



# Code of Good Practice

## Explanatory & Contextual Notes



code of  
good practice  
scottish finfish aquaculture

# EXPLANATORY AND CONTEXTUAL NOTES

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## EXPLANATORY AND CONTEXTUAL NOTES

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*In order to simplify the structure of the Code, the following notes provide background to issues covered within the text. They are designed to make the presentation of its provisions clearer and more concise, increase accessibility to lay readers and improve user-friendliness for subscribers. These notes cut across most of the sections of the Code and set out relevant aspects of legislative background to the provisions of the Code, with some more detailed contextual information to understand the way aspects of the Code work in practice.*

### HEALTH & SAFETY ON FINFISH FARMS

The health and safety of farm staff and visitors to finfish farms is of vital importance to the companies, to the industry and to the wider community. Many of the practices designed to ensure health and safety are a matter of statute. With the high level of importance attached to health and safety in aquaculture operations, reference to existing and emerging guidance and associated documentation should be sought through the [Health and Safety Executive](#) (HSE), the [Maritime and Coastguard Agency](#) (MCA) and the Environmental Health Department of the Local Authority.

### FOOD SAFETY & CONSUMER ASSURANCE

The primary purpose of finfish aquaculture is to produce high quality food for human consumption. Many aspects of food safety are addressed through existing legislation and regulation and this Code is designed to supplement this through the application of good practice, reflecting the highest standards in food production. The Scottish finfish industry is also committed to sustainable growth, managing and minimising the environmental impact of its activities and ensuring the responsible sourcing of feed.

### ***Food safety plans based on HACCP principles***

Hazard Analysis Critical Control Point (HACCP) is a step by step approach to managing food safety risks. It is not currently a legal requirement for primary production activities to operate a full HACCP system. However, an approach based on HACCP principles is required and adoption of HACCP methodology is advised. The Code advocates and supports this approach.

### ***Veterinary medicines and treatments***

The use of authorised veterinary medicines and other treatments to support and protect fish health and welfare is a proper and legitimate aspect of food-producing animal husbandry. The use of such treatments and measures to ensure that any medicine residues are properly cleared from fish flesh intended for human consumption is governed by law and, in all cases, veterinary medicines and other treatments must be used in such a way as to minimise the risk of unacceptable residues being present in fish at the point of harvest.

### ***Environmental contaminants***

As in the wild, the food eaten by farmed fish is one route through which miniscule residues of environmental contaminants may arise in fish flesh. European, UK and Scottish law sets out acceptable levels of environmental contaminants in all of the commonly eaten fish species and also sets out provisions aimed at improving feed safety in the medium and longer term. Fish farmers must be able to demonstrate that the feeds used and the fish harvested for human consumption meet the requirements of this legislation.

### ***Food hygiene***

In the same way as in all other foods, a wide range of microorganisms that have no implications for consumer safety can occur in fish. Additionally, some microorganisms which have the potential to give rise to risks to consumers can

sometimes occur under certain circumstances. Any such risks are minimised or eliminated by observing good hygiene practice.

### ***Carotenoids***

A large number of carotenoids occur naturally in many different types of food, including fish, and it is natural to find them, especially in salmonid fish. Many carotenoids are known to have positive nutritional benefits, by virtue of their antioxidant properties. A small number of carotenoids are fully approved under EU and UK legislation for use in feeds for salmonid fish.

### ***Origin - traceability to farm and enclosure***

European and UK legislation requires farmers to have systems and procedures in place to allow them to identify the suppliers of their stock, to maintain traceability throughout the farming and production process and to identify other businesses that they have supplied. Although the law requires farmers to have 'one up, one down' traceability (i.e. covering things supplied directly to them and things they have supplied directly to others), they have developed and implemented systems for their farmed fish that exceed the requirements of the legislation and which ensure full traceability of batches of fish throughout the whole production chain.

### ***Flesh quality and nutritional benefits***

The nutritional benefits of eating fish are widely acknowledged. The [Food Standards Agency](#) advises that people should be eating at least two portions of fish a week, including one of oily fish. However, few people eat enough fish.

Oily fish, such as salmon, is a good source of essential Long Chain Polyunsaturated Fatty Acids, often referred to as "Omega-3s". Farmers should ensure that fish are produced to an agreed standard which ensures fitness for purpose for their customers and consumers. Oil rich fish such as salmon and trout should represent an important source of the essential Omega-3 fatty acids EPA and DHA.

## FISH HEALTH AND BIOSECURITY

Since its inception over forty years ago, the development of fish farming in Scotland has been accompanied by an increasingly comprehensive and rigorous regulatory system. Notable within this is the regulation of many different aspects of farmed fish health and welfare. While early regulation of fish health in Scotland revolved largely around UK statute, over the course of the past two decades the development and implementation of European law, including the [2006 Aquatic Animal Health Directive](#) and associated European, UK and Scottish legislation, has taken precedence. This has brought much greater focus on the use of risk analysis and assessment in decision making and these same principles are fully reflected in the Code.

Like other forms of statutory regulation, European, UK and Scottish legislation broadly underpins the good practice routinely followed on fish farms. Companies operating within the Scottish finfish aquaculture industry have extensive practical experience of managing the health of their fish and have committed to encapsulating in the Code the good practice that has been developed. The application of such provisions in the Code extends beyond the basic requirements of the law.

There is already a high level of awareness on the part of farmers and industry regulators of the potential for newly identified, emerging and exotic pathogens to appear in Scottish waters. Additionally, there is potential for global climate change, particularly as reflected in increasing sea surface temperatures, to complicate and exacerbate well-understood fish health issues. However, industry is confident that the provisions of the Code, and its continuing development in light of new knowledge and experience, make a significant contribution towards reducing risks to farmed fish posed by known and emerging fish pathogens.

***The body of text in Chapters 1 to 7 of the Code sets out provisions that are above and beyond the minimum requirements of the law.***

## ***Broodstock***

Broodstock or brood fish are terms used within the finfish farming industry to describe adult fish of reproductive age that are used to produce eggs and sperm, from which juvenile fish result.

Farm sites on which broodstock are held may contain multiple year classes (or generations) of fish. The Code recognises that there is a distinction between sites holding broodstock and production farms in the level of risk associated with their operation.

### ***The origin of broodstock***

Some of the fish used as broodstock may originate within the UK, while others may be imported. The importation of fish to be used as broodstock from other countries is subject to EU, UK and Scottish fish health legislation

### ***Stripping broodstock and the production of gametes***

It is normal practice for brood fish to be manually or mechanically stripped (i.e. the process during which eggs or milt are removed from them prior to fertilisation). It is industry good practice to carry out appropriate testing of broodstock and their progeny for vertically transmitted diseases (i.e. diseases that can be transferred from parent to offspring).

### ***Importation of fish gametes and fertilised eggs***

The importation of gametes (unfertilised fish eggs and milt) and fertilised eggs is subject to legal controls. It is acknowledged that any risks to fish health associated with the movement of gametes and fertilised eggs are considerably lower than risks associated with the movement of live fish.

### ***Importation of live marine finfish***

The importation of live marine fish (i.e. non-salmonids) from countries within the European Union and from outwith the EU ('Third countries') is subject to EU, UK and Scottish fish health legislation.

### ***Importation of live salmonids***

The importation of live salmonids from countries within the European Union and from outwith the EU ('Third countries') is also subject to EU, UK and Scottish fish health legislation.

### ***The movement of live fish by wellboats and other vessels***

Wellboats are custom designed and constructed vessels which are used routinely for a variety of tasks essential to the efficient running of salmon farms. Wellboats are used to transfer salmon smolts to sea water sites at the beginning of the marine production phase, to grade fish by size, to transfer fish between sea water sites, to transport fish for harvest at the end of the production cycle and to carry out medicinal bath treatments. From time to time, other non-specialist wellboats may also be used to transport live fish.

The use of wellboats and other vessels to deliver fish to, and collect fish from, multiple sites can present a risk of pathogen transmission. Risks are often considerably lower where fish movements are within defined Farm Management Areas (FMAs - see below) that have been established for sea lice management, disease control and biosecurity purposes, when compared with movements between different FMAs. Risks associated with the delivery of fish to multiple unstocked and fallowed sites in different management areas are also relatively low.

It is the joint responsibility of those supplying and receiving fish to ensure that the fish are in good health and physical condition when they are transferred on to farms.

## **Sea lice**

Sea lice are naturally occurring copepod ectoparasites of wild and captive marine fish. In Scotland, the two commonly occurring sea lice species are *Lepeophtheirus salmonis* and *Caligus elongatus*. The former is an obligate parasite of salmon and sea trout and has been associated with both of these species of fish for millennia. The latter is a ubiquitous parasite of many species of wild marine fish, which may also be found on wild and farmed salmonids and other captive marine fish.

Farmers are now bound by a legal requirement to maintain specific records in relation to sea lice that may occur on farmed fish. The record keeping requirement set out in law is based upon the provisions of the Code. Although the Code no longer includes specific reference to legal requirements, it is important to note that, in the context of sea lice management and control, Scottish law is founded on principles of good practice developed and implemented by industry for over two decades and amalgamated into the body of the Code.

Since its inception, the Code has required farmers to observe the provisions of 'A National Treatment Strategy for the Control of Sea Lice on Scottish Salmon Farms' (*The NTS*). Prior to the publication of the Code in 2006, companies in the Scottish salmon farming industry voluntarily participated in the NTS through the offices of the Scottish Salmon Growers' Association. The NTS is set out in full in Annex 6.

For more information on sea lice biology, management, information exchange and reporting see <http://scottishsalmon.co.uk/category/science-behind-fish-farming/fish-health/>.

## **Area management**

The Code strongly advocates an area-based approach to fish health management, specifically one which involves Farm Management Areas (FMAs). Area-based management saw its beginnings in the late 1970s and early 1980s, when the approach was developed to minimise risks presented by Furunculosis, a serious

bacterial disease of salmonids first described in the late 19th century in Bavaria, Germany. Area-based management is now the norm within the Scottish salmon farming industry, where it is the preferred approach in dealing proactively with a number of potential challenges to fish health.

### ***The Farm Management Area (FMA) Approach***

This involves the designation and delineation of areas in which farmers undertake farming activities at one or more farm sites. In these areas farmers coordinate and synchronise production in order to reduce and manage the risks posed by naturally occurring infectious agents and parasites that may be present in the environment, in wild and farmed fish, and in other occurring biota. FMA policies will, in most cases, focus on: the stocking of sites; the coordination of production; arrangements for fallowing individual sites and areas; and on the management of sea lice. Additionally, in some cases they will also include provisions for dealing with other agents with a potential to affect fish health.

In some places, an FMA may coincide with [an area designated by Marine Scotland](#) in relation to statutory controls over fish disease but the two designations are distinctive and different in their purpose.

### ***Farm Management Statements and Farm Management Agreements***

Farming activities within a Farm Management Area are covered by a documented Farm Management Statement (FMS) or a Farm Management Agreement (FMAg). Both types of document are important, both to Code audits and to inspections by MS's Fish Health Inspectorate. The fine detail of FMSs or FMAgs will be tailored to the circumstances of the FMAs to which they relate, and examples of their content are set out in the various chapters of the Code.

FMAs for Scottish marine farms are set out in Part 5 of the Code. The delineation of FMAs is subject to periodic review, taking into account changes in operation, ownership, production plans, and other important criteria.

## ***Minimising risks presented by restocking natural water bodies***

This aspect of the Code applies to all who are involved in the movement of fish into water bodies in Scotland for angling or stock enhancement purposes. It is recognised that the release of fish for such purposes presents risks of the inadvertent spread of fish pathogens; and that the transfer of disease through the stocking of fish may lead to a reduction in the official health status of zones containing freshwater fish farms, hatcheries and fisheries.

## ***Primary processing operations***

In the context of the Code, the term 'primary processing' refers to the removal of internal organs and, as appropriate, the gills, from slaughtered and bled fish; the washing and cleaning of eviscerated fish; and the packing of washed, eviscerated fish in boxes. Although the main focus of the Code is on farming operations and the management of live fish, it is acknowledged that certain aspects of primary processing should be included because they have a potential to impact on live fish health and biosecurity.

## ***Medicinal products***

Farmers have legal and ethical responsibilities to safeguard the health and wellbeing of the fish under their care. Farmers will normally involve their veterinary surgeon to assist them in discharging these responsibilities. Proactively protecting the health of farmed fish sometimes involves the use of veterinary medicinal products and other treatments, which are used responsibly and in accordance with the relevant legislation. Therapeutic medicinal products and vaccines are complementary to sound management and husbandry.

Veterinary Health Plans (VHPs) and Biosecurity Plans (BPs) are important tools in planning production and in the day to day management of fish health. Such plans are tailored to meet the needs of the company and its farms and identify management

procedures which focus on targeting the use of treatments. This helps to minimise medicine use, consistent with the protection of fish welfare, and to preserve the efficacy of medicinal products. There are also clear benefits in carrying out periodic reviews to assess the efficacy of medicines, so that the regimes under which they are applied can be modified and optimised.

The information set out in the relevant sections is similar in nature to that contained within many farm assurance schemes for terrestrial food producing animals, and helps support the responsible use of medicines in finfish aquaculture. As a general principle, the handling and application of medicines should take account of the likelihood of their eventual discharge into the aquatic environment. The [Scottish Environment Protection Agency](#) (SEPA) has responsibility for authorising the discharge of medicinal treatments in freshwater and marine aquaculture.

A range of medicines is available for use in farmed fish. The legal terminology for distribution categories covering all UK veterinary medicinal products is:

- Prescription Only Medicine–Veterinarian (POM-V)
- Prescription Only Medicine–Veterinarian, Pharmacist, Suitably Qualified Person (POM-VPS)
- Non-Food Animal-Veterinarian, Pharmacist, Suitably Qualified Person (NFA-VPS)
- Authorised Veterinary Medicine-General Sales List (AVM-GSL)

### ***Suspected Adverse Reactions***

A Suspected Adverse Reaction (SAR) is a harmful and unintended reaction which may be due to exposure to a veterinary medicine administered to an animal at its normal dose. A human SAR may also occur, in this case in a person administering a veterinary medicine (e.g. through self injection with a vaccine) or a person exposed to a recently treated animal.

Companies holding a Marketing Authorisation (MA) for veterinary medicines, including fish medicines, are legally obliged to report suspected adverse reactions within 15 days of receiving a report and at specified periods in the case of non-serious adverse reactions. Further information is available from the [Veterinary Medicines Directorate](#).

### ***Vaccination***

As in most other livestock, vaccines can be used in farmed fish to prevent diseases and reduce the need for medicinal treatments. Vaccination of Scottish salmon is now normal practice and has had a demonstrable effect in maintaining fish health, while minimising the use of antibiotics.

Good practice in relation to vaccination is described in 'Responsible use of vaccines and vaccination in fish production' produced by [The Responsible Use of Medicines in Agriculture Alliance \(RUMA\) in 2006](#).

## **MANAGING AND PROTECTING THE ENVIRONMENT**

The finfish farming industry recognises that the environment in which it operates is an asset to be protected, now and for future generations. The designation of sites of particular environmental significance has been recognised in Scotland for many decades and certain areas in Scotland are so important in terms of marine biodiversity that they have been designated under EU, UK and/or Scottish environmental legislation. In some cases, long-established fish farms exist in the same areas.

Two of the most frequently cited issues relating to the industry's duties to manage and protect the environment in which fish farming takes place are sea lice and failure of containment.

Sea lice are known to have the potential to move between wild and farmed fish and *vice versa*. The National Treatment Strategy and the sea lice-related activities that

are coordinated through the [Scottish Salmon Producers' Organisation](#) are designed to demonstrate industry's commitment to maintaining control over sea lice on farms.

The occasional escape of fish from farms has negative implications for fish farming, especially when measured in terms of the cost of lost fish to the business, as well as in terms of reputation. Fish farming companies are already required to maintain records in relation to containment and breaches of containment. [MSS Fish Health Inspectorate](#) has powers to inspect records relating to the containment of fish on farms, to assess measures in place to contain fish, prevent breaches of containment and recover escaped fish, and to ascertain risks of breaches of containment. The record keeping requirements are based upon the provisions of this Code. Industry performance in reducing breaches of containment has improved significantly over the years, with the development of pens, nets and moorings capable of dealing with the often extreme weather conditions that can be experienced where fish farming takes place. The ongoing development of [a Scottish Technical Standard](#) will encapsulate the best technical options, along with good practice, allowing industry performance to continue to improve.

### ***Interface between the Scottish regulatory system and the Code's provisions***

Under current policies, farm developments take place only in selected areas of the west and north west coast and the western and northern isles. There is a planning presumption against fish farm development on the north and east coast. Additionally, all environmental aspects of the industry's activities are strictly controlled and highly regulated under statute. Implementation of regulatory and other control processes takes place via a number of Scottish Government Departments and agencies with [Marine Scotland](#) (MS), and particularly [Marine Scotland Science](#) (MSS), the [Scottish Environment Protection Agency](#) (SEPA), [Scottish Natural Heritage](#) (SNH) being the most prominent.

MS, MSS, SEPA and SNH have the role of statutory consultees in the planning process by which new finfish farms are established and existing farms are developed.

[Marine Scotland](#) is part of Scottish Government and is the lead marine management organisation in Scotland. It has responsibility for a wide range of marine policies and activities including fishing, marine aquaculture and marine renewable energy. In addition to its marine responsibilities, it has responsibility for the policy, management and licensing of freshwater fisheries and freshwater aquaculture.

[MSS is the science division](#) of MS. It has a variety of roles in the statutory regulation of environmental aspects of finfish farming, including responsibility for the system of locational guidelines which determines the bay and loch areas in which fish farms can be located. It also provides the Fish Health Inspectorate services for fish farms; carries out research to support Scottish Government policy and policy development; provides advice to Local Authorities and other agencies and issues licences for a number of activities relevant to aquaculture, including aspects of the management of seal predation and discharges from vessels, including wellboats.

SEPA is a non-departmental public body accountable to the Scottish Government. It is Scotland's main environmental regulator. It acts to protect and improve the environment through regulating community, business and industry activities that can cause harmful pollution and by monitoring the quality of Scotland's air, land and water. Statutory regulation of water quality and the quality of sediments underneath and surrounding fish farms takes place through SEPA. Because fish farms are situated in marine or freshwater environments, or rely on supplies of clean fresh water, they are subject to strict regulatory controls in regard to the quality of the water and of the loch or sea bed surrounding the fish farm. SEPA publishes a substantial volume of information on the way in which it [regulates the Scottish aquaculture industry](#) and on the results of monitoring, surveillance and recording.

SNH is a non-departmental public body accountable to the Scottish Government. SNH's remit comes from the Natural Heritage (Scotland) Act 1991 and its purpose is to promote the care and improvement, responsible enjoyment, greater appreciation and understanding and sustainable use of the natural heritage, now and for future generations. SNH acts in the capacity of statutory consultee in a range of consultative processes related to aquaculture and is important in ensuring that fish

farms are established and operate within the capacity of the environment, with respect to wild flora and fauna, biodiversity and visual impact.

### ***Regulatory controls***

Finfish farms are subject to a programme of regular inspection and monitoring by SEPA and MSS Fish Health Inspectorate.

As a condition of the licence issued by SEPA under the [2005 Controlled Activities Regulations](#) (the CAR licence), farms are required to carry out a substantial programme of environmental monitoring that complies with strict criteria established by SEPA, with the results being regularly reported to SEPA.

Farms in environmentally sensitive areas must meet conditions specified by SNH for the management of those areas.

It is now common in Scotland for information collected during inspections and surveillance carried out by official agencies to be published on the relevant agency website and on [Scotland's Aquaculture website](#) .

## **FISH WELFARE AND CARE**

Fish are covered within the scope of Scottish animal health and welfare legislation and fish farmers are obliged to comply with the relevant provisions of the law. Since its inception, the Code has acknowledged the relevance of '[The Five Freedoms](#)' as they apply to farmed fish.

High standards of water quality are essential to the welfare of fish. Fish at different stages of development may have different water quality requirements, particularly in relation to dissolved oxygen and carbon dioxide, temperature, pH, ammonia and levels of suspended particulate material. Fish, and particularly salmonids, are known to be extremely sensitive to even relatively small variations in the conditions under

which they are held, requiring high standards of welfare if they are to grow and thrive.

Many aspects of husbandry relevant to the welfare of farmed fish are encapsulated in other sections of the Code (e.g. Fish Health and Biosecurity and Feed and Feeding). Nonetheless, it is acknowledged within the industry that high standards of welfare cannot be achieved without adherence to principles covered under Fish Health and Welfare. In parallel, the [RSPCA/Freedom Food Scheme](#) (FF), to which the majority of farmers within the Scottish industry subscribe, plays an extremely important role in identifying and addressing fish welfare-specific issues; and Scottish aquaculture industry members and their trade bodies work closely with RSPCA/Freedom Food to ensure that there is parity between what the Code and the RSPCA/FF scheme require.

### ***Transfer of salmon smolts to sea***

It is important that the transfer of juvenile salmon to sea takes place only when smoltification has occurred. Smolting status assessment will aid in the identification of the transfer window. Suitable assessments include biochemical tests (e.g. based on ATPase) or salt water tolerance tests. Salt water tolerance testing involves holding a sample of juvenile salmon which show morphological and behavioural indications of having smoltified in full strength seawater equivalent (i.e. 34-35 parts per thousand (ppt)) for 24 hours. Blood samples are taken after 24 hours for testing for appropriate physiological parameters.

### ***Withholding feed***

The withholding of feed can have negative consequences for fish welfare, especially when the fish concerned are accustomed to being fed regularly. However, there are circumstances where withholding feed will improve welfare, or is necessary for reasons of food hygiene. Before transport or harvest, feed should be withheld to reduce metabolic rate, prevent the egestion of partially digested food, or reduce the excretion of waste products; and also to eliminate the presence of food and/or faecal

material in the gut at harvest, thereby reducing the risk of microbiological contamination of the flesh during processing.

### ***Stocking Density***

The farming system in which farmed fish are held and the farmer's ability to maintain high standards of water quality are important defining factors in determining optimum stocking density. As a general rule, stocking density may be adjusted in line with the biological and behavioural needs of fish, having regard to the prevailing environmental conditions and, in particular, water quality.

For marine salmon farms, a number of important welfare indicators, such as condition factor and fin condition, may also be taken into account in determining the appropriate stocking density for given sites.

### ***Exclusion and control of predators***

Farmers have a legal duty to protect fish under their care from harm and unnecessary suffering, and predation by piscivorous birds and mammals clearly creates circumstances under which significant harm and suffering can occur.

Both freshwater and marine fish farms can be subject to attack by predators with risk of serious mortality or compromise to the welfare of fish. This can represent very significant costs to farmers, directly through the immediate loss of fish, and consequentially through losses arising as a result of damage to fish, stress, disease and damage to nets resulting in the escape of fish. The most significant predators of farmed fish are seals, otters, mink, herons, and cormorants, with some other species of birds also occasionally causing damage and loss.

It is good practice to anticipate and, where possible, prevent predation and to adopt the correct management of predation problems when they occur. The effectiveness of predator control is likely to be site specific and, in many cases, subject to regulation.

## *Birds*

Birds such as herons, cormorants, shags and gulls may attack fish and/or raid feed stores. Exclusion measures such as properly designed and deployed top nets or tensioned underwater nets, visual and audio scarers can be used.

All wild birds are protected under the law. Licences to kill or take a limited number of certain wild birds *may*, in principle, be issued by Scottish Government as an additional provision to reinforcement scaring measures. If exclusion measures fail to control attacks and predatory birds are causing serious stock loss or damage, or are disturbing the fish stock, an application may be made to Scottish Government for a licence to kill a limited and strictly controlled number.

## *Seals*

Seals are known to be the most significant marine predators of farmed fish in Scottish waters. Two species of seal may be present - the common or harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*) - and both are protected under by the law. It is good practice for salmon farmers to use appropriate site specific non-lethal measures to deter seals from taking and damaging their fish.

Where properly applied anti-predator measures fail to control a defined predation problem and a seal or seals are causing serious welfare problems, stock loss or damage, or are damaging the farm, lethal methods of control may be considered as a last resort under an approved licence as set out in a ['Seal Licence'](#) issued by Marine Scotland.

## *Otters*

Otters may eat farmed fish and be attracted to cage sites. They are protected under the law and must not be killed. In the absence of satisfactory alternatives, farmers may apply to SNH to allow live trapping and relocation to take place.

## *Mink*

Mink can kill significant numbers of farmed fish and are difficult to exclude. They are an invasive non-indigenous species and are not protected by law. They may be humanely trapped using live capture cages and despatched. The most likely access point to fish farms for mink is via the walkways.

## **FEED AND FEEDING**

The manufacture of fish feed is a specialist sector of the animal feed manufacturing industry and fish farmers source their feed through specialist commercial suppliers, who operate within the relevant feed legislation, strict regulatory controls and industry schemes that are designed to provide assurance to all of those in the production chain, the retailer and the consumer. This situation is reflected in the feed provisions of the Code.

The choice of feed used by farmers is defined mainly by the nutritional and welfare requirements of the fish being farmed. Feed formulation is defined, amongst other things, by the species, stage of growth, feed quality and safety requirements, consumer requirements and the sustainability of feed ingredients.

The statutory and voluntary controls governing the manufacture of fish feeds are extensive and detailed, being derived mainly from European legislation. They cover a wide range of aspects, including: feed hygiene; permitted ingredients; ingredient quality; the addition of vitamins, carotenoids, antioxidants, binders, etc.; animal and consumer safety; marketing, traceability and labelling. Feed manufacturers also subscribe to industry schemes designed to assure those involved in the production chain, and particularly processors, retailers and consumers.

Feed formulation is critical to optimising the growth of the fish, the efficiency of feed conversion and the high nutritional and consumer quality of the fish being produced.

## ***Feed Sustainability***

Over the past decade, the sustainability of feeds and the ingredients used to manufacture them has become more important to producers, retailers and consumers. At one time, feeds for salmonids were based largely on fishmeal and fish oil, but nowadays they contain a range of highly sustainable and nutritious non-marine ingredients and this has had the effect of both improving sustainability and increasing the feed manufacturer's flexibility in formulating diets for farmed fish.

Although the use of non-marine ingredients is unquestionably a positive development that has helped to sustain the growth and development of finfish aquaculture across the globe, it is important to recognise that fish such as salmon and trout are naturally piscivorous, consuming other fish in the wild. Continuing to have access to ingredients such as high quality marine fishmeal and fish oil for use in feed formulations is still important for the health and wellbeing of the fish, and for the quality and nutritional profile of the fish flesh eaten by consumers. It is clearly more ecologically efficient and natural to use a proportion of marine ingredients in feeds for farmed fish than it is to use the same ingredients in the production of terrestrial food producing animals such as pigs and poultry.

Research studies have shown that the efficiency of use of feed resources in farmed fish such as salmon and trout is high compared with food-producing terrestrial animals and is much higher than the feed conversion in wild-catch fisheries. The huge increase in aquaculture production that has taken place over the past 30 years has been achieved without any trend of increase in global fish meal production, although there has been a substantial diversion of fish meal use from pig and poultry into aquaculture, and an improved efficiency in the use of fish trimmings from the human food-chain for fish meal production. Thus, on any of these measures aquaculture has contributed positively to sustainable food production. Against this background, the focus of the Code is that fisheries from which fish meal and fish oil are derived should be properly and responsibly managed.

## GLOSSARY OF TERMS AND ABBREVIATIONS

### *Glossary of Terms*

<b>Batch:</b>	Progeny from a “batch” of eggs would be defined as the progeny from a single hatchery season of production.
<b>Biosecurity:</b>	Measures designed to protect a population from transmissible infectious diseases.
<b>Cleaner fish:</b>	Species of fish, such as wrasse or lumpsucker fish, which are stocked with farmed fish as a biological control measure for sea lice.
<b>Competent authority:</b>	Person or organisation that has the legally delegated or invested authority, capacity, or power to perform a designated function.
<b>Disease Management Area:</b>	An area defined by Marine Scotland which is used for disease control purposes in the event of a disease outbreak.
<b>Disinfection:</b>	For example, as applied to equipment or pumped seawater installations; the treatment of equipment or seawater to inactivate agents capable of causing disease in fish.
<b>Documented risk assessment:</b>	In the cases relating to fish health, the documented risk assessment should be based on Annex 3. In all other cases a simplified risk assessment covering relevant aspects of the risks and the decisions taken is sufficient.
<b>EN 45011:</b>	European standard for bodies operating product certification systems.
<b>Fallowing:</b>	Practice of leaving pens empty of fish for a period of time.
<b>Farm Management Agreement:</b>	An agreement between two or more farm businesses operating in the same Farm Management Area, setting out the key aspects of the agreed farm management procedures for the area.
<b>Farm Management Area:</b>	A geographical defined marine area in which one or more fish farmers operate.
<b>Farm Management Statement</b>	Document setting out key aspects of a company’s operation within an FMA.
<b>Harvest station:</b>	A land or sea-based site dedicated to harvesting of fish.

<b>ISO 14001:</b>	<a href="#">International Standards Organisation</a> quality standards for environmental management systems.
<b>Locational Guidelines:</b>	A <a href="#">guidance document</a> produced and annually updated by Marine Scotland Science, providing advice on location of fish farms on the basis of water body classification, relating to dissolved nutrients and sedimentation of particulates.
<b>Multi-year class site:</b>	A site which contains more than one year class of fish.
<b>Non-native:</b>	A species that does not originate in Scotland and which has been introduced from other parts of the world by humans, either deliberately or accidentally.
<b>Omega-3 fatty acids:</b>	Beneficial long-chain fatty acids, EPA and DHA, of which oily fish, such as salmon and trout, are a rich source.
<b>Primary Processing:</b>	Primary processing refers to the removal of internal organs and, as appropriate, the gills from slaughtered and bled fish; the washing and cleaning of eviscerated fish; and the packing of washed eviscerated fish in boxes.
<b>Primary Production:</b>	Primary production and associated operations include the transport, storage, and handling of fish at the place of production provided that this does not substantially alter their nature and the transport of live fish from the place of production to a processing establishment.
<b>Production farm (or production unit):</b>	An installation used for on-growing fish to market size.
<b>Restocking:</b>	The cultivation of fish for introduction to both open and closed water bodies for the purpose of stock enhancement.
<b>Salmonid:</b>	Natural members of the salmonid family; in Scottish aquaculture, particularly <i>Salmo salar</i> (salmon), <i>Salmo trutta</i> (brown trout and sea trout) and <i>Oncorhynchus mykiss</i> (rainbow trout).
<b>Sea lice:</b>	<i>Lepeoptheirus salmonis</i> Krøyer and <i>Caligus elongatus</i> Nordmann, marine ectoparasites of salmonids.
<b>Single-year class:</b>	Any group of fish stocked into a site over any six-month period. For marine species, a year class is defined by the calendar year of production of the juvenile fish.

<b>Traceability:</b>	Defined in EU law as: “The ability to trace and follow a food, feed, food-producing animal or substance .... Through all stages of production, processing and distribution”.
<b>Sustainable development:</b>	Often defined as ‘Development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.
<b>Transgenic:</b>	Containing genetic material introduced from another species by techniques of genetic engineering.
<b>Written control procedures:</b>	Written procedures identifying the nominated veterinary surgeon, justifying the use of specific animal health treatments and specifying the details of the treatment application, the official controls on its use and the measures to prevent unacceptable residues entering the human food chain

### ***Abbreviations***

<b>ADD</b>	Acoustic Deterrent Device
<b>AMA</b>	Area Management Agreement (established between farming, fisheries owners and other interests under the Tripartite Working Group model, or otherwise)
<b>AMG</b>	Area Management Group (Group overseeing an AMA)
<b>BMFA</b>	British Marine Finfish Association
<b>BP</b>	Biosecurity Plan
<b>BS</b>	British Standards
<b>BTA</b>	<a href="#">British Trout Association</a>
<b>CAR</b>	Controlled Activities Regulation
<b>CEFAS</b>	<a href="#">Centre for Environment, Fisheries and Aquaculture Science</a>
<b>CoGP</b>	Code of Good Practice for Scottish Finfish Aquaculture
<b>DEFRA</b>	<a href="#">Department for Environment, Food and Rural Affairs</a>
<b>DMA</b>	Disease Management Area (area designated for management of transmissible diseases)
<b>FAO</b>	<a href="#">Food and Agriculture Organisation</a> (United Nations)

<b>FEPA</b>	<a href="#">Food and Environment Protection Act</a>
<b>FHI</b>	<a href="#">Fish Health Inspectorate</a> (of Marine Scotland Science)
<b>FIN</b>	Fishmeal Information Network
<b>FMA</b>	Farm Management Area (area designated for cooperation and management under the CoGP)
<b>FMAg</b>	Farm Management Agreement (Agreement between farmers covering an FMA)
<b>FMS</b>	Farm Management Statement
<b>GPS</b>	Global Positioning System
<b>HACCP</b>	Hazard Analysis and Critical Control Points (A risk analysis and control methodology originally developed for food safety assurance.)
<b>HSE</b>	<a href="#">Health and Safety Executive</a>
<b>IFFO</b>	<a href="#">International Fish Meal and Fish Oil Organisation</a>
<b>ISA</b>	Infectious Salmon Anaemia
<b>ISLM</b>	Integrated Sea Lice Management
<b>MA</b>	Marketing Authorisation
<b>MCA</b>	<a href="#">Maritime and Coastguard Agency</a>
<b>MGA</b>	<a href="#">Ministerial Group on Aquaculture (2009-2012)</a>
<b>MGSA</b>	<a href="#">Ministerial Group for Sustainable Aquaculture</a> (2012–present)
<b>MS</b>	<a href="#">Marine Scotland</a>
<b>MSS</b>	<a href="#">Marine Scotland Science</a>
<b>MWGA</b>	Ministerial Working Group on Aquaculture (2003-2009)
<b>NTS</b>	National Treatment Strategy (for the Control of Sea Lice on Scottish Salmon Farms)
<b>OIE</b>	<a href="#">Office International des Epizooties</a> (World Organisation for Animal Health)
<b>POM-V</b>	Prescription Only Medicine – Veterinarian
<b>POM-VPS</b>	Prescription Only Medicine – Veterinarian, Pharmacist, Suitably Qualified Person
<b>PPE</b>	Personal Protective Equipment

<b>SAR</b>	Suspected Adverse Reaction
<b>SEPA</b>	<a href="#"><u>Scottish Environment Protection Agency</u></a>
<b>SNH</b>	<a href="#"><u>Scottish Natural Heritage</u></a>
<b>SOP</b>	Standard Operating Procedure
<b>SSPO</b>	<a href="#"><u>Scottish Salmon Producers' Organisation</u></a>
<b>UKAS</b>	<a href="#"><u>The United Kingdom Accreditation Service</u></a>
<b>VHP</b>	Veterinary Health Plan

**\*\*\* ENDS \*\*\***