



Code of **good practice:**
Freshwater Tanks, Ponds & Raceways

Seawater Tanks

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Chapter 5. Seawater Tanks

The following Code of Good Practice for Scottish Salmonid Aquaculture (CoGP) has been formatted to allow for easy comparison of compliance points between the 7 chapters. As such a compliance point will have the same ID across all chapters. Compliance points are not missing where ID's skip, that compliance point exists in another chapter but not in this one.

Many of the activities carried out in Seawater tanks are regulated under European, UK and Scottish law. The undernoted provisions are additional to legal requirements.

1: Documents and Training

1.1: Documentation Control	
1.1.1	Documents, records and other information relevant to the management of fish farming operations should be held and effectively controlled.
1.1.2	All documents should be the current version and be properly authorised.
1.1.3	All documents should be clearly written, contain sufficient detail for the purpose and be readily accessible to the relevant personnel.
1.1.4	Reasons for amendments to, and replacement of documents should be recorded.
1.1.5	All documents should be retained for an appropriate time and be available for inspection.

1.2: Training	
1.2.1	Individuals should receive training relevant to their role.
1.2.2	Procedures should only be carried out by properly trained and competent personnel, or personnel in-training who are being supervised by an appropriate member of staff.
1.2.3	Documented evidence of training of individuals in relevant areas should be maintained, this includes but is not limited to areas such as but not limited to: Fish Handling, Health and Safety, Sea Lice Management & Identification, Plankton identification, Vaccination, Boat Handling and operations.
1.2.4	Training of vaccinators should be carried out to British Veterinary Association or similar recognised veterinary standard.

2. Food Safety and Consumer Assurance

2.1: Use of Licensed and Approved Treatments	
2.1.1	Veterinary medicines should be used prudently under the conditions set out in the data sheet and/or as advised by the veterinary surgeon. ^{3b, 4k}

2.2: Traceability to Farm and Enclosure of Origin	
2.2.1	Traceability records for eggs and fish should be maintained throughout production processes. ^{3f}

3. Fish Health and Biosecurity

3.1: Key principles of fish health and biosecurity management	
3.1.1	Companies should have a Veterinary Health & Welfare Plan (VHWP) and Biosecurity Management Plan (BMP) covering relevant aspects as set out in Annex 2.
3.1.2	VHWPs and BMPs should be reviewed at the end of each production cycle.
3.1.3	All staff engaged in the production of fish should be familiar with the relevant aspects of the VHWP and BMP.
3.1.4	Risk assessments should be conducted by trained personnel experienced in the appropriate methodology (see Annex 3).
3.1.5	The outcome of risk assessments should be communicated to the relevant production personnel and other personnel responsible for implementation of the outcomes.
3.1.6	Farmers should reduce any risk to fish health associated with the presence of wild birds, mammalian predators and vermin by ensuring the secure storage of feed, good feeding practice and the secure temporary storage of dead fish.
3.1.7	Companies should have written procedures to ensure that production staff notify fish health teams immediately when disease is suspected, where abnormal behaviour is evident, or where morbidity or mortality levels are unusually high or subject to rapid increase. Procedures should also be in place to flag issues to management where appropriate.
3.1.9	Personnel and visitors to sites should be made aware of the role they play in minimising the risk of disease transmission, following good hygiene practice and procedures.

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Disposal of dead fish is the subject of EU, UK and Scottish legislation.

3.2: Removal and Disposal of Dead or Moribund Fish	
3.2.1	Where possible (eg. subject to safe operating conditions) fish should be inspected daily and dead and moribund fish removed, minimising handling to avoid stress to healthy fish within the enclosure.
3.2.3	Where problems are identified during an inspection, prompt remedial action should be taken in accordance with the VHWP and BMP to determine the cause and deal with the problem including, where appropriate, consultation with a veterinary surgeon or fish health specialist.
3.2.4	At all stages, the number of dead fish should be recorded, along with, where possible, a record of the cause of death.
3.2.5	Where the level of fish mortality exceeds the threshold(s) below, this should be notified in a timely manner to Marine Directorate's Fish Health Inspectorate and the veterinary surgeon who has the fish under their care.
3.2.6	Subject to safe operating conditions, in the event of a disease outbreak, dead fish should be removed daily.

3.3: New Production Farms - proximity to existing broodstock sites	
3.3.1	All new production farms, pens, and marine linked land-based sites should be sited as a result of a thorough documented risk assessment, with consideration for environmental parameters that includes but is not limited two tidal excursions, regional hydrodynamic, potential site linkages.

3.5: Importation of Gametes and Fertilised Eggs	
3.5.1	Companies proposing to import eggs for the first time from overseas should visit the sites on which the eggs are produced and audit the procedures being followed on these sites to satisfy themselves that good practice and appropriate risk management are being followed. ^{4c}
3.5.2	Proposals to import gametes and fertilised eggs should be underpinned by a documented risk assessment. A decision to import should only be taken if the outcome of the risk assessment is satisfactory (see Annex 3). ^{4c}
3.5.3	In all cases, written evidence should be provided that eggs have been properly disinfected. ^{4c}
3.5.4	Water and packaging which has come into contact with imported eggs should be properly disinfected and disposed of by an approved method. ^{4c}

It is acknowledged that risks to fish health associated with the movement of gametes and fertilised eggs are lower than risks associated with the movement of live fish.

3.6: Importation of Live Salmonids	
3.6.1	Companies proposing to import live salmonids from overseas should visit the sites on which the fish are being produced and audit the procedures in operation to satisfy themselves that good practice is being followed.
3.6.2	Proposals to import live salmonids should be underpinned by documented risk assessments.
3.6.3	A decision to import should only be taken if the outcome of the risk assessment is satisfactory.
3.6.4	Risk assessments should take into account the potential to introduce Gyrodactylus salaris
3.6.5	Farmers should hold on record, appropriate, independent certification to demonstrate that any salmonids to be imported are free from pathogens.
3.6.6	Farmers should hold records to demonstrate that salmonids to be imported have been vaccinated, where this is appropriate.
3.6.7	Live salmonids should not be imported from countries of lower health status.

3.6.8	<i>In order to ensure no erosion of the health status of fish in the Scottish jurisdiction, an exception to the foregoing will only be acceptable under very specific circumstances, where no other suitable source of fish is available. Where this is the case, the following condition(s) should be met:</i> - <i>The company has suffered an acute, significant, and unforeseen challenge which has materially impacted the company's ability to put smolt to sea using existing smolt capacity. It is unacceptable to propose importation of live salmonids from countries of lower health status to facilitate company growth.</i> - <i>Where a company needs to identify a new source of smolt supply and is considering importation from an approved zone or compartment within a country of lower health status, contact should first be made with Scottish producers to establish availability from within Scotland and to consider options.</i> - <i>Operators receiving such applications should consider them favourably and facilitate supply options to operators who are considering the import of smolt from countries of lower health status.</i> - <i>Documented evidence should be provided which demonstrates that the operator's existing production requirements cannot be met from existing and suitable UK sources or from countries of a similar or higher health status. Due to commercial confidentiality, there is no expectation on operators to share details of their production plans with other operators.</i> - <i>Prior to each importation, the importing company should visit the site(s) on which fish are being produced and audit the procedures in operation to satisfy themselves that good practice is being followed</i> - <i>The operator wishing to import live salmonids should notify and seek written approval from the relevant trade bodies.</i>
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3.6.9	<i>Following the importation of live salmonids from zones or compartments within countries of lower health status, the following conditions should be met:</i> - <i>Imported live salmonids should be contained, for no less than three months, on farms which are no less than two tidal excursions from other defined salmon producing areas.</i> - <i>For no less than three months after importation, fish should be tested at weekly intervals for parasites and listed, notifiable and other potentially serious diseases.</i> - <i>For no less than three months after importation, all boat movements off the farm holding the fish should be subject to appropriate disinfection.</i> - <i>During the initial 3-month containment period, the owners of the imported fish should make all other operators aware of where imported live salmonids are being held/farmed.</i> - <i>Testing for listed, notifiable and other potentially serious diseases should be carried out on all dead fish and any fish showing signs of morbidity.</i> - <i>If any listed, notifiable or other potentially serious diseases are identified, all fish should be culled in a timely manner, and the farm followed.</i> - <i>Imported fish should only be positively released from initial containment farms where the results of health tests have been negative.</i> - <i>Where fish cannot be positively released from the containment farm, measures to deal with the fish should be in accordance with OIE and Marine Directorate guidance.</i> - <i>Following importation, movements of imported live salmonids should only take place on the basis of a satisfactory outcome from a documented risk assessment (Annex 3).</i> - <i>Following importation, movements of imported live salmonids should only take place after the owner of the fish has notified salmon farmers operating within two tidal excursions of their new destination and their planned route to that destination.</i>
3.6.10	<i>All risk assessments, independent health certificates and vaccination records relating to live salmonids imported from countries of a lower health status should be shared with the appropriate trade body.</i>

3.9: Site Disinfection	
3.9.1	Enclosure (pen, tanks etc) should be cleaned/ disinfected when empty, along with associated equipment.
3.9.2	Disinfection should be conducted to a level sufficient to inactivate pathogens considered to pose significant risk (Annex 4).

3.10: General Criteria Applying to All Fish Movements	
3.10.1	Decisions to stock sites or move fish should be made on the basis of an acceptable outcome from a documented risk assessment
3.10.2	Disinfection should be conducted to a level sufficient to inactivate pathogens considered to pose significant risk (Annex 4).
3.10.3	General health check (above) should be performed by relevantly trained staff, documented, and records maintained.
3.10.4	During transfer, all efforts should be made to ensure factors likely to stress fish are minimised. ^{6a} Examples of potential actions taken include: • documented risk assessment prior to transport • managing oxygen whilst in transport • managing any crowding appropriately
3.10.5	The number of different sources of fish used to stock sites should be kept to a minimum

3.11: Ongrowing and Transfer	
3.11.1	As far as is reasonably practicable in freshwater ongrowing areas, personnel, equipment and personal protective equipment should be site specific. ^{6a}
3.11.2	Where movement between freshwater ongrowing areas is unavoidable, cleaning and disinfection should, as far as is reasonably practicable, be in accordance with the Standard Disinfection Protocols (see Annex 4).
3.11.3	Helicopter buckets, vehicles and road transport equipment used for fish transfer should be cleaned and disinfected, (see Annex 4)
3.11.4	Documented evidence of disinfection should be obtained from those responsible for transportation.
3.11.5	Salmonid aquaculture sites should contain only one commercial species. An exception to this is the cohabiting of salmon/trout with cleaner fish such as wrasse and lumpsuckers on marine sites or seawater tanks.
3.11.6	As far as is reasonably practicable in marine FMAs, personnel, equipment and personal protective equipment should be site specific. ^{4h}

3.21: Harvesting Operations	
3.21.1	The method used to crowd, remove and harvest fish should be assessed for the risk of escapes and, where appropriate, contingency arrangements put in place to minimise the risk.
3.21.4	Bleeding of fish should take place on a facility where the blood water is contained.
3.21.5	Blood water and effluent should be contained and disinfected so as to minimise the risk of spread of pathogens.
3.21.6	Appropriate containment measures should be in place to prevent the leakage of blood water from bins, etc.
3.21.7	Harvest bins should be checked for damage, thoroughly cleaned and disinfected between operations.
3.21.8	Equipment used for on-site harvesting should be dedicated to individual sites or, if moved between sites, thoroughly cleaned and disinfected before being moved
3.21.9	At the end of each period of harvesting, all equipment should be thoroughly cleaned and disinfected.
3.21.10	All activities involving movement of fish, cleaning and disinfection of bins and equipment should be recorded and the records retained for an appropriate time.

3.22: Biological Vectors of Fish Disease - Birds & Mammals	
3.22.1	Transmission of infectious agents by birds and mammals should be minimised through ^{6h} , ⁶ⁱ , ^{6j} : • Measures designed to exclude birds and mammals from areas where farmed fish are held; • Hygienic procedures for handling dead fish; • Feeding practices that minimise wastage;

All of the veterinary medicines currently licensed for the treatment of salmonids are Prescription Only Medicines (POMs). As such, they must be prescribed by a veterinary surgeon and used under his/her instructions.

3.29: Use of Medicinal Products	
3.29.1	VHWP's and BMP's should include relevant aspects of medicine and vaccine use. ^{4k, 4m}
3.29.2	When medication is to be applied, clear written instructions on the use of the medicine should be obtained and effectively communicated to the personnel responsible for its application. ^{4k}
3.29.3	Where the recommended course of treatment at the correct dosage cannot be completed a treatment may be curtailed. Where treatment is terminated early, this should be recorded and further advice sought from the veterinary surgeon. ^{4k}
3.29.4	To avoid the possibility of contamination of unmedicated feed with medication, feed bins or hoppers should be emptied and cleaned or emptied and flushed with appropriate volumes of feed that can only be fed to the population the prescription was originally written for (ie the medicated population). ^{4k}
3.29.5	If you are administering a medicine, you must follow what is written in a prescription. The veterinary surgeon or other person supplying the product should also advise on the correct withdrawal period. Where there is a lack of clarity on any areas of the prescription the appropriate veterinary surgeon should be contacted. ^{4k}

As is the case with most terrestrial food producing animals, vaccines are used in fish farming in Scotland to help prevent or mitigate the effects of a range of bacterial and viral diseases. Vaccination of Scottish salmon is now normal practice, and this has had a demonstrable effect in maintaining high standards of fish health. In the case of the vaccines used against bacterial diseases, these have also had a very significant effect in minimising the need for antibiotic use. Most vaccination takes place in freshwater. Good practice in vaccination is described in 'Responsible use of vaccines and vaccination in fish production' published by the Responsible Use of Medicines in Agriculture Alliance (RUMA).

Vaccines must be used and stored in accordance with the manufacturer's data sheet and/or the advice of the person prescribing the vaccine. Vaccines for use in Scottish salmon are categorised as either POM-V or POM-VPS; however only a veterinarian may prescribe any vaccine for use outwith the conditions of its Marketing Authorisation, which may include use in fish of a specific size or within a temperature range.

The temperature of the water in which vaccinated fish are held pre- and post-vaccination will often have an important bearing on the effectiveness of the vaccine and the protection it confers.

3.30: Vaccination	
3.30.1	Where appropriate, VHWP's and BMP's should include a vaccination regime to protect fish from diseases which may present a risk to their health. ^{4k}
3.30.2	Farmers should develop documented SOP's to be followed when vaccinating populations of fish. ^{4m}
3.30.3	There should be an SOP that draws on information supplied by the prescriber and vaccine manufacturer, along with any guidance prepared by third parties. ^{4m}
3.30.4	If a vaccination contractor is engaged, SOP's should be mutually agreed and specify responsibilities of all parties involved. ^{4m}
3.30.5	Feeding should be withdrawn from fish to be vaccinated for an appropriate period, in accordance with Data Sheet recommendations and fish welfare guidance. ^{4m}
3.30.6	Fish should be appropriately graded in preparation for vaccination. ^{4m}
3.30.7	The temperature of the water in which fish are held should be recorded in the week leading up to vaccination, and for a period (as indicated by product data sheets) afterwards. ^{4m}
3.30.8	Vaccination equipment should be maintained and used in a hygienic manner. ^{4m}
3.30.9	In the immediate lead up to vaccination operations, all machinery, equipment, tables, vaccination kit, PPE and other materials to be used should be checked to ensure that all that is required is available and fit for purpose. Where companies utilise external equipment, declarations can be sought and held on record. ^{4m}
3.30.10	The relevant SOP for automated vaccination equipment should state that it is manned at all times whilst in operation. ^{4m}
3.30.11	An appropriate regime for monitoring fish welfare during automated vaccination should be included in the relevant SOP. ^{4m}

3.31: Where vaccination equipment is brought on site from elsewhere	
3.31.1	Equipment should be disinfected appropriately. The supplier should provide proof that the equipment has been appropriately disinfected and equipment should be disinfected before and after use. Records should be kept.
3.31.2	To verify that vaccines have been applied in an optimal manner, that they have assisted in achieving the required protection against the relevant pathogen(s), and to demonstrate that the health and welfare of the vaccinated fish remains good, fish should be examined at appropriate intervals during the procedure and after vaccination.
3.31.3	Any suspicion of adverse effect should be immediately reported to the person who prescribed the vaccine.

Certain responsibilities are associated with adverse events arising from veterinary medicine use. Summaries of these are available from the VMD and the National Office of Animal Health.

3.32: In addition to the legal requirements above	
3.29.1	VHWP and BMPs should include relevant aspects of medicine and vaccine use. ^{4k, 4m}
3.29.2	When medication is to be applied, clear written instructions on the use of the medicine should be obtained and effectively communicated to the personnel responsible for its application. ^{4k}
3.29.3	Where the recommended course of treatment at the correct dosage cannot be completed a treatment may be curtailed. Where treatment is terminated early, this should be recorded and further advice sought from the veterinary surgeon. ^{4k}
3.29.4	To avoid the possibility of contamination of unmedicated feed with medication, feed bins or hoppers should be emptied and cleaned or emptied and flushed with appropriate volumes of feed that can only be fed to the population the prescription was originally written for (ie the medicated population). ^{4k}
3.29.5	If you are administering a medicine, you must follow what is written in a prescription. The veterinary surgeon or other person supplying the product should also advise on the correct withdrawal period. Where there is a lack of clarity on any areas of the prescription the appropriate veterinary surgeon should be contacted. ^{4k}

3.33: Adverse Events	
3.33.1	Farmers should report and record adverse events, both in fish being treated and in persons involved in the application of a treatment.

4. Managing and Protecting the Environment

4.3: Redundant Equipment and Waste Materials	
4.3.1	All waste materials such as feed bags, etc. should be carefully collected, properly segregated, stored and recycled or disposed of by an approved means within a defined timescale.

4.4: Noise	
4.4.1	Farmers should ensure that equipment that creates significant noise (air blowers, generators, etc.) is suitably muffled in order to prevent unacceptable disturbance to wildlife or humans. Local Environmental Health Departments may be consulted for advice.

4.5: Lights	
4.5.1	The appropriate use of surface and submerged lights on pen sites should seek to minimise any local issues

4.6 Odours	
4.6.1	Farmers should ensure that offensive odours that might arise from farming activities are strictly managed and minimised. Local Environmental Health Department may be consulted for advice.

4.7: Containment - Environmental Assessment	
4.7.1	Weather permitting, and having regard to health and safety conditions, daily visual inspection of the holding units should be carried out to ensure containment of the stock
4.7.3	Existing sites should have SOPs which are based on risks identified. These may include risk assessments that consider the impact of the following: • Fish handling and transport • Failure of utility services, structures, equipment • Predators • Weather - flood, wind, snow, ice • Collision • Pollution • Mass stock kill event • Fire • Intruders

4.7.4	Farmers should identify and hold contact details for other relevant stakeholders sharing the same water catchment, e.g. other finfish farms, fishing interests, leisure water sports, hydro-electric production, public drinking water or other abstraction schemes. ^{5c}
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4.8: Containment - Design and Construction	
4.8.1	If an existing farm is in a location where it is likely to be affected, suitable flood defences should be in place to prevent the escape of any stock. ^{5c}
4.8.2	Farmers operating land-based aquaculture systems should have effective measures in place to prevent stock from jumping out of the holding facilities and making their way into surface waters or natural water courses. ^{5c}
4.8.3	All reasonable measures should be put in place to screen the water inflow to the aquaculture system to prevent the ingress of wild fish, while still allowing them to return to their natural environment. ^{5c}
4.8.4	Inflow systems should also be designed to prevent any upstream escape of farm stock. ^{5c}
4.8.5	Screen sizes and configuration should be capable of containing the entire range of fish sizes contained within the unit in every instance. ^{5c}
4.8.6	The farmer should be aware of the minimum fish size supplied where new stock is introduced. ^{5c}
4.8.7	Screen integrity should be inspected daily and any necessary action taken. ^{5c}
4.8.8	Records of inspections and any remedial action required should be maintained. ^{5c}
4.8.9	Screens should be constructed from suitably strong and robust material to ensure they are fit for purpose. ^{5c}
4.8.10	The water leaving a land-based aquaculture system should incorporate two screens between the fish holding unit and the outflow of a suitable size and construction to prevent the passage of fish in all potential water conditions. ^{5c}
4.8.11	Screening should be configured so as to enable changing of screens without any potential escape of stock. ^{5c}

Guideline Minimum Fish Size vs Screen Size: Trout	
Minimum Fish Size (g)	Maximum Screen Size or Aperture (mm)
0.2	2
0.8	3
3.0	6
10	8
30+	12.5

Guideline Minimum Fish Size vs Screen Size: Salmon	
Minimum Fish Size (g)	Maximum Screen Size or Aperture (mm)
0.2	2
0.8	3
3.0	4
10	8

4.15: Second-hand Equipment	
4.15.1	Farmers should have documented records for the selection, preparation and installation of second-hand pens and mooring equipment to ensure they are fit for purpose.

The risk of escape is increased during procedures such as fish input, grading, vaccination and transfer of fish within and between sites.

4.16: Fish Handling and Transfer	
4.16.1	Prior to handling fish, the integrity of all handling equipment should be checked, including: pipelines, pumps, transport tanks, graders, counters and vaccination stations
4.16.2	Checks should also include suitability during adverse weather conditions, where this is appropriate.
4.16.3	The use of safety nets, secondary pipe joint security devices or other forms of bunding is recommended at potential risk points, such as pipe connections.
4.16.4	A documented risk assessment, a standard operating procedure and a contingency plan should be in place before any such procedure is followed, and nets should be checked for tears or damage.

4.17: Helicopter Operations	
4.17.1	Helicopter operations will be accompanied by a documented risk assessment which includes but is not limited to: • Appropriate checks on receiving farms equipment • Named person responsible for operation • Safety briefing from ground or helicopter pilot

4.19: Failure of Containment	
4.19.1	Farmers should have site-specific contingency plans that describe actions to be taken in the event of any escapes.
4.19.2	All farm staff should be aware of factors affecting the potential breaches of containment and trained in actions to take in the event of an escape ^{5c}
4.19.3	Weather permitting, and having regard to health and safety conditions, daily visual inspection of the holding units should be carried out to ensure containment of the stock. ^{5c}
4.19.4	Any escape, or suspected escape, of live fish should be reported immediately to all relevant stakeholders, including the relevant trade body, the local District Salmon Fisheries Board and Fisheries Trust (or at the latest, within 48 hours of discovery). ^{5c}

5. Fish Welfare and Care

5.4: Backing up a Farm	
5.4.1	Where appropriate, there should be emergency back-up systems to maintain a high standard of water quality.

5.5: Design and Planning of Farms, Equipment and Operating Systems	
5.5.1	Where appropriate, there should be emergency back-up systems to maintain a high standard of water quality.
5.5.2	Equipment should be designed in such a way as to avoid creating welfare problems for the fish
5.5.3	Equipment should be capable of being cleaned and disinfected
5.5.4	Contingency plans should be in place in case of failure of the water supply or equipment which is critical to the welfare of the fish.

5.6: Water Supply and Quality	
5.6.1	Monitoring should be carried out to ensure that water quality parameters are maintained within the known acceptable limits for the species. The parameters measured and the monitoring intervals will depend on the system, species, stage of development and time of year.
5.6.2	Where water quality parameters are outwith the acceptable range, steps should be taken to identify the cause and put in place remedial action as soon as possible.
5.6.3	Where appropriate, automatic equipment fitted with alarms should be used to monitor water quality.
5.6.4	Where the welfare of the fish is critically dependent on air/oxygen supply or pumped water, automatic oxygen and water level monitoring equipment should be used.
5.6.5	Aeration/oxygenation/water level monitoring equipment should be fitted with alarms and backup systems which are tested daily.
5.6.6	Automatic and emergency back up and monitoring equipment should be routinely inspected, calibrated and serviced, in accordance with manufacturer's recommendations.

5.7: Lights	
5.7.1	Levels of light to which fish are exposed should be appropriate to the salmonids stage of development, optimal for welfare, and its use based on sound research/ specialist advice/ practical experience.

5.8: Inspection and Testing	
5.8.1	Levels of light to which fish are exposed should be appropriate to the salmonids stage of development, optimal for welfare, and its use based on sound research/ specialist advice/ practical experience.
5.8.2	Sudden changes in light levels should be avoided wherever possible.
5.8.3	Reported defects should be immediately rectified and, where this is not possible, alternative measures put in place to safeguard fish welfare.

redator management involves a site-specific approach. Various management options are available for the control of predators. However, it is acknowledged that not all control options will be suitable for all farm situations.

Some aspects of predator management are subject to UK and European legislative controls. Consequently, predator management plans may be subject to regional restrictions.

5.9: Predator Control - General	
5.9.1	Farms should have a site-specific predator management plan
5.9.2	Farmers should document sightings of relevant predators in the vicinity of farms

5.10: Stockmanship and Husbandry	
5.10.1	Farmers should be able to recognise indicators of reduced welfare in fish, including abnormal behaviour, physical injury and symptoms of disease, and take remedial action in the event that such indicators are apparent.

5.11: Handling Live of Unconscious Fish	
5.11.1	Live fish should only be removed from water and handled when absolutely necessary.
5.11.2	Adequate support should be given to the body where fish are handled.

5.12: Hand Nets	
5.12.1	Hand nets should be kept clean, disinfected and in good repair

5.13: Assessing Suitability for Transfer to Sea	
5.13.1	The principles of assessing smoltification should be incorporated in the VHWP
5.13.2	Prior to the transfer of juvenile Atlantic salmon to sea, smolts should be checked and all relevant data recorded

5.13.3	Farmers should assess smoltification of fish using a suitable, evidenced test.
5.13.4	Fish should not be exposed to salt concentrations greater than 35 ppt.
5.13.5	Saltwater tolerance tests can be aversive in non-smolting fish. Farmers should immediately kill any moribund fish and terminate the test if fish begin to show signs of distress.

5.14: Crowding	
5.14.1	Personnel should adhere to a written procedure for crowding of fish
5.14.2	The frequency and duration of crowding should be kept to the minimum.
5.14.4	Farmers should monitor fish behaviour during crowding and take action if fish show signs of stress or damage.

5.15: Marking	
5.12.1	External marking methods that cause distress or injury to farmed fish should not be used

5.16: Stocking Density	
5.16.1	Stocking density should be monitored in relation to fish health, fish behaviour and water quality to ensure that fish welfare is not compromised.

5.17: Grading	
5.17.1	Details of planned frequency and procedures for grading should be part of the VHWP

5.18: Transport of Live Fish	
5.18.1	Fish should be crowded and transported in such a way that possible adverse effects on their welfare are minimised
5.18.2	Biosecurity and fish welfare should be considered before transporting fish populations and covered in the VHWP and BMP
5.18.3	For transport, oxygen monitoring should be carried out with sufficiently frequent monitoring intervals
5.18.4	Control systems for oxygenation of water should be such that adjustments may be made timeously to ensure that oxygen levels remain within safe limits at all times
5.18.5	Supplementary oxygen or air should be sufficient to last longer than the anticipated length of the journey, including helicopter transport
5.18.6	Excessive or rapid changes in water temperature or pH in transport tanks should be avoided.
5.18.7	Any fish that die during transportation should be separated from live fish as soon as possible after arrival and the cause of death determined by a competent person.

5.19: Harvest and Culling	
5.19.1	Crowding fish prior to harvesting should be for the minimum time possible, especially where more than one crowding session is necessary to complete the harvest.
5.19.2	Killing efficiency should be monitored by a proficient person to ensure fish do not regain consciousness prior to death.

6. Feed and Feeding

6.1: Feed Formulation	
6.1.1	Farmers should ensure, through labelling information or documentary assurance, that they use feeds that have been formulated for the species and life stage of fish being grown.

6.3: Use of Feed	
6.3.1	Farmers should have a written feed management plan or a digital system, which includes/tracks the following: • Feeding the correct feed size; • Feeding the correct amount of feed to any population of fish, in the proper manner and over the correct period(s) of the day; • Regular monitoring of feed conversion efficiency (following sample weighing), and assessment of whether feeding protocols and guidelines to assist farm personnel are effective.

6.4: Withholding Feed	
6.4.1	Before any relevant handling event, feed should be withheld.
6.4.2	Veterinary advice should be sought on feed withdrawal with, as appropriate, feed withdrawal protocols being included in the VHP

7. Fallen Stock Management

7.2: Fallen Stock Collection	
7.2.1	Where fallen stock are transported after collection from the production unit to any storage facility (temporary or otherwise), closed, secured and labelled transport/ storage containers should be used at all times.
7.2.3	Any equipment used for the terrestrial transfer of fallen stock from a shorebase or land-based production unit for further processing should be cleaned and disinfected according to recommended practice before re-use.
7.2.4	Fallen stock will be handled in a discrete manner. Any container (e.g., tubs etc.) used for the storage of fallen stock should be kept covered and secured when in use and/ or unattended to prevent unauthorised access at all times.
7.2.5	Any equipment used for the storage of fallen stock should be cleaned and disinfected, as required, according to recommended practice (see Annex 4).

