sites** must have internal assessment systems that:

a) monitor and verify conformance with the requirements of the Standard
b) identify problems where they occur
c) provide actions to address problems
d) maintain records of all completed internal assessments.

1.05 Procedures for identifying, monitoring, and minimising animal health and welfare risks across all **sites** must be maintained.

### Animal Care Statement

1.06 An Animal Care Statement must be drawn up and:

a) be reviewed and agreed to by RSPCA Australia at least annually
b) be updated **promptly** to reflect changes in practice
c) have modifications reviewed and agreed to by RSPCA Australia
d) be complied with.

1.07 The Animal Care Statement must specify general management, monitoring, husbandry, and standard operating procedures as relevant to the freshwater and marine stages, during transport, and at slaughter, including:

a) procedures for reporting breaches of animal welfare legislation
b) internal assessment systems (including regularity of assessments and review of video surveillance footage)
c) contingency plans and procedures to manage **site** conditions in the event of power failure, equipment failure or other breakdowns, fire, flood, drought, **extreme weather**, or other **major reportable events** (including during fish transport)
d) determining, maintaining and reviewing **stocking density**
e) fish observation (including assessment method and **trigger levels**)
f) **site** maintenance
g) cleaning of tanks, pens and equipment (including wellboats, **biofouling** assessment/management)
h) **water quality** management (including **trigger level** for **water quality** parameters)
i) lighting (including photoperiod manipulation)
j) incubation
k) **stripping**
l) hatching
m) smoltification (including testing)
n) removal of fish requiring **euthanasia**
o) removal and disposal of dead fish
p) removal of non-target fish
q) wildlife management strategy (including seal management)
r) general fish handling
s) crowding (including crowd intensity scoring method and **trigger level**)
t) grading (including **trigger level** for **water quality** parameters, feasibility of passive grading)
u) bathing (including **trigger level** for **water quality** parameters)
v) fish transport
w) harvest and slaughter (including indicators and **trigger levels** for ineffective **stun** and bleed).

## Fish observation (from first feeding to broodfish)

1.08 Observation of fish appearance and behaviour must be:

a) carried out at least once in every 24-hour period, unless delayed due to risk to staff safety (e.g., intense storms and wave action at marine **sites**)
b) increased during periods of adverse environmental conditions (e.g., **water quality**), disease outbreak or any other circumstance where fish health or welfare may be compromised.

1.09 Fish must be observed to ensure that their appearance and behaviour are normal as determined by:

a) appetite
b) absence of injury, disease, or deformity
c) ability to swim
d) control of body position
e) schooling behaviour
f) low aggression
g) absence of gasping
h) skin pigment colour changes
i) uniformity in weight.

## Fish identification

**GUIDELINE**: Identification of fish is relevant and important in selective breeding programs to identify a small number of individual broodfish who carry desirable genetic traits (often with welfare benefits) that will then be passed on to millions of future generation production fish. Such traits may include, for example, improved disease resistance, growth, survival, temperature resilience, and decreased jaw deformity.

RSPCA acknowledges that fish identification methods have the potential to cause pain and handling stress. As such, the Standard will only permit specific identification methods, to be used for a specific purpose, and to be carried out in combination with a handling procedure that would have been conducted regardless. RSPCA Australia will continue to monitor the published literature with a view to determining whether non-invasive identification procedures or practices applicable at a commercial scale become available and therefore require consideration in a future Standard. In the meantime, industry should prioritise research and development opportunities that aim for improved broodfish welfare outcomes applicable at a commercial scale.

1.10 Where it is considered necessary to identify fish, the procedure must only be performed:

a) on **selective breeding program broodfish**
b) under anaesthesia
c) using measures that aim to prevent infection at the wound site
d) in combination with a necessary fish handling procedure.

1.11 The following identification methods for **selective breeding program broodfish** are permitted:

a) insertion of a Passive Integrated Transponder tag
b) fin tissue sampling (no larger than 5mm by 5mm).

## Other management or husbandry procedures

1.12 The triploidisation process and the farming of triploid salmon is not permitted due to the risk of higher disease incidence, cataracts, deformities, and other health and welfare concerns.

1.13 Where extraneous/non-target fish are present:

a) they must be released **promptly**
b) they must be **euthanased promptly** where injured
c) their estimated mortality numbers must be recorded
d) strategies for exclusion and/or removal of extraneous/non-target fish must be considered before fish handling procedures commence.

1.14 A procedure must be in place to ensure that, within 24 hours:

a) any breach of animal welfare legislation is reported to the relevant authority
b) any breach and any potential breach of animal welfare legislation is reported to RSPCA Australia.

1.15 Management or husbandry procedures that negatively impact fish health and welfare and are not specified in this Standard must not be performed unless prior consent has been obtained from RSPCA Australia.

### Environmental certification

1.16 Participation in and conformance with a third-party audited certification scheme that promotes best environmental practice in aquaculture must be maintained.

### Research and innovation

1.17 Participation in research and/or innovation programs or initiatives, including collaborative programs, targeting continuous improvement in the welfare of fish and the welfare of wildlife impacted by farming operations must be maintained.

### Records

1.18 Observations (including through automatic monitoring) of abnormal fish appearance, behaviour, and/or environment at each stage of development or any problems identified, including with conformance with the Standard, or **trigger levels** reached, during checks and fish handling procedures (including transport and slaughter) must be recorded and include:

a) date the problem was identified
b) nature and frequency of the problem
c) date the action was taken
d) nature of the action taken.

1.19 The following records must be maintained for each year class:

a) details of origin of stock
b) number of eggs laid down to hatch
c) number of fertilised eggs disposed of
d) number of **smolts** transferred to sea
e) number and weight of fish in each tank/pen (and relevant tank/pen water volume)
f) **stocking density** in each tank/pen
g) age and weight at which fish transferred to sea
h) age and weight slaughtered.

# 2 Health

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

### Veterinary Health Plan

2.01 A Veterinary Health Plan must:

a) be drawn up in consultation with **veterinary advice**
b) be reviewed and agreed to by RSPCA Australia at least annually
c) be updated **promptly** to reflect changes in practice and/or protocol including following circumstances or events where fish health and welfare has been compromised
d) have modifications reviewed and agreed to by RSPCA Australia
e) be complied with.

2.02 The Veterinary Health Plan must specify fish health management and monitoring procedures that minimise risk to animal health, including:

a) biosecurity
b) routine health monitoring procedure (including prior to grading)
c) **broodfish** selection, management (including breeding, fasting, **stripping**, and identification)
d) use of veterinary medicines (including, where **antimicrobials** are used, an **antimicrobial** stewardship strategy and **trigger level** for **antimicrobial** usage)
e) anaesthesia (including anaesthesia reversal and recovery)
f) vaccination strategy (including schedule and procedure, and vaccine-related abdominal adhesions)
g) feeding and fasting
h) water temperature manipulation
i) **euthanasia** (including emergency mass **euthanasia**)
j) body condition (including scoring method and **trigger level**)
k) physical injury and deformity monitoring (including scoring methods and **trigger levels** for fin and skin condition, and deformity)
l) disease (including notifiable diseases)
m) amoebic gill disease strategy (including scoring method and **trigger level**)
n) **harmful algal and jellyfish bloom** strategy (including scoring method and **trigger level**)
o) parasites
p) mortalities and classification of cause of death (including production and transport mortality **trigger levels**)
q) pest control procedures.

### Vaccination

2.03 A vaccination strategy to protect fish from diseases for which an **effective vaccine** is available must be in place and complied with.

### Medicines

2.04 Medicines, including **antimicrobials,** must only be administered:

a) under **veterinary advice**
b) for therapeutic purposes, unless where required to reduce the risk of disease spreading to healthy fish in close contact with fish showing clinical signs of

disease.

2.05 Any **antimicrobial** classified by the Australian Strategic and Technical Advisory Group on Antimicrobial Resistance as being of 'high' or 'medium' importance for human medicine is not permitted for use in fish, unless **veterinary advice** indicates that the only effective treatment option is an **antimicrobial** from these categories.

2.06 Where **antimicrobials** are used, an **antimicrobial** stewardship strategy must be in place and complied with, and:

a) demonstrate the principles of prudent **antimicrobial** usage
b) consider available evidence of **antimicrobial** resistance in farmed Atlantic salmon in Australia
c) specify a year-on-year strategy which considers the reduction, refinement, and/or replacement of **antimicrobial** usage
d) specify husbandry, management strategies, and any alternative preventative treatments, where used, to manage disease risk during any planned reduction, refinement and/or replacement of **antimicrobials**.

## Amoebic gill disease

2.07 An amoebic gill disease strategy must be in place that aims to minimise the development of gill lesions that compromise fish welfare, including by:

a) routine monitoring of fish for gill lesions
b) treating by freshwater bathing only, unless an alternative is directed by **veterinary advice**.

2.08 Records of amoebic gill disease monitoring must be maintained for each pen and include:

a) date of amoebic gill disease severity scoring
b) gill lesion score of the population sampled
c) notes of any problems identified and the action taken.

## Harmful algal and jellyfish blooms

2.09 A strategy must be in place to minimise the negative impact of **harmful algal and/or jellyfish blooms**, including:

a) active monitoring for the presence of **harmful algal and/or jellyfish blooms**
b) measures to minimise the impact of **harmful algal and/or jellyfish blooms** on fish welfare.

## Euthanasia

2.10 Fish must be **euthanased promptly**, where accessible, if they are suffering from disease, injury, or deformity and are not able to respond to treatment or recover.

2.11 Fish must not be left to die in air.

2.12 The permitted **euthanasia** methods are:

a) an overdose of a suitable anaesthetic using immersion in a solution of the agent

b) in the marine stage, a non-recoverable percussive blow to the top of the head (in the middle and slightly behind the eyes) of sufficient force to render the fish immediately dead.

2.13 A manual and/or mechanical percussive device must be available for all procedures where live fish are being handled.

2.14 A manual percussive device must only be used for emergency **euthanasia** where a mechanical percussive device is not available.

2.15 Fish must have death confirmed immediately after application of the **euthanasia** method by checking for all the following signs:

a) no eye movement (eye rolling or visual evoked response)
b) small or no muscular twitches
c) no rhythmic opercular movement
d) no reaction to tail pinch.

## Health monitoring

2.16 Quarantine and biosecurity procedures must be in place to minimise the risk of introducing and spreading disease among fish.

2.17 Where the cause and/or appropriate treatment of injury, disease or deformity is unable to be identified, **veterinary advice** must be sought immediately and followed accordingly.

2.18 Dead fish must be removed and disposed of in a safe and hygienic manner:

a) daily in the freshwater phase of production
b) daily in the marine phase of production, unless delayed due to risk to staff safety (e.g., intense storms and wave action at marine **sites**).

2.19 Any **major reportable event** must be reported to RSPCA Australia within 24 hours of becoming aware of the event and include:

a) date the problem was identified
b) nature of the problem
c) date the action was taken
d) nature of the action taken.

## Health records

2.20 Health records for each stage of development must be maintained and contain, as relevant, details of the following:

a) vaccinations
b) diagnosed clinical diseases
c) physical injury or deformity
d) treatments or medicines administered, including **antimicrobials**
e) dates of registered veterinarian visits, including any problems identified and the action taken
f) mortalities noting the main reason for cause of death
g) known escapes and unexplained losses.

# 3 Facilities and equipment

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

3.01 Surfaces, fittings, equipment, and other facilities must be designed, constructed, operated, and maintained to:

a) ensure their optimal performance
b) minimise the risk of injury, **entrapment**, escape, or disease in fish
c) minimise noise and vibration-related impacts on fish and non-target species.

3.02 Facility alarms, monitors, and controls must:

a) be operational
b) have a back-up power supply that is tested at least weekly
c) have date of alarm checks, any problems identified, and action taken recorded
d) have staff available to respond to alarms **promptly**.

3.03 A maintenance program must be in place to ensure that:

a) facility defects are **promptly** identified
b) facility defects are **promptly** rectified.

3.04 Where animals classified as pests are present and could cause distress or transmit disease to fish, any control program in place must:

a) use the most humane techniques that are applicable to the situation
b) reduce the risk of impact on non-target species.

3.05 Methods or treatments to maintain **water quality** or reduce pathogen loads must ensure that fish welfare is not compromised.

### Water intake and discharge

3.06 Water intake and discharge into the facility must:

a) minimise ingress of wild fish
b) be monitored to prevent blocking
c) be alarmed to ensure effective control of water level and water movement through the facility.

### Pumps and pipes

3.07 Pumps, pipes, and couplings must be of a diameter which is appropriate for the size of the fish.

3.08 All pipes must be securely attached to prevent fish from escaping during the unloading process.

3.09 Pumps must be able to pump the required distance and head.

3.10 Pumps and pipes used for unloading must be positioned to minimise the height and distance that the fish have to be pumped.

3.11 The angle and drop from the end of any pipe used to unload fish must be such that it:

a) prevents excessive splashing of fish upon entry to the water
b) allows fish to disperse without colliding with other fish.

3.12 Returning pipes must be of sufficient length to return fish away from the edge of the tank/pen.

3.13 Any pipes used for unloading at sea must be able to be adjusted to account for tidal flows and wave action where necessary to ensure fish welfare is not compromised.

3.14 Water must always flow through the pipework to minimise scaling.

3.15 All fish must be removed from pipes before the end of an operation or during a significant pause in an operation.

## Dip and brail nets

3.16 **Dip nets** must be:

a) of a suitable size so that they can be easily lifted by hand
b) of a suitable size to comfortably contain the whole fish
c) of a suitable mesh gauge for the size of the fish that does not allow the fish to escape.

3.17 Where used, **brail nets** must:

a) be wet **brail nets** only
b) not be overcrowded
c) only hold fish for the minimum period required to carry out weight checks or health assessments
d) be discharged at the water surface.

## Marine pens

3.18 Marine pens must:

a) have a minimum **pen depth** of 10m
b) ensure fish have continuous access to the surface to allow leaping behaviour
c) effectively contain fish
d) minimise predator interactions with fish through physical exclusion measures
e) have net mesh gauge size recorded for each pen
f) have nets and lines that are adequately tensioned and weighted to minimise wildlife entanglement and net/line distortion, taking into account currents, tidal flows, and wave action.

## Crowding device

3.19 The crowding device must be of an appropriate size and design for the pen.

## Grading equipment

3.20 Grading equipment must be suitable for the size and type of fish.

3.21 Graders must have safe access around them to facilitate routine checks by staff.

### Fish counting

3.22 Fish counting equipment must be routinely calibrated and tested to ensure accuracy.

3.23 A counting/weighing device must be fitted in order to calculate fish numbers and **stocking density** during grading and bathing.

### Lighting

**GUIDELINE**: The welfare impacts of photoperiod manipulation or other practices that could encourage periods of rest and/or sleep in farmed Atlantic salmon is an area requiring further research. RSPCA Australia will continue to monitor the published literature with a view to determining whether a requirement is needed in a future Standard. In the meantime, industry should prioritise research and development opportunities that aim to better understand the importance of rest/sleep for fish and for improved fish welfare outcomes applicable at a commercial scale.

3.24 Lighting (photoperiod and intensity) must be maintained at a level suitable to each stage of development and ensure:

a) exposure to high levels of UV light does not cause distress
b) protection from sudden changes in lighting levels
c) fish are encouraged to access the entire water column.

### Biofouling

3.25 **Biofouling** must not be allowed to build up in tanks, on pen nets or other infrastructure to the extent that:

a) water flow and oxygen supply are reduced
b) risk of obstruction within pipes and machinery is increased or
c) the population of stinging, noxious, and other potentially harmful fouling organisms reaches a size that fish welfare is likely to be compromised.

3.26 Where cleaning requires tank water volume to be reduced, the rate of discharge must be regulated to minimise the disturbance to fish within the tank.

3.27 Cleaning of marine pen nets *in situ* using automated devices must either:

a) collect the released **biofouling** for disposal away from the pen or
b) minimise the extent that released **biofouling** moves through the pen.

3.28 The use of copper-based antifoulant on marine pen nets is not permitted.

### Wellboats

3.29 A video surveillance system (e.g., CCTV) must be installed and operational to ensure:

a) clear, unobstructed viewing and recording of fish behaviour within the well
b) continuous viewing of real-time footage

c) routine reviewing of stored footage
d) availability for viewing (both stored and real-time footage) by RSPCA Australia
e) storage of footage for a minimum of 14 days.

3.30 Wellboats must:

a) be equipped with **water quality** monitoring and maintenance equipment
b) be able to monitor and record the number of fish loaded in each well
c) have sufficient natural or artificial lighting to enable continual observation and monitoring of the fish throughout the well
d) have the ability to close valves and re-circulate water
e) allow **water quality** to be maintained during journey times and holding times under conditions of closed valves
f) have a continuous transfer system for loading
g) be cleaned and disinfected when used for grading/bathing or collection of fish from **sites** and/or regions with different biosecurity status.

3.31 Calibration accuracy of measuring/monitoring equipment must be checked at least weekly.

## Environmental enrichment

**GUIDELINE**: The welfare impacts of environmental enrichment at various stages of fish development is an area requiring further research, e.g., whether and what types of structural, sensory, occupational, or dietary enrichment are practical, safe, as well as effective in positively engaging fish by enhancing their environment. RSPCA Australia will continue to monitor the published literature with a view to determining whether a requirement is needed in a future Standard. In the meantime, industry should prioritise research and development opportunities that aim to better understand the importance of enrichment and enrichment types for fish, and their effectiveness in improving fish welfare outcomes at a commercial scale.

# 4 Feeding

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

4.01 Feeding must be such that the quality, quantity, and frequency of delivery meet the fish's requirements at each stage of development.

### Feed content

4.02 Feed for production fish must not contain growth promoters or added hormones.

### Feeding methods

4.03 Feed must be dispensed and distributed:

a) in a way that is responsive to changes in fish appetite
b) at a rate that does not lead to competition or aggression
c) evenly and widely across the water surface.

4.04 Monitoring systems to prevent overfeeding must be in place for marine pens.

### Fasting

4.05 Any period of fasting must be kept as short as possible and not exceed 72 hours, unless directed by **veterinary advice** for fish welfare reasons.

4.06 Records must be kept of any period for which the fish were fasted and include:

a) reason for fasting
b) time fasting commenced
c) time feed was reintroduced (as applicable)
d) notes of any problems identified and action taken.

# 5 Freshwater stage

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

## Stocking density

5.01 **Stocking density** in the freshwater stage must be determined by fish life stage and the system's ability to manage:

a) water temperature
b) **water quality**
c) water exchange
d) aggression
e) fin condition
f) skin condition
g) body condition
h) ability to swim without coming into physical contact with other fish
i) ability to control body position without coming into physical contact with other fish
j) ability to maintain moderate, sustained swimming exercise
k) fish health
l) mortalities.

5.02 **Stocking density** must be:

a) reviewed at the end of each life stage of the fish at each **site**
b) reduced for the next year class where it cannot be demonstrated that optimal conditions can be maintained.

## Water quality

5.03 During incubation, oxygen saturation at discharge must be controlled, monitored, and recorded daily.

5.04 Water flow and/or oxygen alarms must be fitted to all water intakes to the incubation environment.

5.05 For full recirculation hatchery systems and for flow-through hatcheries during periods when water may be partially recirculated, the following **water quality** parameters must be monitored and recorded at least daily:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) nitrite ($NO_2$ mg/l)
d) nitrate ($NO_3$ mg/l)
e) oxygen saturation (%)
f) pH in inlet water
g) minimum and maximum water temperature (ºC)
h) water exchange ($m^3$/day).

5.06 For flow-through hatcheries with no recirculation, the following **water quality** parameters must be monitored and recorded at least daily:

a) oxygen saturation (%)
b) minimum and maximum water temperature (ºC).

5.07 For flow-through hatcheries with no recirculation, the following **water quality** parameters must be monitored and recorded at least monthly:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) nitrite ($NO_2$ mg/l)
d) nitrate ($NO_3$ mg/l)
e) pH in inlet water.

5.08 Oxygen saturation must be at least:

a) 90% during incubation
b) 70% post hatch.

5.09 Water current speed must be such that:

a) oxygen is replenished
b) during incubation, water hygiene and egg quality is maintained
c) fish can easily hold and adjust their position in the water column
d) prevents skin damage and fin damage
e) dead fish and suspended solids are removed.

5.10 Total suspended solids must be monitored and measured routinely.

## Eggs

5.11 Water current speed and/or oxygen must be continuously monitored at all water intakes to the incubation environment.

5.12 **Green eggs** must:

a) be disinfected prior to placement in the hatchery, unless produced on **site**
b) be transported in a manner that prevents damage to the eggs
c) be maintained in a hygienic environment
d) be checked daily to ensure rapid detection of fungal infections
e) remain undisturbed (other than for picking) for 250 **degree days**.

5.13 Egg sorting (shocking) for dead/unviable eggs must not be carried out:

a) before eggs reach the eyed stage
b) onto a dry surface.

5.14 The transportation of **eyed eggs** must be done using boxes that are fit for purpose.

## Alevins

5.15 **Alevins** must be provided with substrate that provides support and prevents bunching.

5.16 Nets must not be used to transfer **alevins** weighing less than 0.5g.

5.17 Where water temperature is used to manipulate egg development, daily fluctuation in water temperature must be minimised.

### Fry

5.18 **Fry** must be encouraged to feed **promptly** after transfer to tanks by ensuring:

a) feed is available to appetite
b) light levels are such that all fish in the water column can see the feed.

5.19 Grading must not occur before the majority of fish weigh a minimum of 1.3g.

5.20 Fish leaving the bottom of the tank (swimming up) must be able to swim normally and control body position without coming into physical contact with other fish.

### Parr

5.21 Water temperature must not be manipulated above 16°C, unless directed by **veterinary advice**.

5.22 Where **parr** are graded:

a) the majority of fish in the tank must weigh more than 1.3 grams
b) feed withdrawal prior to grading must not exceed 48 hours.

### Pre-smoltification

5.23 Fish must only be transferred to seawater when:

a) a blood osmolality test indicates that a population is prepared for transfer
b) visual signs of smoltification are observed
c) fish are gradually acclimated to the salinity level in the marine pen to which they are being transferred.

5.24 The use of hypertonic water (water above 35 ppt) for **smolt** survival testing is not permitted.

# 6 Marine stage

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

## Stocking density

6.01 **Stocking density** in marine pens must not exceed 15kg/$m^3$.

6.02 **Stocking density** must be reviewed at each **site** for each year class placed:

a) with respect to fish condition (including aggression, fin damage, body condition)
b) with respect to environmental conditions (including water temperature and oxygen stratification)
c) and be reduced for the next year class where it cannot be demonstrated that the risk of adverse conditions can be mitigated.

## Water quality

6.03 The following **water quality** parameters must be monitored daily at the surface, middle, and bottom layers of the water column:

a) oxygen saturation (%)
b) maximum water temperature (°C).

6.04 Water current speed must be such that:

a) oxygen is replenished
b) fish easily hold their position in the water column
c) suspended solids are removed.

## Smolts

6.05 Fish must not be handled within 120 days of transfer to sea, unless for veterinary treatment.

## Macquarie Harbour

6.06 The farming of Atlantic salmon in Macquarie Harbour, Tasmania, is not permitted due to **water quality** and other environmental conditions posing a risk to fish welfare.

# 7 Wildlife interactions

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

**GUIDELINE**: RSPCA Australia acknowledges the need to balance fish welfare with the welfare of predators (mainly seals) who can injure and kill large numbers of fish when exclusion methods fail. This Standard aims to ensure fish are contained and predators deterred through effective pen infrastructure and, only as a measure of last resort, allowing the use of a common deterrent device (crackers) in restricted circumstances and at a frequency below that permitted by law. A cracker is a non-tactile, non-lethal deterrent device consisting of a small explosive charge within a wound cardboard cylinder (similar to a firework) that is thrown into the water to sink and detonate under the water's surface where it creates a percussion wave and gives off a flash effect, causing a flight response in the seal.

As well as continuing to monitor the published literature relating to the animal welfare impact of deterrent devices, RSPCA Australia will monitor the effectiveness of pen infrastructure developments, deterrent use, and alternatives to current deterrents. RSPCA Australia intends to phase out cracker use in the next Standard, unless there is peer-reviewed published research to demonstrate that crackers are the preferred option when compared to alternative deterrent measures. In the meantime, industry should prioritise research and development opportunities, including ongoing research into improved pen/exclusion technology, exploring alternatives to current seal deterrent devices, and better understanding the impact of deterrent devices on seals, salmon, and other marine life.

7.01 Wildlife exclusion and control measures must at least meet the minimum requirements for the mitigation of seal interactions set out by the Tasmanian Government, unless specific measures are not permitted under this Standard.

7.02 A **site**-specific wildlife management strategy that establishes practices to minimise wildlife interactions that compromise fish and/or wildlife welfare must be in place and complied with, including:

a) daily routine monitoring for the presence of wildlife
b) size, placement, routine monitoring, cleaning, and repair of fish containment and wildlife exclusion nets
c) criteria and methodology for applying non-lethal control methods
d) **prompt** removal of wildlife entangled/trapped in nets
e) **prompt** management of injured or killed fish following interaction with wildlife
f) **prompt** management of injured or killed wildlife, including, for seals, where found in the immediate vicinity of the farming lease
g) management of lighting on/around infrastructure to reduce disturbance/attraction to wildlife
h) monitoring, evaluation, and refining of wildlife management outcomes.

7.03 The use of bird aerial wildlife exclusion netting is not permitted in the marine stage, unless for pens containing fish weighing ≤1800 gr.

7.04 Fish containment and wildlife exclusion nets must be checked **promptly** following:

a) increased predator activity in the immediate vicinity of a pen
b) increased fish mortality caused by predator attack
c) predator entry into a fish containment pen and/or between the fish containment net and the wildlife exclusion net
d) suspected predator entanglement.

7.05 **Immediate measures** to control and/or deter predators must only be carried out where primary measures to exclude or remove predators have been unsuccessful and:

a) there is sudden or unexpected damage to nets and a predator is in the act of injuring and/or killing fish and/or entering the pen
b) a predator has entered the pen, is injuring and/or killing fish, and repeated attempts to remove the predator by lowering the nets have failed
c) a predator has entered an empty pen, risks entanglement, and repeated attempts to remove the predator by lowering the nets have failed
d) a predator is in the act of causing damage to nets which would allow fish to escape or the predator to enter the pen
e) a predator is in the act of causing damage to nets, vessels or other equipment and risks injury or entanglement, or
f) a predator is in the act of threatening and/or causing injury to staff.

7.06 The use of the following deterrent devices is not permitted:

a) bean bags
b) scare caps
c) electronic seal scarers
d) pingers
e) capsicum spray.

7.07 Where an **immediate measure** involves the use of non-lethal, non-tactile seal control units (crackers), no more than five crackers may be used:

a) within the pen (regardless of the number of seals within the pen)
b) towards any one seal in the act of causing damage to nets, vessels, or other equipment outside the pen
c) within a six-hour window during daylight hours (including dawn/dusk)
d) under exceptional circumstances, additional crackers (up to a maximum of five) may be used within a pen still containing multiple seals to facilitate the complete removal of all seals in one unbroken operation.

7.08 A record must be kept of each interaction with wildlife species requiring their active removal, including:

a) **site**, date, and time at which the interaction occurred
b) pen affected and total fish count in that pen
c) names and position of persons involved in the control operation
d) reason the control method was required
e) details of control and/or deterrent method used
f) number of deterrent devices used per pen
g) the number and species of animal involved per pen
h) any injury to wildlife and action taken
i) the number of fish mortalities.

7.09 Where a seal is found injured or dead in or in the immediate vicinity of a marine pen or farming lease:

a) the location must be recorded
b) the cause of injury or death as determined by **veterinary advice** must be recorded
c) the incident must be reported to the Tasmanian Government
d) the incident must be reported to RSPCA Australia.

7.10 Methods of wildlife exclusion and/or control not specified in this Standard must not be performed without prior consent from RSPCA Australia.

# 8 Fish handling procedures

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

8.01 Handling of fish must:

a) be limited to necessary procedures only
b) be conducted in a manner that prevents pain, suffering, or distress
c) be conducted in a manner that prevents injuries and mortalities
d) minimise time out of water.

8.02 There must be a person responsible for fish welfare present throughout any fish handling procedure that involves spawning, crowding, counting, bathing, grading, vaccination, transport, and/or slaughter.

8.03 If fish must be handled:

a) adequate support must be given to the body
b) live fish must not be held by the tail only
c) live fish must not be thrown on solid objects
d) live fish must not be held with dry hands.

8.04 Time out of water must not exceed 15 seconds for a live fish unless anaesthetised.

8.05 Fish must be continuously monitored through any fish handling procedure that involves crowding, grading, bathing, anaesthesia, or vaccination, to determine that:

a) all equipment is set and functioning correctly
b) the process can proceed safely without causing injury or distress to fish
c) fish recover quickly after the process.

8.06 Fish handling procedures must be completed in one unbroken operation, unless:

a) **extreme weather** or other adverse conditions are likely to compromise fish welfare
b) equipment failure occurs
c) as required for fish handling procedures where prior consent has been obtained from RSPCA Australia.

### Stripping

8.07 Movement and noise around spawning tanks must be minimised.

8.08 Prior to **stripping**, **broodfish** must be humanely killed, unless for **selective breeding program broodfish** to be repeat **stripped** in which case anaesthesia is required.

8.09 Air **stripping** must only be conducted on humanely killed fish.

8.10 Prior to **stripping** of **selective breeding program broodfish**, the anaesthetised fish must:

a) be supported on a surface that will not damage the skin
b) only have excess water removed to aid **stripping**.

8.11 Following **stripping** of **selective breeding program broodfish**, anaesthetised fish must be:

a) identifiable as having been **stripped** to prevent additional handling
b) monitored to ensure they recover **promptly** from the anaesthetic
c) monitored to ensure they recover fully from **stripping**
d) encouraged back on feed
e) treated or **euthanased promptly** where a problem is identified.

8.12 **Selective breeding program broodfish** must, unless directed by **veterinary advice**:

a) not be **stripped** more than once per season
b) not be **stripped** more than twice in a lifespan.

8.13 The following records must be kept for all **stripping** events:

a) feeding records
b) date and time of ripening checks
c) date and time of **stripping**
d) number of fish humanely killed for **stripping**
e) number of anaesthetised fish recovered after **stripping**.
f) the nature of any treatments/medications given to fish pre-and post-**stripping** and the date and time of their use
g) number of post-**stripping** mortalities.

## Crowding

8.14 Crowding must not take place:

a) if **extreme weather** or other adverse conditions are likely to compromise fish welfare
b) more than twice in any one week or three times in any month for the same cohort of fish, unless directed by **veterinary advice**.

8.15 Crowding of fish in a tank/pen must not commence until the transfer of fish can occur without delay.

8.16 Oxygen saturation level during crowding must be:

a) continuously monitored
b) maintained above 80%.

8.17 The volume of the crowd must:

a) be sufficient to minimise fins breaking the surface
b) maximise the time that fish are able to swim at a depth to minimise disturbance from bright light and human activity at the surface.

8.18 During the crowd, action must be taken if **water quality** deteriorates and/or fish show signs of stress including:

a) gasping, burrowing or violent splashing
b) excessive gill movement
c) skin pigment colour changes
d) inability to control body position
e) mortalities.

## Grading

8.19 The following grading methods are permitted:

a) manual grading using traditional 'Y' type boards
b) passive grading with 'flexi-panels'
c) automated grading.

8.20 To minimise repeated handling, grading during the freshwater phase must only be conducted in combination with a necessary fish handling procedure.

8.21 Unhealthy fish, as determined by **veterinary advice**, must not be subjected to grading.

8.22 Grading must not take place:

a) if **extreme weather** or other adverse conditions are likely to compromise fish welfare
b) more than twice in any one week or three times in any month for the same cohort of fish, unless directed by **veterinary advice**.

8.23 The pump operator must be able to control the speed of the pump.

8.24 The grader must be positioned so that the pump operator can clearly see the fish.

8.25 Where fish are graded first into a temporary collection tank:

a) oxygen saturation level must be >80%
b) the tank must not be overloaded
c) tanks must have valves for the return of fish to their designated tank
d) fish must not be removed from the tank using **dip nets**.

8.26 The following grading records must be kept:

For all grading methods:

a) fish health status prior to grading
b) date/time grading commenced/finished
c) number of fish graded
d) post-grading mortalities, noting the main reason for cause of death
e) **water quality** parameters
f) equipment disinfection records.

For wellboat grading, the following additional record must be kept:

g) **stocking density** in the well.

## Bathing

8.27 Oxygen saturation level during bathing must be:

a) continuously monitored
b) maintained above 80%.

8.28 Where freshwater is intended to be used only once for bathing, the following **water quality** parameters must be monitored and maintained at a level that does not compromise fish welfare:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) pH
d) water temperature (ºC).

8.29 Where the same volume of freshwater is used more than once for bathing (e.g., in a wellboat), the following **water quality** parameters must be monitored and maintained at a level that does not compromise fish welfare:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) pH
d) water temperature (ºC)
e) water use number.

8.30 Following bathing, the pen net must be **promptly** returned to full volume.

8.31 The duration of bathing must:

a) be appropriate to the severity of gill pathology
b) be directed by **veterinary advice** or suitably **competent** person
c) commence when the final fish enters the bath.

8.32 The following bathing records must be kept:

a) date/time bathing commenced/finished
b) number of fish bathed
c) post-bathing mortalities, noting the main reason for cause of death
d) water volume in treatment pen/tank
e) **water quality** parameters
f) **stocking density** in the treatment pen/well.

## Anaesthesia

8.33 Anaesthetics must be used:

a) according to the manufacturer's instructions
b) at a dosage suitable to the size of fish
c) with due regard to water temperature, water chemistry, and accumulation of metabolic waste products
d) in conjunction with oxygenation of water
e) for a period of time sufficient for the desired depth of anaesthesia or sedation that permits rapid recovery (unless anaesthetic is being used for the purposes of **euthanasia**).

## Vaccination

8.34 Vaccination at less than 30g liveweight must be by a needle-less method only, unless directed by **veterinary advice** for fish welfare reasons.

8.35 An assessment of fish condition must be made before the vaccination process begins to ensure that fish are suitably robust to undergo the procedure.

8.36 Where a vaccination process has been ineffective (e.g., poor recovery, poor survival post-procedure, and/or delayed time back on to feed), notes of any problems identified, and action taken must be recorded.

### Vaccination by immersion

8.37 Oxygen saturation level in the vaccination tank during vaccination by immersion must be:

a) continuously monitored
b) maintained above 80%.

8.38 Water in the vaccination tank must be monitored and changed at least according to the manufacturers' recommendation.

8.39 Action must be taken to change vaccination tank water if conditions are likely to compromise fish welfare.

8.40 Where used, **dip nets** must:

a) not be overloaded
b) permit fish to swim freely within nets during vaccination.

### Vaccination by injection

8.41 Fish must be anaesthetised before being vaccinated by injection.

8.42 Fish delivery must be controlled to maintain a steady supply of fish to the anaesthetic bath and to the vaccinating table.

8.43 Fish must be checked regularly throughout the vaccination procedure to ensure that vaccinations are being performed correctly and consistently.

8.44 Accuracy testing must only be conducted on fish **euthanased** by anaesthetic overdose.

### Auto-vaccination

8.45 The auto-vaccinator must:

a) correctly measure the size of the fish to be vaccinated
b) ensure correct vaccination depth, position, angle, and dosage of the vaccine.

### Sample weighing

8.46 Biomass estimates must be made:

a) at least weekly during the freshwater phase (not including **broodfish**)
b) at least monthly during the marine phase.

8.47 During sample weighing, fish must not be crowded, unless sample weighing coincides with another fish handling procedure that requires fish to be crowded.

8.48 **Dip nets** used for sample weighing must not contain more fish than can be sampled at any one time.

8.49 Where **brail nets** are used for the purpose of sample weighing:

a) a wet brail must be used
b) the net must be no more than half filled with fish
c) the net must be raised vertically through the water column with minimal horizontal dragging.

8.50 Scales, balances, and other electronic devices used to estimate biomass must be calibrated, suitably tared, and adjusted to account for water.

# 9 Transport

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

9.01 There must be a person responsible for fish welfare present during loading and unloading.

9.02 Journeys must be planned to ensure that delays in moving the fish are minimised.

9.03 Any bath treatment must be completed a minimum of 14 days before transport, unless:

a) directed by **veterinary advice** or
b) for wellboats, when bathing is conducted during transport.

9.04 All transport tanks or wells must:

a) be fit for the purpose of transporting fish
b) be without leaks, chips, cracks, sharp edges or protrusions
c) contain sufficient water at the start of loading to prevent fish being injured from forceful contact with other fish, the walls, or sides of the tank or well.

9.05 Dead fish must not be loaded for transport.

9.06 Fish suffering from disease, injury, or deformity and found not to be recovering must not be transported.

9.07 A counting/weighing device must be fitted in order to calculate fish numbers and **stocking density**.

9.08 **Stocking density** during transport must be determined by the system's ability to manage and maintain **water quality** throughout the journey without compromising fish welfare.

9.09 All lids, outlets, and any other openings must be fully secured before departure.

9.10 Equipment that the fish rely on for survival must be checked at least every 2 hours.

9.11 Oxygen saturation level during transport must be:

a) continuously monitored
b) at least 90% and no higher than 140%.

9.12 Supplementary oxygen or aeration which is sufficient to last at least 50% longer than the anticipated journey length must be:

a) available during all transportation
b) evenly spread throughout the water column.

9.13 Changes in water temperature and pH during the transport process, from tanks/pen of origin to destination tank/pen/well, must be managed to ensure fish welfare is not compromised.

9.14 Action must be taken where **water quality** deteriorates and/or fish are showing any, or a combination of the following signs:

a) an increase in panic and flight responses
b) irregular swim patterns
c) abnormal opercular movement
d) higher than expected scale loss
e) increase in mortality.

9.15 A process must be in place to safeguard fish welfare when removing the last fish from the tank or well.

## Road transport

9.16 The following **water quality** parameters must be monitored and maintained at a level that does not compromise fish welfare:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) pH
d) water temperature (ºC).

9.17 Before leaving the **site**, the driver must:

a) perform a visual check of the oxygen saturation level in the tanks
b) perform a visual check of the rate of aeration into the tanks.

9.18 When arriving at the discharge **site**:

a) company biosecurity requirements must be met
b) fish discharge must take place **promptly**
c) fish must be discharged through valves that allow more than one fish to pass through at any one time.
d) fish must not be unloaded from the transport tanks using nets, unless required in an emergency or the fish being transported are **broodfish**.

9.19 Water must always be in the tanks during unloading to prevent the last fish becoming dry.

9.20 The unloading of fish from road transporters into tanks on the decks of boats is not permitted.

## Wellboat transport

9.21 The following **water quality** parameters must be monitored and maintained at a level that does not compromise fish welfare:

a) ammonia ($NH_3$ mg/l)
b) carbon dioxide ($CO_2$ mg/l)
c) pH
d) water temperature (ºC).

9.22 Water flow through the wells at discharge must:

a) be sufficient to facilitate movement of the fish
b) not be so strong as to cause the fish injury.

9.23 The unloading of fish must not take place if **extreme weather** or other adverse conditions are likely to compromise fish welfare.

9.24 For wellboat transport of fish to slaughter, docking of the wellboat and operations at the slaughter **site** must be coordinated to minimise delays.

9.25 For wellboat transport of fish to slaughter, water in the well must not be chilled, unless where the journey is over 6 hours and:

a) water in the well is chilled at a maximum of 1.5°C per hour
b) the maximum permitted drop in water temperature over a 24-hour period is 50% of the ambient temperature at the start of chilling
c) the minimum temperature of the water at the end of chilling is no lower than 4°C.

## Pushing and towing pens

9.26 Pushing or towing of pens containing fish must only be conducted:

a) where **biofouling** on nets has not built up to the extent that water flow and oxygen supply are reduced and compromise fish welfare
b) with pen nets that are tensioned to minimise bagging
c) at a speed suitable to the size and swimming speed of the fish
d) when **harmful algal or jellyfish blooms** can be circumvented.

## Transport records

9.27 The following transport records must be kept:

a) last handling
b) last vaccination
c) last treatment (including anaesthetic)
d) feed withdrawal time
e) date of full smoltification
f) any clinical signs of disease at time of transport
g) crowding records
h) **water quality** parameters
i) numbers of fish in each tank/well/pen
j) **stocking density** in each tank/well/pen
k) numbers of fish put in each receiving pen
l) transport mortalities, noting the main reason for cause of death.

9.28 Where fish are transported to slaughter, the following additional records must be kept:

a) time loading commenced
b) time unloading finished
c) number of fish transported for slaughter.

9.29 For wellboat transport only, the following additional records must be kept:

a) purpose of wellboat movements
b) disinfection records
c) route covered during transport
d) timing of open and closed valve operation
e) calibration of equipment.

# 10 Slaughter

**NOTE**: Words/phrases highlighted in **bold** within the Standard form part of the requirement/s and are defined in the GLOSSARY.

10.01 The slaughter **site** must nominate a designated person/s who is:

a) responsible for the oversight of fish welfare at the **site**
b) responsible for animal-based welfare assessments and monitoring of live fish handling and slaughter
c) on **site** when fish are being unloaded, handled, and slaughtered
d) knowledgeable in all facets of handling and slaughter
e) responsible for monitoring adherence to the Standard.

10.02 A video surveillance system (e.g., CCTV) must be installed and operational to ensure:

a) clear, unobstructed viewing, and recording of all live fish handling, stunning, killing, and post stun/kill checking
b) routine reviewing of stored footage
c) availability for viewing (both stored and real-time footage) by RSPCA Australia
d) storage of footage for a minimum of 14 days.

10.03 Crowding and handling prior to slaughter must be kept to a minimum.

10.04 Crowding of fish must not commence until the slaughter **site** or vessel is ready to receive and process the fish.

10.05 A counting/weighing device must be fitted on pipes into the slaughter **site**, as applicable, to calculate fish numbers.

10.06 The speed of the pump delivering fish to the slaughter **site** must be controlled to ensure that:

a) fish can control their body position after being pumped and prior to entering the stunning system
b) staff can maintain an efficient and effective stunning procedure.

10.07 Fish must be stunned prior to slaughter.

10.08 The following stunning/killing methods are not permitted:

a) asphyxiation
b) bleeding of conscious fish (e.g., gill cutting or decapitation)
c) carbon dioxide stunning
d) chilling of live fish
e) ice slurry.

10.09 Where percussive stunning is used:

a) a mechanical stunning device must be used for primary and back-up stunning
b) a manual percussive device must only be used for emergency stunning where a mechanical percussive device is not available
c) one blow must be delivered to the top of the head just behind the eyes, of sufficient force to cause immediate and irreversible loss of consciousness that lasts until death
d) mechanical stunning devices must be monitored to ensure they deliver the stun at the correct location.

10.10 Where electrical stunning is used:

a) fish must not be subjected to pre-stun shocks
b) fish must remain in water
c) the stun must cause immediate (within 1 second) loss of consciousness.
d) the stun must be maintained until the fish dies unless, electrical stunning is immediately followed by percussive stunning
e) electrical stunning parameters must be monitored to ensure the set parameters are maintained
f) a percussive stunning device must be available for back-up stunning.

10.11 The first thirty fish exiting each stunner and, every hour thereafter, thirty fish on the bleed table, following the primary stun, must be checked for all the following signs to ensure the stunning system is operating effectively, fish have been effectively stunned and remain stunned until death:

a) no visual evoked response or eye rolling
b) small or no muscular twitches
c) no rhythmic opercular movement
d) no reaction to tail pinch
e) for electrical stunning: fish turns upside down.

10.12 Bleeding must follow within 10 seconds of the stunning method.

10.13 Fish must be checked to ensure they have been effectively stunned and bled prior to entering the ice slurry.

10.14 Methods of stunning and/or killing not specified in this Standard must not be performed without prior consent from RSPCA Australia.

### Records

10.15 The following slaughter records must be kept of the number of fish:

a) not effectively **stunned** and/or
b) not effectively bled.

### Animal-based welfare assessment

10.16 A random sample of at least 100 individual fish per pen population must be examined for:

a) fin injury (dorsal, pectoral, pelvic, tail)
b) skin injury
c) deformities (jaw, operculum, spine)
d) flesh gaping
e) other notable negative condition (e.g., eye injury/loss, snout injury).

10.17 Where more than 10% of the sampled fish have visible injury or deformity:

a) action must be taken to investigate the cause
b) procedures for managing and monitoring physical injury or deformity must be revised as appropriate.

# GLOSSARY

**NOTE**: The glossary defines words/phrases highlighted in **bold** within the Standard and which form part of the requirement/s of the relevant standard.

| | |
|---|---|
| alevins | Hatched eggs not yet ready for first feeding. |
| antimicrobial | An agent that kills or stops the growth of microorganisms such as bacteria, viruses, fungi, and parasites (e.g., an antibiotic is an antimicrobial used to treat or prevent bacterial disease or infection). For the purpose of the Standard, antimicrobials may be used therapeutically for the treatment of a disease or they may be used to prevent the spread of disease to healthy fish in close contact (as indicated by veterinary advice) with fish showing clinical signs of disease. For the purpose of the Standard, the term 'antimicrobial' excludes anthelmintics, antiseptics, disinfectants, essential oils, feed enzymes, prebiotics, probiotics, and organic acids. The principles of prudent antimicrobial usage can be found in the Australian Veterinary Association 'Guidelines for prescribing, authorising and dispensing veterinary medicines'. |
| biofouling | The accumulation of microorganisms, plants, algae, or other marine organisms on wetted surfaces |
| brail net | A net hung from a metal hoop of around 1m in diameter typically operated using a winch or crane. The net must be lined with tarpaulin to retain water (wet brail). The free end of the net is attached to a rope which allows the bottom of the net to be opened to release fish or closed to catch fish. |
| broodfish | Breeding stock of Atlantic salmon housed in freshwater tanks or ponds and used for the production of egg and sperm for breeding purposes. |
| competent | Having the necessary knowledge, experience, skill and ability to undertake a task successfully. |
| degree days | Used to estimate the stage of development and is calculated by multiplying the average water temperature by the number of days after fertilisation. |
| dip net | A small net attached to a handle used for the purpose of scooping individual fish out of the water. |
| effective vaccine | A vaccine that has demonstrated its ability to protect Atlantic salmon from a particular infectious disease known to be present or a risk in commercial aquaculture in Tasmania. |
| entrapment | A situation in which the body or part of the body of a fish is trapped, and the fish is unable to free themselves. |
| euthanasia/euthanased | Humanely ending the life of a fish when it is in the interest of the fish's welfare and using a technique that prevents further pain, suffering or distress. |

| | |
|---|---|
| extreme weather | A weather event which can include heavy and/or prolonged rain, hail, snow, wind, extremely high or low temperatures, or wave action. |
| eyed eggs | Eggs that have reached the stage of development where the black spot of the eye is clearly visible. Approximately 220 to 250 degree days after fertilisation. |
| fry | Fish starting from first feeding up to approximately 1g. |
| green eggs | Fertilised eggs that are water hardened up to the time that the initial pigment of the fish eye is visible with the naked human eye. This will be at approximately 220 to 250 degree days. |
| harmful algal and jellyfish bloom | A population of toxic algae or harmful jellyfish whose size and nearby presence may compromise fish welfare. |
| immediate measure | An interaction with a predator (most commonly, a seal) that has as its primary purpose to deter or remove the predator as quickly as possible and address the risk of injury or death to fish, staff, or the predator. |
| major reportable event | Includes, but is not restricted to sustained above-trend mortality rate(s) or unusual/unexpected incidences of injury, disease, or high mortality (>0.25% for three consecutive days) or any single loss in the marine environment (i.e., escapes) greater than 500 fish, resulting from non-endemic and/or exotic disease outbreaks, natural events (e.g., jellyfish or algal blooms), predator incursions, infrastructure or equipment failure, poor water quality, feed supply and/or formulation issues, transportation, or fish handling. |
| parr | Fish greater than about 1g and up to the start of smoltification. |
| pen depth | Is taken as the actual depth (in metres) of the vertical fish containment net wall from the waterline to the base of the pen and not including the cone base of the containment net. |
| prompt/promptly | To make a priority and address with little or no delay. |
| selective breeding program broodfish | Broodfish participating in selective breeding programs aimed at identifying traits that improve welfare outcomes for production fish (e.g., AGD resistance, temperature resilience). |
| site | A location where production activities relating to this Standard take place and may include hatcheries, slaughter plants/vessels, marine farming lease areas or other relevant locations. |
| smolt | Fish that have completed the physiological transformation and adaption from freshwater to seawater. |

| | |
|---|---|
| stocking density | The total biomass of the fish (in kg) divided by the tank or marine pen water volume (in $m^3$) as relevant. The depth of the marine pen, for the purpose of calculating water volume, is the actual depth (in metres) of the vertical fish containment net wall from the waterline to the base of the pen and not including the cone base of the containment net. |
| stripping/stripped | The process of releasing and collecting eggs and sperm from broodfish. |
| trigger level | A predetermined threshold which sets in motion a course of action to investigate and address the cause of a breach of that threshold. |
| veterinary advice | Recommendation/s provided by a registered veterinarian with expertise in fish health. |
| water quality | The sum of the water quality parameters that have the potential to affect fish health and welfare and include ammonia, carbon dioxide, nitrite, nitrate, oxygen saturation, pH, water temperature as well as suspended solids present in the water (as relevant when fish are held in a freshwater tank or marine pen, or during transport, or slaughter). |

## END OF STANDARD

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