The Committee will meet at 9.00 am in the Mary Fairfax Somerville Room (CR2).

1. **Decision on taking business in private:** The Committee will decide whether to take item 4 in private.

2. **Crofting legislation reform:** The Committee will take evidence from—
   
   Fergus Ewing, Cabinet Secretary for the Rural Economy and Connectivity, Michael O'Neill, Crofting Bill Team Leader, Gordon Jackson, Head of Agricultural Development and Crofting, and Ian Davidson, Head of Agriculture Policy Division, Scottish Government.

3. **Salmon farming in Scotland:** The Committee will take evidence from—
   
   Scott Landsburgh, Former Chief Executive, Scottish Salmon Producers' Organisation;
   
   Ben Hadfield, Managing Director, Marine Harvest;
   
   Craig Anderson, Chief Executive, Scottish Salmon Company;
   
   Grant Cumming, Managing Director, Grieg Seafood Shetland, Grieg Seafood;
   
   Stewart Graham, Group Managing Director, Gael Force Group.

4. **Salmon farming in Scotland:** The Committee will review the evidence it has heard to date on its inquiry on salmon farming in Scotland.
The papers for this meeting are as follows—

**Agenda Item 2**

Cover note

PRIVATE PAPER

**Agenda Item 3**

Cover note

PRIVATE PAPER

(P)
Purpose

1. The purpose of this session is to take evidence from the Cabinet Secretary on the Scottish Government’s proposals for crofting legislation reform.

Background

2. The Scottish Government has been considering a review of crofting legislation. To support that process, in 2016 and 2017 the Rural Economy and Connectivity (REC) Committee carried out a short, focussed review of priorities for crofting law reform. The report was published on 9 March 2017.

3. The Scottish Government ran a consultation from 28 August - 20 November 2017. On 23 March 2018, the Cabinet Secretary for the Rural Economy and Connectivity wrote to the Committee outlining proposals to take forward crofting law reform in two stages. The first stage will involve proposals for a Bill to simplify legislation where there is broad support. This will be followed by a lengthier, more comprehensive, process for new crofting legislation, setting out why crofting is important and what crofting is trying to achieve.

Rural Economy and Connectivity Committee clerks
April 2018
Rural Economy and Connectivity Committee

13th Meeting, 2018 (Session 5), Wednesday, 2 May 2018

Salmon farming in Scotland inquiry

Background

1. The Rural Economy and Connectivity (REC) Committee has agreed to conduct an inquiry into salmon farming in Scotland. The inquiry aims to consider the current state of salmon industry in Scotland, identify opportunities for its future development and explore how the various fish health and environmental challengers it currently faces can be addressed.

2. On 2 May, the Committee will take evidence from the following salmon farming and salmon farming representative bodies: Scottish Salmon Producers’ Organisation, Marine Harvest, Scottish Salmon Company, Greig Seafood and Scottish Seafood Association. See Annex A for written submissions from the organisation who are giving evidence today.

3. A SPICE briefing on Salmon Farming in Scotland was published on 13 February 2018 and is available here.

4. The Environment, Climate Change and Land Reform Committee (ECCLR) on 5 March 2018 wrote to the Committee detailing their conclusions on the environmental impacts of salmon farming in Scotland. The letter, which contains the report can be accessed here. See Annex B for correspondence received by the ECCLR Committee in response to letters it sent to Marine Scotland and SEPA at the end of its work on the environmental impacts of salmon farming.

5. Four evidence sessions have previously taken place. The first evidence session was held on 7 March with aquaculture research bodies. The second evidence session was held on 14 March with environmental organisations. The third evidence session was held on 18 April with regulatory bodies. The fourth evidence session was held on 25 April with development bodies.


Rural Economy and Connectivity Committee clerks
April 2018
Scottish Salmon Producers Organisation (SSPO) represents the Scottish salmon farming industry. Our membership accounts for over 90% of the salmon produced in Scotland. Compliance with the Code of Good Practice for Scottish Finfish Aquaculture (CoGP) is a prerequisite of membership of the SSPO.

Scottish salmon production is a success story in Scotland. Farmed Atlantic salmon is Scotland’s and the UK’s largest food export. The industry is one of Scotland’s most important rural sectors, worth over £600m in export value to Scotland in 2017 and supporting 10,340 jobs. Earnings arising from these jobs amount to £270m per annum. We are a significant source of sustainable local employment.

Scottish salmon production in 2016 was 162,817 tonnes according to Scottish Government official statistics. Long term industry confidence is evident in the continued level of company investment in people, skills training research and technology. Capital investment has remained steady at around £63m over the past two years.

Consumer demand for high quality Scottish salmon continues to grow in domestic and overseas markets. Salmon is the most popular fish in the UK shopping basket. Its full traceability, provenance and production standards ensure that it commands a premium in many high value international markets.

Scottish salmon production currently represents around 7% of global production. The industry has an aspiration to grow to meet increasing demand but remains resolute that any future growth will be steady and sustainable. The current consenting regime for Scottish aquaculture, including the planning system and other regulatory frameworks relevant to environmental protection, will be the over-riding factor that determines sustainable growth into the future. The industry acknowledges that it must overcome production challenges and minimise wider impacts in order to capitalise on the opportunity of further sustainable development in the rural economy.

There are a range of actions which will help the industry to grow and in doing so will contribute to further economic growth locally and nationally.

**Fish Health is fundamental to the continued success of the salmon sector**

All farmers work to the independently audited CoGP which addresses around 500 compliance points covering all aspects of salmon farming and primary processing. Audits and fish health inspections are carried out almost every day of the year by Scottish Government Fish Health Inspectors, retailers, RSPCA, CoGP, and other quality assurance schemes. Daily fish health checks are carried out on every single farm in Scotland by fish farmers. The combination of professional health checks and
Audited schemes means that the standard of fish husbandry on Scottish farms is very good and independently monitored.

Antibiotic use in salmon farming is extremely low, due mainly to the development of vaccines and fish health management practices.

A Farmed Fish Health Framework is being developed by industry in partnership with the Scottish Government and is supported by all salmon farming companies operating in Scotland. It will set out a strategic framework of high level fish health objectives for the next 10 years to underpin the sustainable growth of Scottish aquaculture, of which 90% is salmon farming.

From its pioneering days in the 1970s, the industry has used science to shape its development and continuously adapts to embrace best practice for production efficiency, fish health and welfare and responsible farming. Challenges are arising from the marine environment, with documented increases in water temperature and associated occurrences of jellyfish and algal blooms. These factors can adversely affect salmon welfare. New problems like gill diseases have emerged and require management alongside the management of naturally occurring sea lice. Mortality levels in Scottish farms have risen since 2011 because of Amoebic Gill Disease (AGD). Farmers have developed good husbandry techniques for controlling the problem, but it recurs, and with it more complex gill health problems have developed. Data on salmon production and mortalities are published by SEPA and Marine Scotland. This reporting shows that the levels are highly variable year to year, which points to a range of underlying causes.

Sea lice occur naturally on wild and farmed fish. They are managed in a number of ways including the use of cleaner fish, which swim with the salmon and eat the sea lice; single year class production; fallowing farms; machines to remove the lice and medicines which are prescribed by vets. Significant progress has been made in reducing the use of veterinary medicines to manage sea lice by cleaner fish and other techniques.

Priorities for the salmon farming sector include:

- Continuing analysis of the factors affecting mortalities and the development of an action plan to tackle underlying causes.
- Better understanding of the causes, impacts and mitigations of gill health disease.
- A shift towards alternative measures rather than medicinal interventions. The industry will further develop best practice for the use of cleaner fish on farms, in the use of equipment such as thermolicers and hydrolacers and techniques such as fresh water bathing.
- A review of current Area Management Agreements incorporating changes to improve performance including fallowing, stocking and treatment synchronicity as sea lice and disease management tools.
- Using the latest modelling expertise and working with regulators to understand how to reduce farm connectivity, position farms in the most appropriate places to ensure the best possible fish health and ensure minimal impact of salmon farms on the environment.
A reduction in the requirement to use wild caught wrasse through increased focus on hatchery reared cleaner fish. Currently more than 70% of all cleaner fish used is hatchery reared.

Alignment of resources required to support revised strategic research priorities to improve fish health and welfare.

Industry publication of site by site mortality and sea lice reports together with information on the management strategies in place for both.

Salmon depend on a high-quality environment – salmon farmers are stewards of that environment.

The ECCLR Committee Report was critical of aspects of salmon farming operations and the regulatory oversight of these issues and impacts. While accepting that overall industry performance in some areas needs to improve and that recent large-scale fish mortality events presents very difficult challenges, we would wish to highlight the good progress made:

- The industry has developed its reporting (which has been in place since 2010) to produce site by site reports indicating mortalities and sea lice alongside relevant information on the management strategies in place for both.
- Compliance with environmental consents issued by SEPA is good. Over 85% of our operations are categorised as Excellent or Good, and remedial measures are pursued on farm sites which dip below this high standard.
- Predator attack by seals must be managed to protect farmed salmon. The number of seals shot under licence continues to fall for the 6th consecutive year and the industry remains committed to reaching its target of zero.
- The environmental impact of use of licensed veterinary medicines is appraised through the licensing process. Their use and discharge are strictly controlled by SEPA, through CAR licences. This framework incorporates an Environmental Quality Standard (EQS)-based approach to regulation, which is supported through European legislation, and includes high safety margins.
- We agree with the findings of the SAMS report, that the potential impacts of sea lice are just one of a multitude of factors that might impact wild salmonid populations. Any potential impacts on wild fish are not well understood and the science is particularly lacking for Scotland.
- In 2017 Marine Scotland introduced new regulatory measures relating to sea lice control, implemented under the Aquaculture and Fisheries Act (2007). These measures should be given sufficient time to allow any targeted improvements in lice levels to be realised.
- Salmon farming has been involved in numerous local and national engagement activities with the wild fisheries sector and has supported research to better understand the science. SSPO currently co-sponsor a SARF project (SARFSP010) studying return rates of smolts with a view to better understanding the impact of sea lice. We expect significant further research will be needed.
- More open publication of wild fisheries data would enhance understanding and analysis of the position and help move the debate forward.
- The industry supports the position presented in the SAMS report, that the survival of escapes is low; however, Scottish salmon farming is committed to reducing the number of escaped fish.
We also support the view that much of the science surrounding the potential for genetic introgression and its potential impact, refers mainly to Norwegian studies which are not directly comparable to the Scottish context. The Scottish situation is highly complex, and further confused by the fact that in the early 1970s and 1980s, mutual agreements between farmers and fisheries proprietors promoted the stocking of farmed salmon into various river systems.

The development of the Scottish Technical Standard (STS), by both the salmon farming industry and regulatory authorities (within the Ministerial Group for Sustainable Aquaculture) is key to minimising escaped fish.

Specific training in containment is being delivered to support the uptake of the STS.

**Salmon farming underpins local economies and supports local community projects**

Salmon farming has transformed the Scottish food sector and the rural communities of the west Highlands and Islands and Argyll & Bute with jobs, investment and business opportunities. Families are now able to live and work in the communities where they were brought up. Salmon farming companies list nearly 2,500 companies in the Highlands and Islands area they do business with. Last year, salmon farming donated £735,000 to local sports and community groups.

The industry offers modern apprenticeships, training, and career opportunities and second generations of families are joining the sector. From engineers to fish health managers, from marketing to vets, the range of jobs in salmon farming is impressive. But to capitalise on these opportunities the Highlands and Islands must improve its transport and digital connectivity. International business emanates from these remote areas, so they need high quality systems to communicate and deliver high quality salmon.

**Brexit implications**

As we approach Brexit, we seek frictionless, tariff free and uninterrupted trade with our European partners during the transition period and after the UK exits the EU. If the UK is not able to secure a trade deal with the EU, that would result in a tariff of 13% being applied to smoked salmon products and a 2% tariff on fresh salmon exports to a major trading bloc. In any future trade agreement with the EU it is essential that UK immigration policy reflects the need to safeguard current EU nationals in our industry and continues to allow recruitment of the people and skills we need.

Scottish Salmon Producers’ Organisation
April 2018
RURAL ECONOMY AND CONNECTIVITY COMMITTEE

SALMON FARMING IN SCOTLAND

SUBMISSION FROM GRIEG SEAFOOD SHETLAND LTD.

1. Do you have any general views on the current state of the farmed salmon industry in Scotland?
The Scottish salmon farming industry is active in many remote communities in the west coast and islands. The industry supports 10,340 jobs in Scotland, providing earnings of £270M per annum. Many of these jobs are helping to support sustainable rural communities by providing year-round stable employment. This in turn helps to keep rural schools, post offices, shops and community halls open. The industry has faced new environmental challenges recently but has taken proactive measures to meet them.

2. There have been several recent reports which suggest how the farmed salmon industry might be developed. Do you have any views on action that might be taken to help the sector grow in the future?
The Scottish Government has taken valuable steps to support the industry in meeting its growth goals. The establishment of the Scottish Aquaculture Innovation Centre has helped to stimulate the development of new tools and procedures to assist the industry tackle challenges which act as bottlenecks to further sustainable expansion. The development of the new Depomod model is also to be welcomed and should allow better accuracy in modelling the impact of farms.

The regulation surrounding the development of new sites is tough and should remain so, however the number of licences required to establish a salmon farm, does not help to support a holistic approach to salmon farming. Currently to operate a salmon farm the following licences are required:

- Crown Estate Lease (Crown Estate)
- Planning Permission (Local authority)
- CAR licence (SEPA)
- Marine Licence (Marine Scotland)
- Aquaculture Production Business Licence (Marine Scotland)

It is our belief that these licences could and should be combined into no more than 2 documents, controlled by no more than two bodies. It is particularly important that medicine usage and sea lice control are covered by the one licence to provide a well-rounded approach to the issue of minimising both in a sustainable manner.

3. The farmed salmon industry is currently managing a range of fish health and environmental challenges. Do you have any views on how these might be addressed?
Rising seawater temperatures and the emergence of new diseases such as Amoebic Gill Disease have challenged the industry recently. This together with reduced sensitivity to sea lice medicines has made it harder to control sea lice numbers. These challenges have led to considerable investment and innovation within the industry as it has had to find new solutions to both old and new problems.

Grieg has cut production and increased fallow periods (the length of time sites remain empty after harvesting the fish prior to restocking) to allow us to get on top of these challenges in as short a timeframe as possible. We have cut our harvest biomass from a peak of 19,723 tonnes in 2015 to a low of 12,055 tonnes in 2017. We plan to harvest a similar amount in 2018. This is a proactive, sustainable and pragmatic approach to these challenges.

We have invested in the following control methods to help maximise survival:

- More demanding Farm Management agreements with other neighbouring operators, placing an emphasis on synchronous fallowing and close working cooperation
- Sea lice skirts, these are tarpaulins which surround the top 6 meters of the salmon pens and help to prevent the planktonic stage of the sea lice from encountering and settling on our salmon
- Cleanerfish programme, we are culturing lumpsuckers (Cyclopterus lumpus) which eat the lice from our salmon. Going forward we plan to stock lumpsuckers on all our sites. We are not using wild caught cleanerfish.
- Aeration systems, these are designed to draw deep water up to the surface in our net pens. This system can help to keep algae and jellyfish, as well as planktonic sea lice, away from our salmon. This will reduce sea lice infection rates and improve the gill health of our salmon
- Freshwater treatments for sea lice, Grieg Seafood have the capacity to treat our fish with freshwater. This is effective at controlling Amoebic Gill Disease (AGD) and sea lice. It also reduces our reliance on sea lice medicines.

While these changes, many of which have been introduced at a commercial scale in the last year, still need time to fully demonstrate their effectiveness, we are very encouraged by early results. At the end of March 2018 Grieg Seafood’s total salmon lice numbers per fish were reduced by 83% when compared to the figures for the end of March 2017. Adult female salmon louse numbers were reduced by 87% on the previous year.

4. Do you feel that the current national collection of data on salmon operations and fish health and related matters is adequate?

Grieg Seafood are supportive of data collection on salmon farming. We provide data as requested by the regulating authorities and accept that informed public scrutiny can help to drive performance improvement within our industry. It is however worth noting that data collection is time consuming and comes at a cost. We would
therefore ask that any data collection is done with a specific aim in mind and in as efficient a manner as possible. While Grieg Seafood are not currently a member of SSPO, we remain committed to supplying data relating to sea lice levels and salmon survival to SSPO, to allow them to publish data relating to the Scottish salmon farming industry as a whole.

5. **Do you have any views on whether the regulatory regime which applies to the farmed salmon industry is sufficiently robust?**
   As previously stated under point two, Scottish regulation of the salmon farming sector is very robust as it should be. We would however wish to see a more holistic approach to regulation which could be promoted by combining a number of the required licences to promote more joined up regulation.

6. **Do you have any comments on how the UK’s departure from the European Union might impact on the farmed salmon sector?**
   Scottish salmon is the UK’s largest food export with an export value of £600M in 2017. The value grew by 35% compared with 2016. Industries such as salmon farming, which can help address the trade deficit will become even more important to the UK post-Brexit. There is a strong demand for Scottish salmon and while free-trade with the EU would be beneficial we are confident that there will be a strong market for our product whatever the eventual terms of Brexit may be. About 20% of Grieg Seafood Shetland’s employees are EU nationals. They are not seasonal workers but are long-term valued members of our workforce and communities in rural Scotland. We wish to see their right to remain protected.

Grieg Seafood Shetland Ltd
April 2018
RURAL ECONOMY AND CONNECTIVITY COMMITTEE

SALMON FARMING IN SCOTLAND

SUBMISSION FROM THE SCOTTISH SALMON COMPANY

The Scottish Salmon Company (SSC) produces fresh quality Scottish Salmon with over 60 sites across the remote and rural communities on the West Coast of Scotland and the Hebrides. Our focus is on steady and sustainable business growth, developing exports and retaining value and employment in the rural communities in which we live and work.

Our People and our Communities
We employ a team of over 500 staff across the Highlands and Islands with our Head Office in Edinburgh. People are paramount to our business, as is their development. Over a fifth of our employees have worked with the Company for over 10 years, we provide steady year round employment. We provide a diverse range of interesting careers across our supply chain including; brood stock, freshwater, marine, processing, technical, nutrition, biology, environmental, planning, engineering, finance, sales, HR, marketing and IT.

Salmon farming has transformed the Scottish food sector and the rural communities across the Highlands and Islands with jobs, investment and business opportunities. Families are able to live and work in the communities where they were brought up, supporting the traditional rural way of life. We respect our responsibility to our communities and the environment. We appreciate and understand the necessity for coexistence with the many users of our seas and the importance of working together in partnership.

We are committed to sourcing locally and creating value in our communities. In 2017, SSC spent about £100m with over 550 Scottish suppliers and invested £15m locally with increased investment planned for this year and going forward.

Growing Exports is Fundamental to our Strategy
We produce over 26,500 tonnes annually of fresh high quality Scottish Salmon and export over half to 26 countries around the world with a focus on North America and the Far East. Demand remains strong and growing exports is fundamental to our strategy. This is underpinned by our commitment to Scottish provenance and quality.
Quality Scottish Salmon depends on environmental stewardship and good fish health
Our focus is on producing world class quality salmon which takes about three years. Integral to this is husbandry and rearing healthy fish in a high-quality environment. Our staff are custodians of that environment and live and work in locally.

Our Biology department provides site-specific veterinary health planning, in-house veterinary diagnostic services and professional health checks to promote optimal health and welfare for the salmon in our care. Together with audited schemes this ensures that there are high standards of fish husbandry and independent monitoring. In addition, our Environmental Management Plans (EMPs) set out the methods of good husbandry for each of our sites and details the measures that should be considered should an increased impact be detected and in a way that is transparent for the planning authorities, SEPA and Marine Scotland (see further our response to question 5 below). In addition, all new sites undergo a thorough Environmental Impact Assessment (EIA) process. The EIA process is central to the planning regime and is a method of identifying significant environmental impacts and agreeing mitigation. These agreed mitigation measures represent the method and control designed to avoid, lessen and remedy any significant adverse environmental effects as identified through the EIA and planning process.

We work to the independently audited ‘Code of Good Practice for Scottish Finfish Aquaculture’ (CoGP) for the Scottish industry. This addresses over 500 compliance points covering all aspects of salmon farming, the environment and processing. In addition, SSC has further ensured standards are exceeded by achieving internationally recognised certifications and accreditations including; ‘Best Aquaculture Practice’ (BAP), ‘GlobalGAP’, ‘Label Rouge’ and ‘Friends of the Sea’. Audits and fish health inspections are carried out almost every week of the year by Scottish Government Fish Health Inspectors, CoGP and our customers. We also carry out daily health checks on all our farms, supported by our in-house specialist team of biologists, fish vets and nutritionists.

Committed to Working Collaboratively
We are committed to working collaboratively with academics and industry partners to develop long term solutions to tackle industry wide challenges. Challenges that can adversely affect the welfare of the salmon are arising from the marine environment, with increased water temperature and associated occurrences of jelly fish and algal bloom. New problems such as gill diseases have emerged and require treatment alongside the management of sea lice, a naturally occurring parasite affecting both wild and farmed salmon globally. Improved management techniques are being developed including a programme for use of cleaner fish and substantial investment in alternative mechanical methods for lice removal.

Annex A

REC/S5/18/13/3
As members of the SSPO (Scottish Salmon Producers’ Organisation) and in partnership with Scottish Government, we are working to develop the ‘Farmed Fish Health Framework’. This will set out the strategic framework for fish health objectives for the next 10 years to underpin sustainable growth of the sector.

Innovative Native Hebridean Broodstock Programme
Our innovative Native Hebridean Broodstock Programme has taken our commitment to Scottish provenance one stage further by guaranteeing unique Hebridean origin and heritage. Descended from Hebridean stock originally sourced locally in Uist, this unique strain of salmon is reared in the Hebrides. This programme has been in development in Uist over a number of years. To date we have invested over £3m which includes the development of a specialist freshwater facility, creating specialist skilled long-term employment in an area classified by Highlands and Islands Enterprise (HIE) as economically fragile. This award winning salmon was introduced to the market recently and has already gained international recognition for its quality and for our commitment to sustainability and creating economic value in our rural communities. Through this programme we have worked collaboratively for many years with local parties to support their wild fish re-stocking programmes.

Working in partnership with the Scottish Government and other key stakeholders will help ensure our business, and the food and drink sector more widely, continues to deliver real benefit for both the local communities in which we live and work and Scotland as a whole.

Development Going Forward
1. General Views of the Salmon Farming Sector
In 2016, the ‘Aquaculture 2030’ was announced to deliver an ambitious and collaborative plan for sustainable steady growth across the entire aquaculture value chain in Scotland. The feedback that followed from the report was focused towards the potential growth of the sector, doubling in value. From 2002 to 2016, salmon farming in Scotland grew by only 13%, from 144,589 tonnes in 2002 to 162,817 tonnes in 2016. Therefore doubling capacity in the next 12 years would be unrealistic as this would only be four generations of salmon production. Therefore the focus for the sector should be to create a more realistic target to achieve steady sustainable growth.
There are many misconceptions about salmon farming and we welcome the opportunity to explain developments in this young and developing sector.

2. Action to help the Sector Grow in the future
Responsible and sustainable growth is fundamental for the sector. We would welcome the opportunity to consider a process to review site locations and potentially move
underperforming sites, releasing environmental headroom, to develop in more suitable alternative locations. Under current planning processes it typically takes three years to complete each application. It is envisaged that this collaborative approach could benefit the environment and shorten the planning process. We encourage and welcome further collaborative development for connectivity, skills and innovation which is key for the development of rural communities and operations.

3. Management of a range of fish health and environmental issues
   a. Environmental risk-management solutions, for example, Environmental Management Plans. See our response to question 5.

   b. Areas Management Agreements (AMA)
      SSC remain committed to the intent of the previously established Area Management Agreements. We interact with neighbouring farms and other stakeholders in the shared aquatic environment to facilitate complimentary fish health strategies and preservation of the integrity and biodiversity of the natural environment that supports our farming operations. We will actively support the work of stakeholders who constructively engage in meaningful activities to conserve and restore wild salmonid populations.

   c. Marine Protected Areas (MPA)
      Biodiversity of our land and sea is the main purpose of an MPA. It is important that the management options are appropriate and relevant for the aim of the specific MPA.

4. Collection of data
We support accurate and transparent reporting of data throughout the industry. We currently report in line with requirements from Marine Scotland, SEPA and SSPO. Further development of data collection and reporting is a key objective of the ‘Farmed Fish Health Framework’, which is currently being developed by the industry in partnership with Scottish Government and will set out fish health objectives for the next 10 years to underpin sustainable growth of the sector.

We therefore consider that the national collection of data is adequate for salmon operations, fish health and related matters. It is key to ensure that data is available from all users and the data is then used transparently and productively.

5. Sufficiently Robust Regulatory Regime
   a. Regulation
We view the regulatory regime as being sufficiently robust. The regulations form a base line and responsible regulations must be robust, proportionate and attainable. The Code of Good Practice and standards must complement regulations and exceed regulatory standards. Regulations are continually reviewed and updated by EEC, UK and Scotland and the Code of Good Practice must be reviewed to remain in line.

b. Planning and Consents Framework
The current planning and consents framework is complex, cumbersome and not always conducive to developing practical solutions. The need for a fit for purpose regulatory system is fundamental for the continued sustainable growth and development of the industry and to support the broader Scottish economy. Salmon farming is regulated through a range of regulatory regimes and currently administered by different public bodies including: Local Authority Planning Department, Marine Scotland, Marine Scotland Science, SEPA and SNH. Coordination through one body with a solution driven ethos would streamline activities and ensure effectiveness, supporting growth of the industry and the development of Scotland as a whole, including all users of the sea and land. An overarching streamlined framework for aquaculture development is required with an integrated planning approach for site development.

c. Mitigation and Precaution
We recognise that our commitment to sustainable business growth means taking a precautionary approach to development. However, ‘precaution’ can be a misused and misunderstood concept. Taking a precautionary approach is about balancing benefits / risks, and managing environmental risks through proportionate mitigation measures. Sustainable development and the precautionary principle are already enshrined in Scottish Planning Policy (SPP) and underpinned by a cascade of legislation\(^1\), applicable to fish farms. SPP cautions that the precautionary principle should not be a reason to impede development without justification. In our view, development which accords with current policy and legislation and includes proportionate mitigation and monitoring, such as Environmental Management Plans, can clearly be both sustainable and precautionary.

For example, Environmental Management Plans were proposed and secured by planning conditions in recent consents granted for two of our sites in Loch Fyne. We consider that Environmental Management Plans can be flexible and adaptive, so long as basic fairness is met by avoiding unknown retrospective

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\(^1\) For example, at the highest level of protection, a prospective fish farm must prove, taking account of mitigation measures, it will not adversely affect any European site (unless imperative reasons of overriding public interest are shown). See also the biodiversity duty.
measures. They are an important risk-management tool to ensure a precautionary approach to development and achieving sustainable growth.

6. Impact of the UK’s Departure from the European Union
Brexit presents an opportunity to drive export growth out with Europe. The Scottish Government needs to lobby to ensure Scottish Salmon is high on the negotiating agenda as UK’s largest food export and worth over £600m to the economy.

Reputation and Scottish Provenance are key to the sector and the Inquiry has resulted in major disruption for the positioning both in the UK and export markets. This will take considerable time and investment to re-build. Scottish provenance and food origin labelling must also be high on the agenda to guarantee country of origin and protect the quality and integrity of Scottish produce. This is particularly important as the reputation and demand for Scottish Food and Drink increases internationally.

Scottish Salmon Company
April 2018
17th April 2018

Dear Mr Dey,

ECCLR Committee inquiry into the environmental impacts of salmon farming

Thank you for your letter of 13 March. Marine Scotland welcomes the recent report published by the ECCLR and are currently analysing its conclusions alongside the current considerations of the REC.

Please find below detailed responses to the points raised in your letter. My Team and I are, of course, happy to discuss any of these in greater detail if that would be of assistance.

On setting of ‘trigger levels’ for the reporting of the action associated with sea lice levels within fish farms.

You indicate that the Committee is unclear as to the process for setting the ‘trigger ‘levels’ for the reporting of action associated with sea lice levels within fish farms. I should explain that Marine Scotland has never set a trigger level for sea lice but instead the reporting and intervention levels are used by the Fish Health Inspectorate (FHI) to assess the measures which individual companies and sites require to demonstrate that they have satisfactory measures in place for the prevention, control and reduction of parasites, defined as Caligus elongatus and / or Lepeophtheirus salmonis (hereafter referred to collectively as sea lice) as required by the Aquaculture and Fisheries (Scotland) Act 2007 (AFSA).

The reporting level of three and the intervention level of eight adult or ovigerous female sea lice were developed following detailed and lengthy discussions within Marine Scotland and with stakeholders. It was a significant development of lice management policy and largely measures with observations made of the average lice loadings on farmed salmon populations [in Scotland] over the previous three years. A paper describing this analysis, Hall & Murray (2018), is enclosed. While the copyright is reserved to Elsevier, the paper is publicly available at https://www.sciencedirect.com/science/article/abs/pii/S0044848617318367

This is the modelling work that Rob Raynard referred to when he provided evidence.
There will be an opportunity for these levels to be revisited when the policy is reviewed later this year (July 2018).

I should also explain that the suggested criteria for treatment defined in the Code of Good Practice for Scottish Finfish Aquaculture (CoGP) are a starting point for discussions between farmers and their consulting veterinary surgeons to consider whether a sea lice treatment (medicinal, biological or physical) is appropriate. These systems are used to consider different requirements, so it is perhaps not surprising that they differ significantly.

National sea lice numbers falling

As you may be aware, a publication scheme for all sea lice data held by the FHI is in development. Information developed by epidemiologists (Hall & Murray (2018)) in Marine Scotland Science from the Scottish Salmon Producers Organisation published data suggests that the average adult and ovigerous female sea lice numbers are at their lowest for four years – this cannot be attributed to any single factor, but may suggest improved management of sea lice on farmed salmon stocks in Scotland.

Technical mitigations – development of RAS

There are a series of technical mitigations which have been introduced to the commercial production of salmon in Scotland. The introduction of vaccines in the 1990’s massively decreased the industry’s reliance on antibiotic use and at the time dramatically improved farmed fish survival. Vaccines are now widely used against a range of viral diseases also. Innovations in sea lice prevention and treatment have decreased industry reliance upon veterinary medicine usage – these methods include the use of cleaner fish (both farmed and wild caught), physical lice removal using pumping, freshwater and warm water, physical barriers such as lice skirts and snorkel cages. Recirculating aquaculture systems (RAS) in the production of smolts have been in use in Scotland for the last decade or so and their use is expanding, with one site opening at Inchmore, near Inverness and another in the construction phase near Oban. RAS in themselves do not necessarily mitigate the effects of disease in farmed salmon populations – this may be improved with the introduction of closed containment systems, and these systems do introduce their own unique set of challenges, particularly with regards water quality, water chemistry and dissolved gas management – each of which produces their own health challenges.

The introduction of the Code of Good Practice for Scottish Finfish Aquaculture (CoGP) has seen the underlying principles of the industries operation enshrined in one document, with the description of operations such as farm management area operation, the requirement for biosecurity and risk assessments prior to the movement of fish all requiring to be addressed by all companies and operations audited by an independent third party.

Disease management areas and movement controls on fish, equipment and personnel are used in the case of the outbreak of listed diseases – powers given to Scottish Ministers in the Aquatic Animal Health (Scotland) Regulations 2009 regs 23-31 and may also be invoked to control emerging diseases. The last two incidents where these powers were invoked were an outbreak of viral haemorrhagic septicaemia (VHS) in populations of cleaner fish in the Shetland Islands in the winter of 2012/13 and an outbreak of infectious salmon anaemia (ISA) in salmon in the Shetland Islands in the autumn and winter of 2009/10. The development of the disease management area system arose from the Final Report of the Joint Government / Industry Working Group on Infectious Salmon Anaemia (ISA) published in January 2000 – following the first outbreak of ISA in Scotland.
Locally the impact of the statutory controls is severe – in the case of the ISA outbreak, in the protection area (an area within the disease management area, centred around farms confirmed as being infected) farms had to be cleaned and disinfected, prior to lying fallow for significant periods of time. These two simple procedures have a significant direct and indirect cost associated with them.

**On licensing of fish farms**

You have asked a number of questions regarding the licensing of fish farms by Marine Scotland (MS-LOT) and how MS-LOT interacts with statutory consultees.

Operation of a fish farm requires a marine licence, issued by Marine Scotland MS-LOT, and an Aquaculture Production Business (APB) authorisation, issued by Marine Scotland Fish Health Inspectorate. This is in addition to planning permission, issued by the local authority, a CAR licence, issued by SEPA and a seabed lease, issued by the Crown Estate.

To assist your understanding of MS-LOT operations it may be helpful to briefly rehearse the licensing requirements of the Marine (Scotland) Act 2010. Although detailed, I think this might address some of the apparent misunderstandings.

I should begin by referencing Part 4 of the Marine (Scotland) Act 2010, Marine licensing, which makes it a licensable marine activity to deposit or remove substances and objects from a vehicle, vessel…etc. in the ‘Scottish marine area’. Marine licences are determined by MS-LOT on behalf of Scottish Ministers.

The Marine Licensing (Consultees) (Scotland) Order 2011 lays down the ‘statutory consultees’ for marine licensing, these are:

1. the Commissioners of Northern Lighthouses (NLB);
2. the Maritime and Coastguard Agency (MCA);
3. the Scottish Environment Protection Agency (SEPA); and
4. Scottish Natural Heritage (SNH).
5. Any delegate for a region is specified as a person who must be consulted in relation to any application for a marine licence for an activity which is to be carried out in that region*

   * - refers to marine planning partnerships.

Marine licences are required for, among other things, construction, dredging and deposit of dredged spoil. In relation to seawater finfish aquaculture, marine licences are required for (1) the deposit of aquaculture equipment (for the purpose of mitigating navigational risk only) and (2) for the deposit of chemotherapeutant from a vessel, following sea lice treatment in the wells of a wellboat. The former (1) shall be referred to as a ‘navigational marine licence’, the latter (2), a ‘wellboat licence’.

It is also a ‘licensable marine activity’ to remove substances and objects, so the taking of sediment for routine testing by fish farm operators is classed as a licensable marine activity. However, this activity, where the removal activity is carried on as a condition of an authorisation of a controlled activity granted by the Scottish Environment Protection Agency
under Part II of the Water Environment (Controlled Activities) (Scotland) Regulations 2011, is exempt from the requirement for a marine licence. The relevant Article is 18B of the Marine Licensing (Exempted Activities) (Scottish Inshore and Offshore Regions) Amendment Order 2012 and effectively exempts fish farm operators from the requirement for a marine licence to remove sediment for testing.

‘Navigational marine licences’

Article 12 of The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011, exempts deposits in relation to the propagation and cultivation of fish from the requirement for a marine licence. More specifically, the exemption applies to the deposit of any trestle, raft, cage, pole, rope or line in the course of the propagation or cultivation of fish. The article does not apply to a deposit made for the purpose of disposal; made for the purpose of creating, altering or maintaining an artificial reef; or that causes or is likely to cause obstruction or danger to navigation.

Advice given to the Scottish Ministers by its navigational consultees (MCA and NLB) considers fish farms likely to cause obstruction or danger to navigation and, as such, the exemption is not used. Advice received through consultation with MCA and NLB regarding safe navigation, includes marking and lighting requirements and is included as conditions of ‘navigational marine licences’.

Given that the environmental effects are considered through the Planning system, SEPA has no objection to applications for ‘navigational marine licences’ recognising that other aspects of fish farms are dealt with under other regulatory regimes.

SNH is consulted on the applications for ‘navigational marine licences’. Where SNH advises that there is likely to be significant effects on European sites, MS-LOT refers to the advice given to Local Authorities by SNH during the planning process and adopts any ‘appropriate assessment’ carried out during the planning process by the Local Authority as the competent authority under The Conservation (Natural Habitats, &c.) Regulations 1994. A similar process occurs where SNH advises that an activity may affect the feature of a Marine Protected Area (MPA).

‘Navigational marine licences’ are not issued in the absence of valid planning permission. ‘Navigational marine licences’ are for six (6) years and must be re-applied for every six (6) years.

‘Wellboat licences’

Wellboat licences are issued by MS-LOT to fish farm operators to permit the discharge of chemotherapeutants following treatment for sealice in a vessel (a wellboat). Such licences are only issued where a valid Controlled Activity Regulations (CAR) licence has been issued to the relevant fish farm site for discharge of chemotherapeutants following in-cage treatments by SEPA following its consideration of the environmental effects. The volumes permitted for discharge are the same as the CAR volumes and Marine and CAR licences are conditioned to prohibit the release of chemotherapeutant under one regime at the same time as the other, thereby avoiding cumulative effects.

Wellboat licences are issued for three (3) years.
MCA and NLB have confirmed they will not provide routine comment on the applications for ‘wellboat licences’ as there is not a navigational element.

SEPA has provided standing advice that it has no objection to ‘wellboat applications’ provided the type and amount of chemical used and discharged will not exceed that specified in the respective CAR licence. An agreed condition is added to licences which prevents the simultaneous discharge from bath treatments.

SNH is consulted where such activity takes place in a European site, and advise of the likely significant effects. SNH directs MS-LOT to advice given by SNH during the CAR licensing process. MS-LOT would look to adopt the ‘appropriate assessment’ carried out by the SEPA as the competent authority under The Conservation (Natural Habitats, &c.) Regulations 1994. Again, a similar process occurs where SNH advise that an activity may affect the feature of a Marine Protected Area (MPA).

With regard to your other specific points:

How it takes account of the representations of those organisations and if, and how often, decisions are taken to grant licences, contrary to the advice of these agencies;

MS-LOT determines licence applications based on the representations received during consultation. Where statutory consultees advise the requirement for condition, MS-LOT issues a marine licence with an advised condition where appropriate.

What triggers intervention from Marine Scotland Licensing in the operation of a fish farm, and what and how information flows influence a decision to undertake an investigation.

Potential intervention relating to fish farms could come from a number of ‘sources’ such as:

1. Information from a third party
2. Information from Marine Scotland
3. Information from NLB (NLB routinely visit fish farm sites to check navigational requirements are met)
4. Site visits by MS to follow up information provided by other sources

The Marine (Scotland) Act 2010 provides Marine Scotland, on behalf of Scottish Ministers, powers to investigate potential breaches of the licensing requirements and take enforcement action where appropriate.

Whether a licence has ever been refused or revoked based on environmental concerns (please provide details of the cases)

In respect of ‘navigational marine licences’, prior to the issuing of a marine licence, the environmental aspects will have been dealt with through the Planning system and any concerns addressed. As such, to date, MS-LOT has not refused or revoked a licence based on environmental information.

MS-LOT may refuse a licence application where unacceptable levels of risk to safe navigation are identified and where no satisfactory mitigation is available. To date, this has
not been necessary, but a small number of fish farm sites have made adjustment to the location during the determination process to meet the stakeholder concerns.

In respect of ‘wellboat licences’, the environmental effects of chemotherapeutant release are considered by SEPA during the CAR process. Prior to approval of a ‘wellboat licence’ application by MS-LOT, SEPA will have addressed the environmental concerns regarding release of chemotherapeutant at a certain site in order to issue a CAR licence. Therefore the environmental concerns relating to wellboat licences have been addressed through that process.

However, there are examples of applications for wellboat licences in protected areas where MS-LOT has concerns about impacts. In such cases, and where no assessment has been carried out by SEPA, applicants must demonstrate the acceptability of the proposal to MS-LOT. In a small number of cases this has not been supplied and as a result MS-LOT has not issued licences.

**Why licences are granted in perpetuity;**

That is not the case - Marine licences are not granted in perpetuity, ‘navigational marine licences’ are for six (6) years and wellboat licences are for three (3) years.

**Your views on the merits of granting licences for a limited time period with fixed conditions and examples of where this might be practical.**

Marine licences are never granted in perpetuity and do have conditions attached.

**Wild Salmonids**

You ask about the extent to which I consider Marine Scotland has the necessary capacity, expertise and necessary information to make an informed assessment of the interaction between wild salmon and aquaculture. This is of course an ongoing challenge for any organisation, notwithstanding the particular policy interest, but I remain confident in the ability of the personnel within Marine Scotland and across the broader Government bodies to be able to make informed and evidence based science and policy determinations in this area. That is not to say that we are complacent or that we are not prepared to seek further information and data when required, notwithstanding the difficulty in generating scientific evidence cannot be underestimated.

I should explain that Marine Scotland have studied distributions of salmon and sea trout smolts in relation to salmon farms to help to inform planning of site placement. Work is on-going, but some results have been published in peer-reviewed literature.


The potential for impacts of sea lice on sea trout have also been identified in two separate studies (the SAMS report suggests that it is a single study):


The potential for using direct experimental methods to assess the impact of sea lice on salmon (as done in Norway) has been examined through a SARF project that will be published in due course. Further work to examine potential to estimate impacts of sea lice on sea trout at a population level is on-going. Patterns of dispersion of sea lice from farms has been reported in numerous papers by Salama, Murray, and others from MSS together with publications on the development of novel investigatory methods.

The overall conclusion of this research effort is that although it has not yet been possible to quantify impacts of sea lice on populations of sea trout and salmon in Scotland, knowledge of the distributions of the fish and sea lice, and hence the information available for informing salmon farm planning, is steadily increasing.

The Planning System

On the wider issue of a potential and alternative consenting regime, the Committee will be aware that this proposal first emerged as part of the Independent Review of Scottish Aquaculture Consenting published in July 2016 which was commissioned by Marine Scotland and The Crown Estate to consider whether there were inefficiencies, duplication or unnecessary complexities across the current consenting regimes; and whether the overall system fits the requirements and operation of the industry. These themes were subsequently picked up in the industry’s “Aquaculture Growth 2030” strategy.

The Review made a number of recommendations for improvement (quick wins and longer-term options including an alternative consenting regime). Marine Scotland have now looked to see how we might move that longer term proposal into a working group discussion to consider and explore options for an alternative consenting regime. Those discussions have not been based on a predetermined view that wild salmonid impacts should be removed from the planning system.

I anticipate that we may be able to say more about that thought process later next month.

I hope that is helpful.

Yours faithfully

GRAHAM BLACK

Graham Black, Director of Marine Scotland
Scottish Government | Area 1B-South | Victoria Quay | Edinburgh | EH6 6QQ
By email only
28 March 2018

Dear Graeme,

Request for further information: Environment Climate Change and Land Reform Committee (ECCLR) inquiry into the environmental impacts of salmon farming

Thank you for your letter requesting further information on issues relating to the above. I trust that you will find this response helpful.

This is an important topic and I read your Committee’s report to the Rural Economy and Connectivity Committee with great interest. Your Committee has done an excellent job in identifying the main issues that must be addressed to protect and improve the environment if the industry is to be able to grow sustainably.

I am also in complete agreement that the status quo is not an option for securing the protection of the environment alongside ongoing increases in production. This is why I made aquaculture one of the first industries for which SEPA is developing a sector plan. The plan will consider the industry’s whole environmental footprint and set out the steps needed for One Planet Prosperity, our regulatory strategy for securing environmental protection and improvement in ways that, as far as possible, also create health and well-being benefits and sustainable economic growth. It will include:

1) protecting the environment and biodiversity by ensuring fish production is matched to environmental capacity;
2) increasing the capture and beneficial use of waste;
3) reducing medicine releases into the environment;
4) supporting action to protect wild fish; and
5) strengthening the evidence base.

Matching production to environmental capacity
The capacity of different parts of the water environment to accommodate fish farm development differs. For sustainability, we need to encourage and ensure that fish farming businesses look at the most environmentally suitable locations in their development planning. One such step
towards this is our proposal for depositional zone regulation. This removes potential disincentives to investment in locations where the impacts of open-net farming systems on the sea bed are likely to be small and disease risks can be less. We want and expect businesses to start to re-locate and consolidate open-net farming in such locations and away from the most unsustainable sites in terms of pressures on the environment and fish health.

**Increasing the capture and beneficial use of waste**
Reducing pressure on the environment and re-using waste materials wherever possible are key to One Planet Prosperity. For the industry to be able to achieve its growth targets, a transition to innovative farming systems that reduce pressure on the environment by capturing and making beneficial use of waste is going to be essential. Some very promising low impact production techniques are already being trialled. These include a range of membrane technologies and other systems capable of capturing a significant proportion of waste food, faeces and medicine residues. Early signs are that some of the systems are likely to have the added benefit of reducing the risk of fish disease. Innovation appears to be particularly strong in the Norwegian industry. Over the last few months, we have been engaging with the Scottish industry’s leaders to encourage much more focus on innovation here at home. In due course, our intention is for innovative production systems, appropriately matched to the farm location, to become a prerequisite for new and expanding farms as well as an alternative to re-location for farms in the most unsustainable locations.

**Reducing medicine releases into the environment**
It is also important that the industry finds ways of ensuring that the quantity of medicine residues discharged into the environment is decoupled from production growth and reduced over time. This will require much greater emphasis by the sector on:
- reducing infection risk;
- increasing the use of non-chemical parasite removal, for example, by using freshwater baths and other systems for lice removal; and
- where medication is needed, the use of methods that allow the capture and treatment of a significant proportion of medicine residues.
We have been working with the industry and other regulators to drive practice in this direction and will continue to do so.

**Supporting action to protect wild fish**
As the ECCLR report highlights, it is increasingly clear that sea lice from fish farms and escapes of farmed fish can pose a risk to wild sea trout and salmon. The sector needs to better manage this risk. We are in the process of exploring with other regulators, in particular Marine Scotland, how we can contribute. This includes reviewing how the different policy and regulatory frameworks, including our own wide regulatory powers, can be used to better effect. Subject to the outcome of this review, we are open to taking account of the risk posed to wild fish in assessing the appropriateness of farm locations in our advice to local planning authorities and in our permitting process.

**Strengthening the evidence base**
Continually strengthening the evidence base on the environmental effects, and performance, of fish farms is important to enable the right investment decisions. This is also important to enable us to identify and apply the right level of precaution when managing risks.
We already have an established and significant programme of evidence work. The programme includes our own routine monitoring, model development and investigative surveys. The latter are increasingly focused on improving understanding of cumulative risks to marine ecosystems.

A second core element of the evidence base is the information that fish farm operators provide through our licencing regime. The regime requires operators to know and understand environmental risks and provide ongoing, quality assured, monitoring information to us. We audit and check this data on an ongoing basis and use it to help us ensure that there are no adverse impacts on the environment. Our revised approach to regulating marine cages (DZR) will increase the protection of the marine environment by providing enhanced monitoring and modelling information, including information from marine hydrodynamic modelling to help assess risks over large scales. Operators will be required to provide much more information but we will also increase our audit monitoring of farms.

The third way that the evidence base is being strengthened, and a key part of our approach to promoting and supporting innovation in environmental protection, is innovative research. This involves collaboration with universities; other research institutes; the sector; and public body partners. For example, we are currently supporting a project with Crown Estates and aquaculture interests investigating the potential to extract value from aquaculture wastes. In another, we are contributing to the development of novel, eDNA monitoring techniques. These will enable rapid assessments of sea bed health; allow more information to be collected more efficiently; and, in due course, help shorten adaptive management response times.

One area where the evidence base requires particular strengthening is in relation to the risks posed to wild salmon and sea trout. We have committed to a large, jointly funded project with Marine Scotland and Scottish Natural Heritage to improve understanding of the current status of salmon in rivers across Scotland. This information will help us evaluate the results of the investigative surveys we have been carrying out into salmon stocks in rivers on the West Coast.

The Committee’s report has usefully highlighted a number of other areas that need to be addressed to enable the industry to develop sustainably. I will make sure we consider how we can contribute to addressing each of these as we complete the development of our sector plan.

I have provided the detailed information you requested in the Annex below. Please do not hesitate to get in touch if you need anything further.

Yours sincerely

Terry A’Hearn
Chief Executive Officer

Annex 1: Detailed response to request for further information

Monitoring and consenting
1. What were these unacceptable impacts and how were they identified? (p. 110 of the ECCLR Committee’s report)

The impacts were pollution of the sea bed. They were identified on the basis of environmental samples showing that:

a) the diversity and abundance of the invertebrates had been so altered that pre-defined environmental standards for the condition of those invertebrates were breached. Breaches of the standards that apply close to the cages mean that impacts are so severe that even populations of those animals that are able to cope best in polluted conditions and breakdown organic wastes are reduced to very low numbers and low diversity; or

b) concentrations of fish farm medicines were in excess of environmental standards and hence at levels likely to result in adverse effects on the health and diversity of invertebrate animals.

The majority of the samples used to identify these impacts were quality assured samples provided to us by the fish farmers in accordance with monitoring conditions specified in their licences.

<table>
<thead>
<tr>
<th>Sea bed monitoring results for the period 01/01/2015 to 31/12/2017</th>
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<tbody>
<tr>
<td>Emamectin benzoate sampling results</td>
</tr>
<tr>
<td>Number of samples/surveys</td>
</tr>
<tr>
<td>Number of samples/surveys showing unacceptable impacts</td>
</tr>
</tbody>
</table>

2. How many times was the permitted biomass reduced, over how many farms? and what was the subsequent impact of that reduction? (p. 110 of the ECCLR Committee’s report)

Our regulatory response to unacceptable impacts on the sea bed is detailed in our licence review procedure. Where appropriate, this response includes reductions in the permitted biomass. Between 1 January 2015 and 19 March 2018, action has been taken to reduce the permitted biomass on 42 fish farm licences, nine of the reductions were volunteered by the companies concerned. The purpose of such reductions is to allow the sea bed to recover and then be maintained to the appropriate environmental standard.
<table>
<thead>
<tr>
<th>Sea bed condition change</th>
<th>Recovered</th>
<th>Confirmed recovered</th>
<th>Confirmed not recovered(^1)</th>
<th>Not yet assessed(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>15</td>
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**Notes**

1. *Further action is in process of being identified as part of our normal, planned approach to addressing such impacts. This may include a further biomass reduction.*
2. *The required follow up sea bed surveys are not yet due to be submitted by the operator.*

### 3. What are the information gaps in relation to the sea-bed in the vicinity of fish farms? (p. 130 of the ECCLR Committee’s report)

We routinely have to make regulatory decisions that factor in uncertainties resulting from evidence gaps. We take account of the limitations of our current knowledge by incorporating the appropriate level of precaution into our decision-making and using adaptive approaches to management. This allows us to manage environmental risk effectively even where there are gaps in information. In this regard, the way we regulate salmon farming is no different to the way we regulate any other sector.

On-going work to strengthen and expand scientific understanding of the risks that fish farming can pose to marine and freshwater ecosystems is particularly important given the industry’s growth ambitions.

<table>
<thead>
<tr>
<th>Information gaps: pollution risks from marine cage fish farms</th>
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</thead>
<tbody>
<tr>
<td><strong>What information is needed?</strong></td>
</tr>
<tr>
<td><strong>Why is it needed?</strong></td>
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</tbody>
</table>

**1. Far-field risks – risks beyond the permitted zone of impact on the sea bed**

- Improved assessment of where any wastes, including medicine residues, that are transported from cages end up and the risks posed

  Waste from some farms can be transported over considerable distances as a result of the action of tides and wind. Impacts can result if pollutants in the waste accumulate to harmful levels in the water column or on the sea bed.

  We are strengthening our ability to assess this risk by:

  (a) carrying out investigative surveys;

  (b) increasing use of hydrodynamic modelling, including requiring applicants to develop hydrodynamic models; and

  (c) improving analytical methods to allow detection of very low concentrations of medicine residues

- Improved information on the chronic, non-lethal effects of medicine residues

  Environmental standards are set using all available scientific information about the effects of pollutants on a range of potentially sensitive organisms with the aim of identifying a no-effects concentration. Where there are gaps in information, a safety factor is applied to define a likely no-effects concentration.

  There are gaps in chronic, non-lethal effects of fish farm medicine residues. Manufactures are not obliged to provide data. We are working with the Veterinary Medicines Directorate to help strengthen its approval process.

- Improved methods of assessing

  Our ability to assess the impact of deposition is best where that
Information gaps: pollution risks from marine cage fish farms

<table>
<thead>
<tr>
<th>What information is needed?</th>
<th>Why is it needed?</th>
</tr>
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<tbody>
<tr>
<td>the effects of waste deposition on coarse and hard sea bed substrates</td>
<td>deposition is on sea beds with soft sediments, samples of which can be collected easily using grabs. The expansion of the industry could result in more deposition on coarse and hard substrates, even if only transiently. Practical techniques for investigating impacts are needed (eg using remotely operated submersible vehicle survey) to improve understanding of risks.</td>
</tr>
</tbody>
</table>

2. Cumulative impact of near-field impacts – permitted impact on sea bed

| Improved information on the areal extent of impacted sea bed in the vicinity of cages, including how this area changes over time | To improve the assessment of the cumulative risk from permitted areas of deposition around multiple marine cage sites in sea lochs, improved resolution of our estimates of the total impacted area is needed. Under DZR, enhanced sea bed monitoring at farms will address this gap. |

| Improved information on the distribution of different sea bed habitats in coastal waters | Different communities of sea bed biota are found in different sea bed habitats. The biodiversity of the seas is a product of the diversity of habitats. Improved information on sea bed habitats would improve ability to understand cumulative risks to different habitats and improve spatial planning of development. We are working with partner agencies to improve sea bed habitat mapping, including exploring the opportunity to build on a Europe-wide mapping project. |

4. What proactive work has SEPA engaged in to monitor the impact of fish farms in the vicinity of protected features (PMFs, MPAs, SACs)?

Monitoring effects of existing fish farms
Marine Scotland is responsible for assessing the condition of MPAs and whether the sites’ conservation objectives are being met. Scottish Natural Heritage (SNH) is responsible for assessing the condition of SACs.

Monitoring of MPAs and SACs is coordinated under the Scottish MPA Monitoring Strategy. The strategy was developed by Marine Scotland and Marine Scotland Science in partnership with SNH and the Joint Nature Conservation Committee (JNCC). SEPA was consulted during the Strategy’s development.

We require operators to monitor the impact of operational farms on the sea bed around all marine cages, including those in, or in the vicinity of, MPAs, SACs and PMFs. Where necessary, we include additional requirements for farms in, or in the vicinity of, protected sites. We share the monitoring information that we hold on a regular basis with SNH and Marine Scotland. We also arrange joint surveys where possible to allow SNH and Marine Scotland Science to make use of our survey vessel.
If the assessments made by Marine Scotland and SNH identify that action is needed to reduce the impact of a fish farm in order to achieve a conservation objective for an MPA or SAC, we would review the authorisation for the farm concerned and work with the farmer to ensure appropriate action was taken. To date, no existing fish farms have been identified as compromising the objective for a protected site.

Assessing risk posed by new developments
We are responsible for assessing the risk posed to PMFs, MPAs and SACs when considering proposals for new marine cage fish farms or proposals to change the operation of existing farms.

Proposals that have a clear potential to threaten protected sites are normally identified during joint, pre-application discussions with SNH and the company concerned. Most such proposals are not progressed further by the company and no application for authorisation is made.

Any application we receive for a fish farm development in, or in the vicinity of, an MPA, SAC or PMF is subject to an assessment of its likely effects on the protected interests. If necessary to make these assessments, we require applicants to fill any relevant gaps in available information. This may involve applicants carrying out additional environmental surveys or modelling studies.

5. What is the process and criteria for determining the programme of unannounced visits to fish farms and has this changed over time? (p. 117 of the ECCLR Committee’s report)

SEPA’s programme of visits is currently scheduled and announced in advance. This is because our inspectors:

(a) need the right farm staff to be present if they are to be able to check that the site is being operated correctly;
(b) use the farms’ personal protective equipment to minimise the risk of transferring diseases between farms; and
(c) rely on the use of the farms’ boats to transport them to and from the cages;

Unannounced visits will be made in appropriate circumstances, for example, if we have reason to believe there has been a serious pollution incident.

We are in the process of exploring ways of changing the way we regulate to allow us to develop programmes of unannounced visits for all regulated premises used for animal production, including fish farms and intensive pig and poultry units.

Programmed inspections extend to all fish farm premises in marine and freshwater locations. All marine cage fish farm premises are inspected at least once per growth cycle. Some may be inspected 2 or 3 time per growth cycle. In the year 2016-17, we carried out at total of over 230 inspections of marine cage fish farms.
The number of inspection visits we make is determined using a framework that we apply to all regulated activities. The number of visits depends on the level of compliance and the scale of risk. The depth and scope of inspections also varies with the scale of the activity and risk posed.

As well as site visits, we also analyse and assess compliance by examining the information that farmers are required to submit to us on a quarterly basis as a condition of their licences. Most of this information is then published on Scotland’s Aquaculture Web.

As well as site inspections, we carry out investigative surveys to identify any pollution impacts from aquaculture. Since 2013, we have substantially increased the emphasis given in our marine survey programme to assessing the effects of aquaculture. In 2016, we carried out detailed investigative surveys of Loch Shell, Loch Scridain, Loch Sunart, Orkney (two sites) and Loch Etive. In 2017, work was concentrated on Shetland. Up to four aquaculture areas are planned for survey in the 2018 programme.

6. What resource is SEPA currently allocating to monitoring and reporting on the sector? (p. 315 of the ECCLR Committee’s report)

The staff resource we allocate to the salmon farming sector varies from year to year. It depends on a range of factors, including the number of operational farms; their levels of compliance; and the phasing of our environmental survey programmes.

<table>
<thead>
<tr>
<th>Direct regulatory resource¹</th>
<th>Environmental monitoring and development resource²</th>
<th>Total resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>30</td>
<td>43</td>
</tr>
</tbody>
</table>

Notes
1. Includes site inspection; reporting; processing applications; enforcement work; etc)
2. Includes freshwater and coastal water monitoring; data analysis and modelling; regulatory framework development; sector planning; etc)

We have also invested in our in-house analytical capabilities, with further investment planned in 2018.

<table>
<thead>
<tr>
<th>Recent and planned investment in assessment capabilities</th>
<th>Planned investments for 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed new emamectin benzoate analytical method able to measure to very low concentrations (using new instrumentation costing £250,000)</td>
<td>A new analytical method for azamethiphos in sea water (using new instrumentation costing over £280,000)</td>
</tr>
<tr>
<td>Improved method for measuring organic carbon</td>
<td>Sample collection for partnership research project into the use of new eDNA techniques in monitoring the environmental effects of marine cage fish farms</td>
</tr>
<tr>
<td>Improved method for particle size analysis (using new instrumentation costing over £50,000)</td>
<td>Potential in-house eDNA analytical facility</td>
</tr>
</tbody>
</table>
7. What change in resource is planned as a result of the proposed introduction of DZR and the expansion of the sector? (p. 315 of the ECCLR Committee’s report)

**Introduction of DZR**
Our current charging scheme incorporates provision for an additional charge for DZR-type regulation should this be needed to recover any additional resource costs.

The DZR approach will involve an increase in the amount of audit monitoring we will carry out; and an increase in the amount of information that operators will have to provide. The increase in monitoring will increase the amount of environmental information that we have to check and analyse when assessing proposed developments and evaluating the environmental performance of operational farms. In contrast, the resource required to deal with non-compliances may reduce if farm performance improves and the number of non-compliances reduces.

**Expansion of the sector**
A number of factors affect the scale of the resource we allocate to fish farming. One of the biggest is the number of operational farms. If the expansion of the sector involves an increase in the number of farms, this will result in more resource being allocated to fish farm work to undertake the additional inspection, monitoring and assessment work required to protect the environment. Our charging scheme is set up to enable us to recover the costs of regulating the sector. The additional charging income from an increased number of farms will allow us to proportionately increase the resource allocated.

8. The Committee is extremely concerned that SEPA may, in the past, or may currently, be permitting the discharge of priority substances and potentially damaging substances (p. 182 of the ECCLR Committee’s report)

Priority substances are pollutants identified at European-level under the Water Framework Directive as presenting a significant risk to, or via, the water environment. Currently, no priority substances have a veterinary medicines marketing authorisation for use as a fish farm medicine in the UK1. Farms do discharge other medicine residues and these have the potential to be harmful to aquatic life.

We protect the environment by setting limits on medicine quantities and application rates. The limits are calculated with the aim of ensuring that concentrations of residues do not exceed levels at which damage to biodiversity could result. Safe levels in the environment are defined by environmental standards. We use a combination of monitoring data provided by operators and the results of our own monitoring and investigative surveys to check that the standards are being met in the environment. Where we find failures of standards, we take appropriate action to secure the protection of the marine environment. This action may include reducing the permitted biomass or medicine usage.

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1 A directive identifying cypermethrin as a priority substance was transposed in 2015. Cypermethrin no longer has a veterinary medicines marketing authorisation. Previously it had been used as a sea lice medicine.
The environmental standards are set at a level at which no effects would be expected. The standards incorporate a safety factor to account for any gaps in information on the “no effects concentration” for different groups of species. The standard for emamectin benzoate is currently being reviewed to ensure it takes account of the latest science and has the right safety factor applied.

We use the same approach to controlling discharges from other sectors and of other pollutants into the water environment.

9. The Committee is concerned that there appear to be very significant data and analysis gaps related to the discharge of medicines and chemicals into the environment, including analysis of cumulative or additive effects. This requires to be addressed. The Committee has seen little evidence of proactive activity or action to systematically address the data gaps, either by the industry or the regulator (p. 182 of the ECCLR Committee’s report)

SEPA publishes the following information on Scotland’s Aquaculture website:

<table>
<thead>
<tr>
<th>Annual emissions data by farm</th>
<th>Quarterly data returns for each farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (from feed &amp; nets)</td>
<td>Maximum licenced fish biomass &amp; actual biomass</td>
</tr>
<tr>
<td>Zinc</td>
<td>Quantity of feed applied</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Mortalities (by weight)</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Quantities of any sea lice medicines used</td>
</tr>
<tr>
<td>Total organic carbon</td>
<td>Results of sea bed surveys (including emamectin benzoate levels in sediments if applicable)</td>
</tr>
</tbody>
</table>

We also hold information on the amount of anti-microbials and the volume of hydrogen peroxide used per farm. This information is currently only available on request. We are exploring ways of making sure this information is also as visible as possible to the public.
Depositional zone regulation

1. The advantages and disadvantages SEPA envisages are associated with this approach

The DZR proposals constitute a fairly minor change to one aspect of the regulation of marine cage fish farming. They were developed during 2016 and brought together into a consultation paper during the first half of 2017.

During the same period, we also initiated work to develop a sector plan for fish farming. Thinking on this plan has evolved considerably since the DZR consultation was issued. We intend to publish the plan in the summer. It will encompass a broad range of integrated and innovative regulatory and non-regulatory initiatives.

The basic principles and goals of DZR will be included among these, although the detail of some of the proposals will change to take account of consultees’ views and to ensure they complement the sector plan’s overall approach.

Advantages envisaged

The key advantages and primary drivers for changing the current approach to regulating deposition are:
(a) increased environmental protection through enhanced environmental monitoring and modelling; and
(b) the removal of potential disincentives to investment in farms in exposed and more remote locations with strong tides, where:
   (i) waste impacts on the sea bed will normally be much less severe than elsewhere; and
   (ii) the risks of disease and, hence, medicine usage, are also likely to be lower.

The removal of the disincentives will make it more attractive for fish farm businesses to consider re-locating to, and consolidating production at, sites that have the greatest capacity to cope with farm wastes. It will also help work with operators to plan licence revocations for sites in the most unsustainable locations in terms of environmental risks and disease issues.

The use of remote, exposed locations requires significant investment in cage infrastructure. Removal of the previous 2,500 tonne maximum biomass limit allows the potential for large scale farms that could attract the necessary investment in infrastructure and innovation.

Up to now, the 2,500 tonne cap reflected the appropriate level of precaution given the degree of uncertainty in risk assessments for large farms with the then available modelling techniques. The revised version of the depositional model coupled with hydrodynamic modelling and more extensive monitoring provide us with the necessary confidence to remove the cap.

Disadvantages envisaged

The proposals are designed to deliver increased protection of the environment through enhanced modelling and monitoring. We do not envisage disadvantages from this.
We received 144 responses to the DZR consultation. There were opposing views on some of the details of the proposals. We are considering all the points raised as we finalise how the revised approach is best implemented. The concerns raised are summarised in Annex 2.

2. The basis and development of the regulation (p. 139 of the ECCLR Committee’s report)

Basis

When determining applications for marine cage fish farms, we have a duty to assess the risk posed to the water environment. One of the risks posed is to the health of the sea bed as a result of the deposition on the sea floor of waste food, faeces and medicine residues. The DZR proposals represent an important but small change to how we assess and manage this risk.

The basis of the proposal is similar to the basis on which we operate currently: With the open-net fish cages that are used throughout the Scottish industry, some degree of pollution impact on the sea bed is likely at a large proportion of farm locations. The basis of our current approach is to:

a) allow waste deposition to cause impacts on the sea bed in the vicinity of the cages provided that:
   (i) the impacts do not compromise the condition of PMFs, SACs, MPAs or the wider marine ecosystem; and
   (ii) the intensity of the impacts does not become so severe that the ability of sea bed animals to break down the accumulated waste around the cages between production cycles is lost; and
b) prevent impacts occurring beyond the allowed zone of impact in vicinity of the cages.

DZR retains this basis for all sites but develops the implementation of the approach in the following principal ways:

a) the use of improved risk assessment techniques. These provide better assessments of risks in a wide range of locations, including exposed, deep water locations with strong tides; better assessments of risks from large biomass farms; better assessment of local and wide-scale effects; and
b) the use of more and better monitoring information to inform and adapt decisions; and
c) setting a limit to the permitted scale of local impact on the sea bed around marine cages. Previously, there was no limit on the size of impact footprint. Permitted footprints varied from farm to farm depending on farm size and site characteristics.

Development

The changes proposed under DZR are made possible by the adoption of improved modelling and monitoring. These significantly enhance our ability to assess the risk posed by proposed fish farm expansions.
The model we use to help assess the extent and intensity of impacts on the sea bed in the zone around fish farm cages ("DEPOMOD") has recently been re-developed by an independent scientific institute, the Scottish Association of Marine Science. The new model provides much better predictions of sea bed impacts across a wide variety of sea environments. At the same time, the ability to identify a risk of wider, cumulative effects on the sea bed beyond this zone has been considerably improved through the use of hydrodynamic modelling techniques. These latter models are able to take account of the effects of tides and wind on the dispersal of waste material over long distances from farms.

It is our normal practice to improve the way we assesses environmental risk as scientific understanding advances and new assessment techniques become available.

3. The scientific evidence supporting the regulation, including any assumptions made (p. 138 of the ECCLR Committee’s report)

The science behind DZR is embedded in improvements in the performance of our environmental modelling capability backed up by enhanced environmental monitoring.

Modelling is important, not least because it is impossible to monitor everything, everywhere, all of the time. Models are used routinely by regulators to help assess a wide range of environmental risks. They provide an invaluable means of synthesising and interpreting all the available environmental information to enable us to:

(a) make an overall assessment of the condition of the environment;
(b) predict the likely effects on that condition of development proposals and other changes that increase or reduce pressure;
(c) better target environmental monitoring programmes.

Modelling involves simplifications and assumptions. Its purpose is to capture the main environmental processes that determine if and where impacts are likely to occur. The validity of the simplifications and assumptions in the models are tested by comparing model predications with environmental monitoring results. This testing tells us how much potential error and hence uncertainty there is in the predictions. Knowing this allows us to apply the appropriate level of precaution when using model results to inform our decisions about development proposals.

During the last two summers, we have undertaken monitoring surveys to understand the scale of impacts at a range of existing farms, in various hydrographic environments. These surveys have enabled us to test the new modelling and monitoring framework.

Weaknesses in the old model for predicting waste deposition were identified by comparing predictions with monitoring results. The performance of the new model will be continually refined through testing its predictions against the monitoring information collected as part of DZR.
4. The peer review process for the DZR (p. 110 of the ECCLR Committee’s report)

We have not had, or sought, a peer review of the DZR proposals. The DZR proposals are principally about changes to the way we regulate. We only subject proposed changes to the scientific basis for things like environmental standards to peer review. For example, proposals for revised environmental standards for the medicine, emamectin benzoate, will be subject to scientific peer review. We normally consult the public on any significant changes to regulatory policies.

The models that we use for risk assessment include:
(a) an updated depositional model for assessing the risk of deposition in the vicinity of the cages;
(b) hydrodynamic models for assessing the risk of effects from any transport of waste into the wider ecosystem.

These incorporate independent scientific understanding and expert knowledge.

The previous depositional model has been in use for many years. It was peer reviewed and validated using environmental monitoring results at a selection of fish farm sites. The development of the new model involved considerable technical input from a wide range of marine specialist. It incorporates updated scientific understanding and an improved representation of sea bed processes affecting the erosion and re-suspension of material.

The development of the new model was led by Marine Scotland and undertaken by the Scottish Association of Marine Science. SEPA modelling specialists were closely involved in scoping the project.

The model has been tested by SEPA. This testing has shown that the model can predict the intensity and area of impacts accurately when calibrated using suitable sea bed data. Where such data are not available, it can also be used as a risk-screening tool by applying appropriately precautionary assumptions.

The predictions made by both types of models used for DZR will continue to be tested against environmental monitoring results. This testing ensures that the models’ performance is understood and refined over time.

5. How wider impacts (beyond deposition on the sea bed) are taken into account (p. 139 of the ECCLR Committee’s report)

We assess the risk posed by the releases of pollutants from marine cage fish farm before granting authorisation.

For operational farms, we use a combination of operator self-monitoring and our own monitoring and investigative surveys to monitor for impacts both close to the farms and over a much wider scale.
The pollutants posing the most significant risks include fish farm medicine residues from in-feed treatments and from bath treatments; plant nutrients from waste food and faeces; and organic matter. The risk from other pollutants, such as copper used as anti-fouling, is low subject to the operator complying with good practice requirements on use.

<table>
<thead>
<tr>
<th>Bath treatments for sea lice infections (azamethiphos &amp; deltamethrin)(^2)</th>
<th>Prior to authorising discharges of bath treatment medicine residues, we undertake a risk assessment procedure. The medicines are released into the water column (azamethiphos in solution and deltamethrin frequently associated with suspended particles) and they are dispersed by currents and tidal movements. We use modelling to take account of the effects of dispersion. The models consider the rate of application and the half-lives of the medicines in the environment. To assess risk, we compare the predicted concentrations in the environment with environmental standards designed to protect the most sensitive aquatic wildlife. We require operational farms to provide us with quality assured monitoring data and we undertake our own investigative monitoring surveys of the condition of sea bed life and of medicine concentrations to check that concentrations in the environment are being maintained at safe levels. An investigative survey on azamethiphos is programmed for this year.</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-feed treatments for sea lice (emamectin benzoate)</td>
<td>Prior to authorising discharges of emamectin benzoate from marine cage fish farms, we undertake a risk assessment procedure. Emamectin benzoate is released in uneaten medicated food and through excretion from treated fish, mainly in faeces. As a result, its dispersion and deposition follow that of these wastes. Our assessments consequently use the same types of modelling and monitoring approaches that we use for waste deposition generally. The models differ primarily by inclusion of information on the likely rates of release of emamectin benzoate from the treated fish; and on the medicines half-life in the environment. The updated deposition model and hydrodynamic models used for DZR will also be used for all proposals to discharge emamectin benzoate. To decide if there is a risk to the environment, we compare the concentrations predicted in the environment with environmental standards. These standards are currently under review. Among other things, the review will confirm whether uncertainties in risk are being reflected through use of an appropriate safety factor. During the review, we have modified our risk assessment procedure to add extra precaution in relation to SACs, MPAs and PMFs.</td>
</tr>
<tr>
<td>Nutrients in waste (dissolved inorganic nitrogen)</td>
<td>Prior to authorising discharges of the nutrient, nitrogen, from marine cage fish farms, we undertake a risk assessment procedure using the locational guidelines published by Marine Scotland. The procedure predicts the likely effect of increased biomass on nutrient concentrations and then compares the prediction with environmental standards. The standards are set out in the Scotland River Basin District (Standards) Directions 2014. As the industry expands production, we will be increasingly using more detailed hydrodynamic modelling to improve the assessment of cumulative risk. We also carry out monitoring programmes to assess the status of coastal waters, including their nutrient status. The results of these programmes are published on our classification hub.</td>
</tr>
</tbody>
</table>

\(^2\) Hydrogen peroxide is also used as a bath treatment. It is a very short-lived in the environment, being highly reactive. The UK Veterinary Medicines publishes information on its website about products containing hydrogen peroxide (Paramove - Vm 31011/4000 and ASPERIX Vet - Vm 47367/4000) and how they should be administered. We are currently reviewing whether current practice on the use of hydrogen peroxide remains sufficient to ensure the risks posed to the water environment are minimal.
6. **Stakeholder engagement in development of the DZR (including how views were taken into account)** *(p. 139 of the ECCLR Committee’s report)*

The principles behind the DZR proposals were developed during 2016 and then incorporated into a package of proposals for consultation.

During 2016, SEPA discussed its thinking on the regulation of waste emissions from farms and the developing ideas for DZR with aquaculture trade associations; individual fish farm businesses; Marine Scotland; SNH; local authorities; other Scottish public bodies; environmental non-government organisations; shellfish farm businesses; and regulators from other major salmon producing countries. There were at least 24 meetings involving such discussions. More than half of these meetings included representatives from the sector.

The **consultation** on the proposals was launched on 26 June 2017. We received 144 responses. These have been analysed and the different views are being taken into account in finalising the details of the approach. Further information on the consultation responses can be found in Annex 2. Once we have finalised the details of our approach, we will publish information explaining how we have responded to the views and suggestions expressed in the responses.

7. **The Committee would welcome an explanation of the rational for the DZR approach being limited to expansions in exposed locations** *(p. 142 of the ECCLR Committee’s report)*

The core element of the DZR package of proposals is the introduction of improvements to the way we assess the environmental capacity of different locations in the marine environment to accommodate a proposed new farm or a proposed expansion to an existing farm.

The improved risk assessment process will be applied to all proposals for new farms and expansions to existing farms, irrespective of location.

We already risk assess all such proposals to enable us to prevent deterioration of the biodiversity of marine ecosystems and the condition of MPAs, SACs and PMFs. The improved capabilities of the new risk assessment system will allow some of the precaution (e.g. the 2,500 tonne maximum biomass limit) in the current system to be appropriately reduced. That precaution had been incorporated to account for gaps in understanding but was producing the perverse effect of creating disincentives for farms to locate where the environment is best able to accommodate them.

The DZR proposals are of less relevance to farms that are not planning to expand or re-locate. DZR will involve increased sea bed monitoring around cages, at least in the initial period of a farm’s operation under the system. The purpose of this is to confirm the extent and severity of impacts in the vicinity of the cages to help validate the risk assessment models and improve the evidence base for an adaptive approach to managing risk.
In some circumstances, we may also need additional monitoring information from existing farms, for example, to improve assessments of cumulative risk. Where this is the case, we will apply DZR monitoring to the relevant existing sites.

8. The Committee understands the volume of waste (and untreated waste) discharged from fish farms into the marine environment is half the volume of human (treated) effluent of Scotland. This would not be acceptable in any other sector and the Committee questions why this has been allowed to happen in the development and expansion of the salmon farming industry (p. 143 of the ECCLR Committee’s report)

We regulate waste emissions from all marine cage farms in a way designed to prevent damage to the marine environment beyond a permitted footprint of impact on the sea floor around the cages.

We do this by setting limits on fish biomass and on medicine usage. The limits are calculated with the aim of ensuring that concentrations of pollutants beyond the permitted zone of impact do not exceed levels at which damage to biodiversity could result. These safe levels are defined by environmental standards. We use a combination of monitoring data provided by operators and the results of our own monitoring and investigative surveys to check that the standards are being met.

Where we find failures of standards, we take appropriate action to secure the protection of the marine environment. This action may include reducing the permitted biomass or medicine usage.

We also tightly control the severity of impact on the sea bed in the permitted zone of impact around the cages and we do not permit such zones if they would be likely to compromise the conservation objectives of any MPA, SAC or PMF.

The way we control risks beyond the permitted zone of impact on the sea bed is the same as the way we control the risk posed by other discharges, including urban waste water discharges. The difference between the regulation of fish farms and urban waste water discharge relates to the permitted zone of impact. There is no direct equivalent for urban waste water discharges beyond an initial mixing zone of the waste effluent. This is because sewage solids are settled out as sludge prior to discharge.

We want to see the sector progressively reduce the extent of the zone of impact on the sea bed around fish farms. Our DZR proposals remove disincentives to locating farms in exposed, dispersive environments where current speeds significantly reduce accumulation of waste on the sea bed.

In other areas of the sea, we expect the industry to transition away from open-net cages, either by re-locating production to exposed, dispersive locations or by starting to replace open-net systems with circular economy solutions as technologies able to capture a significant proportion of farm wastes become increasingly available. The extent of transition to new farming systems versus optimisation of farm locations will depend in part on finding ways to manage captured wastes that do not create greater risks to the environment overall.
We are currently contributing to a project investigating options for utilising wastes. This mirrors the approach to urban waste water, where we are jointly exploring with Scottish Water how to maximise the value from sewage waste.

**Further information on the development and implementation of a Scottish containment standard**

Containment is important to reduce the risk of escapes of farmed fish breeding, or otherwise interfering, with wild stocks. We provided some advice during the development of the [Scottish containment standard](#). We have not played a role in its implementation and Scottish Government leads on this.

Good containment infrastructure is going to be particularly important for large farms operating in exposed locations. We would like to see further work to ensure that the standards are suitable and implemented.
## Annex 2: Concerns raised by consultees on the DZR proposals

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Main disadvantages suggested by consultees</th>
<th>SEPA comments about suggested disadvantages</th>
</tr>
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</table>
| **Principle of making it easier and more attractive for businesses to locate in exposed, deep waters with strong tides** | (a) landscape impact may be greater;  
(b) risk of infrastructure failure and fish escapes may be greater; and  
(c) increased challenges for safe working. | • landscape impacts will continue to be considered by the local planning authority;  
• **containment standards** will continue to be important and need to be appropriate to the risk. Farms locating in such areas will need to invest in suitably robust cage infrastructure. |
| **Removal of the current 2,500 tonne cap on maximum biomass** | (a) potential greater risk to wild fish from sea lice;  
(b) increased cumulative risk from such expansion | • other elements of the proposal mean that, in practice, large farms would be limited to more exposed locations where the risk of infection with sea lice and other diseases can be less;  
• irrespective of this proposal, a separate package of measures are needed to appropriately protect wild salmonids;  
• cumulative risks will continue to be assessed and the way this is done will be improved as part of the proposals |
| **Allow up to a 10% increase in biomass per production cycle without re-modelling if sea bed monitoring results good** | (a) larger increases should be allowed if shown to be acceptable;  
(b) concern that operator would have more scope to take risks and breach environmental standards | • The use of monitoring results in adaptive management of environmental risks is important for effective regulation. We are reviewing how best to implement an adaptive approach, taking account of other changes to the content of licences aimed at making them simpler for businesses to understand. |
| **Responsibility for sea bed monitoring**  
Consultation proposed SEPA would take on all monitoring of the deposition zone around the cages rather than fish farm operators | (a) uncertainty of the capacity of SEPA to undertake such a programme of monitoring  
(b) concern about risk to biosecurity from survey equipment being moved between farms | • We are reviewing whether a different balance between self-monitoring and SEPA monitoring would be appropriate. However, the core proposal for more and better monitoring will not change. |
<table>
<thead>
<tr>
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<th>SEPA comments about suggested disadvantages</th>
</tr>
</thead>
</table>
| Breaches of sea bed standards to result in a break in production until the sea bed has sufficiently recovered | (a) economic risk to businesses if forced to stop production whilst sea bed recovers | • As a result of the proposed improvements to monitoring and modelling, we expect the numbers of breaches of sea bed standards to reduce.  
• We are reviewing whether a break in production would be necessary in all cases. |
| Proposal to set a maximum area of 50 hectares of sea bed in the vicinity of the cages in which adverse impacts would be permitted, subject to consideration of cumulative effects; risks to SACs, PMFs and SACs; and the interests of other users of the marine environment. There is no maximum limit in the present system | (a) 50 hectare threshold too small to enable industry to grow  
(b) 50 hectare threshold bigger than most currently permitted zones of impact. The footprint allowed should be reducing not increasing. | • Overtime and in parallel with industry growth, we do want to see a progressive reduction in the footprint of impact on the sea bed around marine cages. This will require investment in locations where waste is less likely to accumulate on the sea bed and in farming systems that can capture a significant proportion of the wastes as part of a circular economy. This will requires a broad packages of measures beyond the DZR proposals.  
• We are considering what package of measures in our sector plan is most suitable for controlling and reducing the impact footprint of farms. |

END