



Policy headlines

- **Spatial marine planning processes** that take into account the cumulative effects of multiple developments in one area to avoid significant impacts – making sure developments are in the right place.
- **Ecosystem-based approach** based on precautionary principle where ecosystem health is put at the centre of decision-making.
- **Support for innovation** within the industry, explore the options for more sustainable practices and advances in technology to provide environmental benefits.
- **Ensure communities have the opportunity to meaningfully engage** in policy decisions and derive benefits from developments.
- **Transparent regulatory framework** with high environmental and welfare standards.
- **Ongoing monitoring to aid in compliance** with regulations and robust enforcement for any breaches.

Definitions

Aquaculture - Aquaculture is the breeding, rearing, and harvesting of fish, shellfish, algae, and other organisms in all types of water environments.

Marine Spatial Planning - Marine Spatial Planning (MSP) is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process. MSP is not an end in itself but a practical way to create and establish a more rational use of marine space and the interactions among its uses, to balance demands for development with the need to protect the environment, and to deliver social and economic outcomes in an open and planned way.

Sustainable development – Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Net Zero - Scotland's climate change legislation sets a target date for net zero emissions of all greenhouse gases by 2045. Net Zero means the amount of greenhouse gas emissions put into the atmosphere and the amount we're able to take out (through carbon storage) will add up to zero.

Natural capital - Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.



[Precautionary principle](#) - The precautionary principle enables decision-makers to adopt precautionary measures when scientific evidence about an environmental or human health hazard is uncertain and the stakes are high

Scope

The term aquaculture refers to the rearing of aquatic organisms, such as fish, molluscs, crustaceans and aquatic plants, in marine and freshwater environments. In 2018, the Aquaculture sector and its supply chain supported an estimated 11,700 jobs within the Scottish economy as well as generating £885 million in Gross Value added (GVA) ¹.

In July 2023, the Scottish Government produced its Vision for Sustainable Aquaculture ¹ which includes long-term aspirations for the finfish, shellfish, and seaweed farming sectors, and the wider aquaculture supply chain. It highlights the sector's considerable contributions to the Scottish economy, both national and local, as well as the role it has in future food security and Net Zero ambitions.

The Vision also makes the crucial point that the sector "depends on Scotland's natural capital and the communities within which [it] operates" ¹ including the ability to market the product as high quality and having been produced sustainably. As such, managing the sector with the environment at the forefront is vital, not only for our marine species and habitats but for the industries themselves.

Aquaculture is included in the Scottish Governments Blue Economy Vision ² as a key sector, which sets out an approach for how we can develop our coasts and seas within environmental limits for future generations. The Blue Economy Vision also "recognises that "our economies, livelihoods and well-being all depend on our most precious asset: Nature".

The main form of aquaculture in Scotland is currently the farming of finfish (particularly Atlantic salmon – *Salmo salar*). This industry has seen significant growth over the last 40 years and is currently the UK's largest food export ¹. In Scotland, finfish farms are found along the sheltered, inshore waters of the west and north-west coasts, the Western Isles, Orkney and Shetland.

Finfish aquaculture is typically carried out in suspended net cages within our inshore waters, like sheltered bays or sea lochs. Cages are permeable in design; built to contain fish yet allow the free exchange of water to provide clean, oxygenated conditions for the farmed fish and allow the export of waste products into the surrounding environment. These systems are commonly referred to as open-net fish farms. As there is no physical barrier separating the farmed fish and the surrounding environment, finfish aquaculture is entirely dependent on the surrounding waters being clean and healthy.

The Issues

The practice of open-net aquaculture can negatively impact the health of the surrounding environment. The three most common issues are:

1. Sea lice

Sea lice (*Lepeophtheirus salmonis* and *Caligus elongatus*) are marine parasites that attach to the fish and feed on their tissue. They pose a risk to the welfare of both farmed and wild fish, causing physiological stress and risk of infection. Fish farms typically keep fish in high densities for long periods of time, which provides perfect conditions for sea lice numbers to expand rapidly ³.

2. Farmed fish escaping into the natural environment

Escapes from fish farms occur both through recurrent small-scale events and through large scale catastrophic events caused by extreme weather. Escaped farmed salmon pose a direct threat to wild populations through competition, spreading disease and interbreeding ⁴.

3. Pollution to the marine environment

Through the application of feed and output of biological waste, finfish aquaculture adds a significant amount of nutrients to sea lochs in Scotland. In addition, a range of antifoulants, pesticides, medicines and disinfectants are authorised for use in fish farming, which pervade into the environment and can be lethal to local fauna.

Evidence suggests that nutrient enrichment of the waters surrounding fish farms can promote the growth of algae and aquatic plants – altering the natural balance and quality of the system, which is known as eutrophication ⁵.

Furthermore, uneaten food and biological waste can accumulate in the water and sediments surrounding fish farms. Nutrient loading on the seafloor can create anoxic conditions, leading to a reduction in species richness and diversity and an increase in organisms resistant to sedimentation and low oxygen levels ⁶. Impacts on sensitive habitats and their associated communities are of concern. For example, organic waste build-up on maerl beds has been detected up to 100m from farm sites ⁷.

The Solutions

In terms of technological approaches to mitigating these impacts the most effective is having a physical barrier separating farmed salmon from the surrounding environment. However, these innovations are still at an early stage with further investment and research required and as such the Trust does not endorse any specific system. Until fully closed systems can be widely implemented, semi-closed systems, offshore farms sited in high energy areas and other innovative technologies present immediate, partial solutions to some of the industry's most pressing environmental impacts.

The Marine (Scotland) Act 2010 ⁸ provides a system for guiding the many uses of the marine environment and ensures they occur in the most suitable and least sensitive areas. Under this Act the Scottish Government published the National Marine Plan ⁹ in 2015, a framework for marine planning that promotes sustainable development and the sustainable use of marine resources.

The objectives in the current National Marine Plan for aquaculture include identifying optimal areas for growth within the industry, the need for research and development into new technologies as well as a robust regulatory framework. The National Marine Plan is currently being renewed by Marine Directorate (a process known as National Marine Plan 2 [NMP2]) with the aim to publish in the next few years. NMP2 must take into account the need for spatial based planning to reduce the cumulative impacts that can occur when multiple aquaculture developments are given consent in one area. Without spatial planning it can be easy to overlook the interconnectedness of our marine areas which do not follow the same planning boundaries.

The reputation of Scottish farmed fish products depends to a considerable degree on the ecological quality of Scotland's marine and coastal environment. Quite apart from the need to minimise impacts on ecological grounds, it makes every sense for the industry to also minimise impacts to mitigate reputational risk. Becoming a world leader in



sustainable methods of production and ensuring the highest environmental management and design standards is, we believe, the best way of mitigating this reputational risk. A truly sustainable industry makes good economic as well as good ecological sense.

References

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