

Salmon Interactions Working Group Report

Scottish Government Response

Ministerial Foreword

First and foremost a message of thanks is due to the Chair of the Salmon Interactions Working Group (SIWG), John Goodlad, for his dedication and to the entire SIWG membership for delivering over 40 recommendations to the Scottish Government on a new interactions approach. It was during a period of ongoing global crisis in 2020 that the SIWG published its recommendations report and we commend the Group and its Chair for seeing this crucial piece of work across the line at a time of great difficulty when life was most certainly not as usual following EU exit and during the Covid-19 pandemic.

Both the fish farming industry and wild fisheries sector are of economic and social importance to Scotland. The 2017 [Analysis of the Value of Wild Fisheries in Scotland Report](#) found that the Scotland-wide economic impact assessment of wild fisheries (which included netting) indicated around £135m of angler expenditure, 4,300 full-time equivalent jobs and £79.9m Gross Value Added (GVA) in 2014. Aquaculture and its wider supply chain alone contributed £880m GVA and supported 11,700 jobs and livelihoods in Scotland in 2018.

The benefits of driving sustainable growth of Scottish aquaculture with due regard for the environment are many. They include contributing to sustainable global food production and security; economic recovery in Scotland where it (and our recreational fisheries sector) adds significant value to local supply chains; supporting livelihoods and much needed investment in communities across rural Scotland.

Significant, sustainable and inclusive growth can only be realised where environmental, social and economic interests are adequately addressed. That means growth must be within environmental limits and develop in a way which supports strategic biodiversity and environment aims. We must also ensure that Scotland meets its international obligations, including the NASCO [Williamsburg Resolution](#) of which the UK is a signatory and through which we are committed to minimising the impacts and risks presented by aquaculture to wild salmonids.

The Scottish Government considers the work of the SIWG as crucial to driving reform of the way we consider regulation of fish farms in Scotland and to help address pressures facing our iconic wild Atlantic salmon. It has to be born in mind that the reasons for the decline in wild salmon stock are wide-ranging and complex. Pressures have been categorised into 12 nominal high level pressure groups, including climate change (water quality and scarcity, water temperature), loss of trees/shade, man-made barriers to migration, exploitation (recreational fishing & commercial sea fisheries), predation, sea lice and disease, escapes and invasive non-native species (including signal crayfish in Scotland).

Alongside pressures on marine and river habitats, climate change seems to be a general driver of decline. Tackling those pressures requires cross-cutting actions across a number of policy areas, and there are clear connections to our Land Use, Biodiversity and Environment Strategies and Climate Change Plan.

Recognising the need for action to protect wild salmon, Scotland has a rigorous regime of statutory salmon conservation orders in place which are refreshed

annually. The Conservation of Salmon (Scotland) Regulations 2016 outlined for the first time a system under which the killing of Atlantic salmon in inland waters is managed on an annual basis by categorising the conservation status of their stocks. However, most rivers practice voluntary catch & release, with >90% of all caught salmon being returned to the river¹. The Regulations also prohibit the retention of salmon caught in coastal waters and in 2019, the Scottish Government determined that the prohibition on retaining salmon caught in coastal nets should remain in place.

The 2017/18 Scottish Parliamentary Inquiries into salmon farming shone a light on the opportunities for the sector, but also identified a significant number of challenges. The Inquiries' recommendations indicated that the status quo was not an option and the Scottish Government committed to moving beyond the status quo. This response sets out the actions which we will take to address the jointly agreed SIWG recommendations.

We are committed to going further still. In August 2021 we launched an [independent review](#) of the current regulatory processes involved in fish farming to ensure that the regulatory regime is efficient, effective and transparent, and to seek recommendations on work to reform the current regulatory framework. That review is essential to securing the sector's future prosperity and sustainability, however, it does not mean that we will pause progress on the known issues.

Environment, climate change and biodiversity challenges have never been more acute. Later this year, Scotland will take its place on the world stage and host the United Nations Climate Summit COP26 in Glasgow. The Scottish Government has reached a ground-breaking agreement with the Scottish Green Party that meets the challenges and opportunities of our time. The [Shared Policy Programme](#) includes an ambitious aquaculture agreement and commits to a step change in how we manage the marine environment. We committed to beginning an immediate programme of work to better protect wildlife and the environment, including publication of this response, consultation on an adaptive spatially-based risk assessment framework and strengthened controls on sea lice and escapes in the course of 2021/22.

To meet our commitments;

- The Scottish Environment Protection Agency (SEPA) will become the lead body responsible for managing the risk to wild salmonids from sea lice from fish farms.
- SEPA will consult on proposals for an adaptive spatially-based risk assessment framework for managing sea lice interactions between farmed and wild salmonids, which will be applied through the Water Environment (Controlled Activities) (Scotland) Regulations 2011.
- We will take forward a programme of work to make fish farm containment measures and regulation more robust, including the introduction of penalties

¹ The proportion of the rod catch accounted for by catch and release has generally increased since 1994, when such information was first recorded. In 2020, 93% of the annual rod catch, and 99% of the spring rod catch, were released.

[Salmon fishery statistics: 2020 - gov.scot \(www.gov.scot\)](http://www.gov.scot)

for fish farm escapes with the ultimate aim of ring-fencing or redistributing this money to support wild salmonid conservation and research.

- A Wild Salmon Strategy will be published by the end of 2021 which will provide an overarching framework to tackle the pressures on wild salmon.

Future Vision

As we look ahead to economic recovery via our Blue Economy (supported by partners such as the Sustainable Aquaculture Innovation Centre), now more than ever it is crucial that we balance environmental, economic and social responsibilities. We acknowledge the Scottish farmed salmon sector's commitment to its responsibilities when considering further growth; this is demonstrated by their sustainability charter, *A Better Future For Us All*, which makes clear commitments across a range of areas including the environment.

It is now time for the Scottish Government and its agencies to set out its aspirations for the fish farming sector. In 2022, we will deliver a Scottish Government led aquaculture vision that places an enhanced emphasis on environmental protection and community benefits.

The SIWG report and our response is testament that all parties involved are committed to making improvements in key areas as highlighted by the Parliamentary Inquiries. Both sectors have shown their commitment to collaborative working, for example, through helping to progress the Atlantic Salmon Trust, Fisheries Management Scotland and Marine Scotland Science [West Coast Tracking Project](#), supported by funding from the Scottish Salmon Producers' Organisation (SSPO) and the launch of the [Wild Salmonid Support Fund](#), a 5-year programme administered by Foundation Scotland that will see £1.5 million invested by the SSPO to invest in projects which benefit wild salmon and sea trout stocks in Scotland.

That close working and collaboration must continue to ensure that Scotland reaches its full potential and is able to support both sectors, which equally rely on a shared marine and freshwater environment.



Mairi Gougeon, MSP
Cabinet Secretary for Rural Affairs and Islands



Mairi McAllan, MSP
Minister for Environment and Land Reform

Background

The Salmon Interactions Working Group was established to provide advice on the interactions between wild and farmed salmon.

The working group was independently chaired by John Goodlad and its membership included the aquaculture and wild fisheries sectors, Scottish Environment Link (SELINK), Marine Scotland, the Scottish Environment Protection Agency and NatureScot.

The group was tasked to;

- Consider the evidence coming from the Environment, Climate Change and Land Reform and Rural Economy and Connectivity Committee Inquiries (including the literature review undertaken by Scottish Association of Marine Science), and any other work, concerning the environmental impacts of salmon and trout farms on wild salmonids;
- Review current Scottish Government policy and advice governing wild/farmed salmon interactions including, but not limited to, sea lice, pathogens and escapes;
- Review the actions required to monitor and mitigate the impact of farmed salmon and trout on wild salmonids (including through Environmental Management Plans, or other future regulatory mechanisms) so that any impact is reduced in accordance with our international and domestic obligations;
- Make recommendations, including a delivery plan of agreed actions and timescales, for a future interactions approach, including the need for any further research; changes to the regulatory regime, including planning advice and environmental monitoring; and the potential use of 'adaptive management' techniques, including the management of risk;
- Look at the conclusions and any emerging recommendations from the Scottish Parliamentary Inquiries into farmed salmon in Scotland.

The Salmon Interactions Working Group published its recommendations in May 2020.

[The Salmon Interactions Working Group report](#) sets out over 40 recommendations on measures to address the interactions between farmed and wild fish sectors.

This paper sets out the Scottish Government's response to the recommendations.

1. Wild/farmed Salmonid Interactions Recommendations

1.1 Scotland's finfish aquaculture regulatory regime should be reformed to ensure that it is fit for purpose, comparable with the highest international and domestic regulatory standards and in line with the Scottish Regulators Strategic Code of Practice;

1.2 The reformed regulatory system should protect wild migratory salmonids, proactively seek to understand and address any negative impacts detected through monitoring of wild salmonids, be fully resourced and meet the tests of being robust, transparent, enforceable and enforced;

1.3 The Scottish Government should holistically assess and review the approach to sea lice treatment, including access to medicines and the use of controls in their use, to deliver an evidence-based approach to sea lice control, whilst ensuring the protection of the wider environment and wild and farmed fish health and welfare;

1.4 District Salmon Fishery Boards (DSFBs) should continue to be statutory consultees in the future regulatory regime. Where no DSFB is established a suitable alternative should be designated by Scottish Ministers where appropriate for the purpose of protecting wild salmonids;

1.5 In advance of the delivery of a reformed finfish aquaculture regulatory system, Marine Scotland should take an overarching role to ensure consistency with respect to managing interactions at the local level through the use of agreed standards for current, interim delivery of Environmental Management Plans;

1.6 A single lead body (with appropriate competence and capacity) should be assigned responsibility for regulating wild and farmed fish interactions and given appropriate powers for monitoring and enforcement;

1.7 The single lead body identified above, should be required to coordinate its activities with all regulatory bodies with responsibility for the range of pressures that wild salmonids face;

1.8 In managing the impact of aquaculture activities on the environment greater priority should be given to the protection of wild migratory salmonids balanced with more efficient protection of seabed and water quality in line with the Scottish Regulators Strategic Code of Practice;

1.9 The existing legislative framework is used, wherever possible to deliver the required changes relating to wild-farmed interactions. Any changes to primary or secondary legislation necessary to support these changes should be made at the earliest possible opportunity;

1.10 The appropriate scale for monitoring of impacts on wild fish is the farm management area or adjacent farm management areas in which sea lice connectivity modelling suggests that interactions with an existing area are likely. The farm management area is also the appropriate scale for local engagement and sharing of information;

1.11 The review of farm management areas being undertaken through Farmed Fish Health Framework is welcomed but should be informed by the recommendations of the SIWG;

1.12 For the purposes of wild-farmed interactions the farm management agreement / statement should be a mechanism for the collation and coordination of adaptive actions to address adverse impacts on wild salmonids identified in the farm management area, in collaboration with wild fisheries managers;

1.13 Local engagement mechanisms between finfish farmers and wild fishery managers should be established as a minimum, to engage in pre-application consultation, agree joint local management priorities and projects, act as a forum for information and data exchange, identify research priorities and request management action as appropriate;

1.14 For sites where best scientific evidence indicates that an existing site presents an adverse impact on wild salmonids:

- In the first instance, tighter regulatory standards should apply (see section 2 below);
- The consenting regime should be amended to enable efficient relocation of existing biomass to a suitable alternative location, within a spatial planning and area management framework

Scottish Government Response to Section 1; Wild/farmed Salmonid Interactions Recommendations

The Scottish Government is committed to the protection of wild salmonids and tackling the biodiversity crisis. Based on the international and domestic scientific evidence base available, there is a risk that sea lice from fish farm facilities negatively affect some populations of salmon and sea trout in areas of Scotland. The published science is summarised [here](#) by Marine Scotland. The Scottish Government welcomes the fact that the SIWG recognised the potential hazard that farmed salmonid aquaculture presents to wild salmonids.

We welcome these jointly agreed recommendations which ask for a step change in how the risk of sea lice transfer from farmed to wild fish is managed. We agree that the regulatory regime for the protection of wild salmonids should be robust, transparent, enforceable and enforced.

In 2019, as an interim measure, we delivered change at a local level by advising that Environmental Management Plans (EMPs) should be standard for any new consents for marine aquaculture where there is potential for sea lice interaction with wild fish.

The Scottish Environment Protection Agency (SEPA) has the powers to control any activity which directly or indirectly is likely to have a significant impact on the water environment. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 ("CAR") established controls over specified activities liable to cause significant adverse impacts on the water environment out to a distance of 3 nautical miles, with the aim of protecting and improving Scotland's water environment to a classification of good ecological status. Good ecological status of rivers and lochs is dependent on the condition of wild salmon populations in those water bodies and protection of the water environment must take account of the composition, abundance and age structure of freshwater fish fauna.

SEPA will become the lead body responsible for managing the risk to wild salmonids from sea lice emitted from fish farms in Scotland.

A Regulators Technical Working Group has been developing an adaptive spatially-based risk assessment framework to facilitate the management of sea lice interactions between wild and farmed fish. SEPA will take forward the further development of this framework, which will be applied through the CAR licencing regime. SEPA will take forward a public consultation exercise on these proposals by the end of the year and, following consultation analysis, it is intended that an inclusive implementation group would be formed to help plan and advise on the introduction of the new framework.

In line with our commitment to streamline the regulatory framework, it is our intention that local authorities would no longer be advised to include Environment Monitoring Plans as a planning condition and instead, SEPA will become responsible for regulating these environmental interactions. The transition will be managed by the implementation group. This change, in addition to the earlier transfer of responsibility of wellboat discharges from Marine Scotland to SEPA, will ensure efficiency and

provide clarity within the regulatory framework with regards to the management of these environmental impacts.

It is intended that development proposals involving increases in the numbers of fish farmed, including applications for new farms or expansion of existing farms, will be assessed using the new spatially-based risk assessment framework as part of the CAR licence determination process and, where there is the potential for interaction, subject to conditions appropriately limiting their contribution to lice loads in coastal waters. Reporting requirements to inform assessments of cumulative risk from proposed and existing developments will apply to existing fish farms through their CAR licence. Further development of the framework, consultation and the framework's final application (including the applicable CAR conditions) will be a regulatory matter for SEPA.

It is important to highlight the adaptive nature of the framework which will be responsive to action by finfish producers, including mitigation built into development proposals; action to reduce lice numbers at existing farms and investing in detailed locally calibrated lice dispersion models. The framework will also respond to the growing evidence base, for example where tracking studies provide local insights on differences in the timing and duration of the smolt migration through identified bottlenecks.

We agree that local engagement mechanisms between finfish farmers and wild fishery managers should be established as a minimum, to facilitate pre-application consultation, agree joint local management priorities and projects, act as a forum for information and data exchange, and identify research priorities and request management action as appropriate.

Crown Estate Scotland is currently reviewing its aquaculture leasing arrangements. Part of this review is the consideration of best practice relating to farm management area agreement participation, a process which is being informed by SIWG recommendations. We expect Crown Estate Scotland to produce a set of recommendations by the end of the year.

Local decision making and debate is a Scottish Government priority. The contribution and local knowledge District Salmon Fishery Boards provide as a statutory consultee in planning determinations is valued. Effective governance and constructive debate is essential within the consenting framework, including through the established CAR consultation and assessment procedure.

The SIWG recommends that the consenting regime should be amended to enable efficient relocation of existing biomass to a suitable alternative location, within a spatial planning and area management framework. SEPA's approach to pre-application is increasingly providing spatial planning advice to operators. By regulating all emissions (including sea lice) to coastal waters from farms, SEPA will be able to provide operators wishing to re-locate with comprehensive upfront advice on whether potential new locations are likely to have sufficient environmental capacity to sustainably accommodate the type of development being sought. This will include consideration of priority marine features using the mapping information already available. The remit of the [independent regulatory review](#) of the processes involved in fish farming asks that efficiency, effectiveness and transparency of the

current regulatory framework is considered, and that it is done so in line with our ambitions on local governance and a vibrant, inclusive democracy. We stand ready to consider any recommendations made by Professor Russel Griggs at the end of the year.

The Farmed Fish Health Framework is currently considering access to, and control of, treatments and medicines including those used in the control of sea lice and will consider this in the context of a holistic approach to sea lice control.

2. Licensing and Enforcement Recommendations

2.1 Robust conditions, based on an adaptive management approach, to safeguard wild salmonids should be contained within a licence rather than through planning consent;

2.2 The licence should contain conditions relating to:

- Requirement for undertaking, recording and reporting of a weekly sea louse count;
- Trigger levels for sea lice intervention action specific to the farm management area (to be reviewed subject to adaptive management);
- Requirement to monitor lice levels in the environment and assess impacts on wild salmonids;
- Requirement to report on the results of such monitoring;
- Requirement to contribute to research to understand the migratory distributions of wild salmonids within the West Coast and Northern Isles context;
- The actions that are required to be taken where monitoring demonstrates adverse impacts on wild salmonids and the timeframe in which demonstrable actions should be successfully delivered;
- Requirement for the farm to be party to a farm management agreement for the farm management area;
- Monitoring for the presence of escaped farmed fish from freshwater open pen farms;
- Requirement for 100% of farmed fish to be retained in all production facilities;
- Minimum technical standards for prevention of escapes of farmed fish;
- Requirement for an Escape Mitigation plan to be in place prior to stocking;
- Notification to all relevant authorities, including to the local DSFB, of escapes or suspected escapes to be made within 24 hours of knowledge of the incident;
- Requirement for recording and reporting of escapes of farmed fish; and,
- Requirement to undertake an end of farm cycle review which informs the next production cycle process.

2.3 Scottish Ministers should direct all relevant statutory bodies to discharge their duties such that they fully take into account the health and welfare of wild salmonids and of farmed fish.

2.4 As a priority, the consenting of new developments should be managed within an adaptive spatial planning model which is risk based, of suitable resolution, underpinned by best available scientific evidence, and takes into account the cumulative effect of management practices of existing developments and impacts on wild salmonid fish;

2.5 The SIWG recommends that the Technical Working Group should ensure that these principles are embedded in the spatial planning framework for sea lice which is due for public consultation;

2.6 An enforcement policy should be published, informed by existing controls, to include specific penalties and sanctions for breaching conditions but incorporating some flexibility to respond to specific local conditions;

2.7 Appropriate fines, proportionate to the incident and scale of the escape, should apply to escapes of fish;

2.8 Where direct costs or nuisance resulting from an escape of farmed fish can be demonstrated there should be a legal requirement on the farm operator to fully compensate those costs;

2.9 Enforcement sanctions relating to sea lice and escapes, including the use of fixed and variable monetary penalties, should have a mechanism to allow monies to be invested into wild salmonid conservation work. Alternatively, this could be informed by the approach taken in Norway through OURO².

Scottish Government Response to Section 2: Licensing and Enforcement Recommendations

We agree that robust conditions, based on an adaptive management approach, to safeguard wild salmonids should be contained within a licence rather than through planning consent and that the relevant licence conditions should apply to existing, as well as new, fish farms.

We agree that, as a priority, the consenting of new developments should be managed through the application of an adaptive spatially-based risk assessment tool, underpinned by the best scientific evidence available and which takes into account the cumulative effect of management practices of existing developments and potential impacts on wild salmon.

SEPA will shortly consult on an adaptive spatially-based risk assessment framework which will be applied through the Water Environment (Controlled Activities) (Scotland) Regulations 2011 [See Response to Section 1; Wild/farmed Salmonid Interactions Recommendations].

Escapes

The Scottish Government and Scottish Green Party shared policy programme commits us to strengthening controls on sea lice, wrasse and escapes in the course of 2021/22.

² In 2015, a new set of rules came into force in Norway to regulate the collective responsibility for recapturing farmed fish that have escaped and ended up in rivers. On the basis of the new rules, OURO, an organisation tasked with removing escapee farmed fish from bodies of water, was formed in the same year. OURO is financed by the industry and involvement is compulsory for farmers.

Escaped farmed fish are in no one's interest. Escaped fish can impact wild salmon populations, result in production loss, economic loss and are detrimental to farmed fish health and welfare.

The UK is a signatory of the North Atlantic Salmon Conservation Organisation's ['Williamsburg resolution'](#). Scottish Ministers are committed to the implementation of this international obligation, minimising the escape of farmed fish and supporting farmers to achieve a goal of 100% containment in production facilities. We are all working together towards this collective aim and recognise the challenges faced by fish farms which can lead to escapes including, but not limited to, extreme weather events and seals.

We commit to further strengthening the regulatory framework which applies to containment and escapes. We will take forward a programme of work to consider how best to achieve this, including how to introduce proportionate penalties for fish farm escapes with the ultimate aim of ring-fencing or redistributing this money to support wild salmonid conservation and research.

Currently, Scottish finfish farms are required to have satisfactory measures in place for the containment of fish as required by the Aquaculture and Fisheries (Scotland) Act 2007 enforced by Scottish Government's Fish Health Inspectorate. This current policy framework already achieves some of the SIWG aims, including reporting, recording and escape and containment plans.

We recently published the [Aquaculture Code of Practice: Containment of and Prevention of Escape of Fish on Fish Farms](#) which aims to address the impact of marine mammal interactions upon containment and escape of fish at fish farms.

Together with the fish farming sector we are revising the Technical Standard for Scottish Finfish Aquaculture (published 2015) which will take account of climate change and higher energy sites to further improve containment at Scottish fish farm sites. We will publish the updated Technical Standard for Scottish Finfish Aquaculture by the end of the year.

We note SIWG calls for one lead body to take responsibility for interactions and that conditions and enforcement should be achieved through a licensing regime. We will consider this in forming our policy options, including how the Technical Standard for Scottish Finfish Aquaculture would fit within or alongside any enforcement regime.

We will use learning from what works well in other aquaculture jurisdictions and consider how fish farm operators can take financial responsibility for the impact of escapes in a way that is fair and proportionate.

3. Farmed and Wild Salmonid Data Recommendations

3.1 The SIWG recommends that the system for collection and reporting of catch data should be reviewed;

3.2 The SIWG recommends that Scottish Ministers invest in the appropriate infrastructure to collect and report catch and associated data, which maintains, as far as possible, the continuity of data since 1952, whilst allowing catch data to be reported in as close to real time as possible;

3.3 The wild and farmed sectors should publish the following historical data:

- Results of wild fish monitoring including lice count data or observations on lice burden;
- Number of farmed fish per farm;
- Number of lice per farmed fish;
- Counts from fish counters, relevant electrofishing data and any other relevant catch assessment data operating on local rivers; and,
- Wild salmon and sea trout catch statistics and catch effort data

3.4 The wild and farmed sectors, working collectively will provide a comprehensive package of data which should be placed on a mandatory footing and should include all data currently available on Scotland's Aquaculture website in addition to;

- Results of wild fish monitoring including lice count data or observations on lice burden;
- Farm management area sea lice load;
- Number of farmed fish per farm;
- Number of adult female lice and gravid female lice per farmed fish;
- Medicinal and physical treatments undertaken;
- Water temperature and salinity;
- Counts from fish counters, electrofishing data and any other catch assessment data operating on local rivers;
- Scottish Government assessments of wild fish conservation status (adult and juvenile fish); and,
- Official wild salmon and sea trout catch statistics and catch effort data.

Scottish Government Response to Section 3; Farmed and Wild Salmonid Data Recommendations

The Scottish Government has a statutory responsibility to collect and publish salmon catch data submitted from local fisheries occupiers. We acknowledge the importance of applying accurate catch and associated data and have previously published an assessment of the value of rod catch data. A key next step is to increase the availability of salmon count data, together with monitoring biological characteristics of adult salmon, to augment assessments of salmon stock status under the Salmon Conservation Regulations process. The potential value of fishing effort data is also under consideration.

As a priority, we have invested over £0.65m in extending salmon counter infrastructure this year and plan to make further additions over a four-year programme of works to bring it to a level compatible with most other countries involved in management of wild salmon through the International Council for the Exploration of the Seas (ICES), reporting to the North Atlantic Salmon Conservation Organisation (NASCO). This project will generate a strategic network of counters to provide balanced geographic coverage throughout Scotland. Data from these additional counters will refine the relationship between rod catches and the abundance of salmon improving the assessments of the conservation status of salmon stocks which are used to regulate fisheries.

We will also continue to invest in the National Electrofishing Programme for Scotland (NEPS), which provides detailed local information on juvenile salmon stocks in the aquaculture regions and elsewhere within a robust structured framework and underpins continuation of the National Introgression Programme for Scotland. The combination of salmon assessments from juvenile and adult data provides the foundation for evaluating vulnerability of populations to impacts of pressures, including aquaculture. We have invested in excess of £1m this year in salmon assessment work, including adult salmon sampling and NEPS (supported also by Crown Estate Scotland), to deliver outputs in collaboration with Fisheries Management Scotland and the Fisheries Trust and Board network.

The Scottish Government is unable to direct wild and farmed salmon interests to publish historical data. The wild and farmed salmon sectors should consider how to deliver this recommendation together and make a public commitment to the publication of the information. We will consider how we could assist with the publication of historic information.

We are absolutely committed to open and transparent regulation and making data available to the public and other users of the marine environment.

Scotland's Aquaculture Website currently hosts information on;

- fish farm site details and location;
- CAR licence conditions;
- environmental monitoring surveys;
- biotoxin and phytoplankton monitoring (shellfish);
- escapes;

- annual emissions;
- Crown Estate Scotland lease details;
- In-feed and bath sea lice treatments;
- fish farm monthly biomass; and
- sea lice data

We will continue to contribute funds to the Scotland's Aquaculture Website improvement programme, led by SEPA.

SEPA is committed to the continued publication of information collected through the CAR licence regime, including any additional information relating to sea lice collected as the CAR regime adapts.

We commit to focussing on data requirements within the proposed Wild Salmon Strategy which will seek to bring together information that will lead to a better understanding of the geographical variation in pressures and opportunities action as identified by the SIWG in collaboration with stakeholders, including the District Salmon Fisheries Boards and Trusts. We are currently working on plans to develop a public-facing salmon catch database.

Alongside the consideration of data requirements in the Wild Salmon Strategy, we will organise a meeting of the regulators which would be involved in making some elements of such a list at 3.4 mandatory and we will provide an update to the SIWG membership on our consideration of this recommendation in the first half of 2022.

4. Farmed and Wild Salmonid Research Recommendations

4.1 Scottish Government should commit resources to review the research priorities identified in the Aquaculture Science and Research Strategy under the Ministerial Group for Sustainable Aquaculture and thereafter set out and commit to deliver a research strategy for wild salmonid research;

4.2 Following an independent peer review, the work undertaken by Marine Scotland Science in 2018 to determine the baseline for current levels of genetic introgression should be expedited for publication;

4.3 Efforts should be made to refine or develop genetic analysis tools to allow recent introgression arising from farmed fish escapes to be distinguished from any introgression arising from historic stocking activities;

4.4 A mechanism should be developed to secure access to biological information from past (if possible), current and future farmed strains, in a secure and safe manner to safeguard commercial and competitive interests, whilst delivering essential support to collaborative genetic monitoring and evaluation work;

4.5 The reforms to the regulatory system should encompass provisions to secure investment into addressing strategic research and innovation questions relating to farmed/wild salmonid interactions;

4.6 The SIWG acknowledges the importance of sea trout and recommends that further research is undertaken to understand sea and brown trout biology, the factors that influence anadromy in a population and the pressures affecting sea trout populations across Scotland including understanding the impact of sea lice and investigating whether any sea lice burdens are influenced by proximity to established farmed finfish sites.

Scottish Government Response to Section 4; Farmed and Wild Salmonid Research

Our freshwater fisheries and aquaculture scientists have progressively increased understanding of interactions between coastal aquaculture and wild salmonids.

Marine Scotland Science has now [published the first national assessment of genetic introgression in Scotland](#). The study shows that there is a risk to wild salmon from introgression of genes from farmed salmon that escape, but that it may be low outside the aquaculture regions even though escaped fish may disperse widely at sea. The study is a snap shot in time and the findings are in line with observations from similar studies in Norway.

As a result of SIWG's recommendations and the recently published evidence of introgression in Scotland associated with fish farming, we will take forward a programme of work to strengthen the containment and escapes regulatory regime [see response to 2].

Our scientists have conducted a long-term monitoring study of the populations of trout in the River Shielraig to assess impacts of sea lice and are currently finalising analyses of the data. Our scientists have already published analyses of the relationships between infestation of sea trout by sea lice and both stage of the farm cycle and distance from salmon farms including sites across the west coast of Scotland.

Methods developed initially for assessing salmon as part of the National Electrofishing Programme for Scotland will be adapted for assessing trout populations. This process will then facilitate an examination of pressures affecting trout across Scotland.

We are currently undertaking tracking studies to map distributions and migration paths of both sea trout and salmon from the Loch Torridon rivers. We have already reported on similar tracking studies of sea trout and salmon undertaken in Loch Linnhe. We are supporting a larger scale smolt tracking initiative, the West Coast Tracking Project, in collaboration with the Atlantic Salmon Trust and Fisheries Management Scotland and support from the SSPO, focussed on identifying migration behaviours of salmon but which may also record movements of sea trout tagged in other projects. Our scientists have generated lice dispersal models to understand movements and distribution of sea lice in relation to salmon farms and integrated best available data to understand how lice numbers on farms relate to likely consequences in terms of impacts on salmonid smolts.

We recognise that there remain challenges with assigning the resourcing required to fully deliver further research recommendations but as an organisation we are committed to improvement and will turn our attention to how these can be taken forward. We will consider how an enhanced containment regulatory framework might help us to deliver these recommendations. The Wild Salmon Strategy will identify and provide a mechanism for the coordination of wild salmonid research and we are committed to creating a vision and development strategy for Scotland's aquaculture

industry and as part of that process we will consider aquaculture research priorities and how they are delivered.

In line with SNP manifesto commitments, the Scottish Government and Scottish Green Party shared policy programme commits us to considering how the fish farming sector can contribute more to support communities, recreational fisheries, promote innovation and support services such as inspections and monitoring, including for the purposes of improving the scientific evidence base.

We agree with the SIWG recommendation which acknowledges the importance of sea trout and we commit to reconvening the Regulators Technical Working Group to discuss this issue.

5. Wild Salmonids Recommendations

5.1 Scottish Ministers should make salmonid conservation a national priority;

5.2 The wild salmon strategy announced in the Programme for Government should explicitly identify and address the range of hazards which wild salmonids (salmon and sea trout) face, and which can be managed. The strategy should direct efforts to move beyond the status quo across the range of hazards which wild salmon face. It should clearly define the role of public bodies and future licensing and regulatory decisions should be made in accordance with the strategy;

5.3 Scottish Ministers should champion the delivery of the wild salmon strategy and ensure that sufficient resources are available to ensure that the range of hazards which wild salmonids face are effectively addressed;

5.4 The SIWG recommends that the wild salmon strategy should urgently consider and recommend the introduction of mechanisms to ensure that riverine and riparian habitat improvements are built into changes to the rural payments system;

5.5 Scottish Ministers should review the potential to further protect salmon within the context of the salmon conservation regulatory framework, particularly in relation to handling fish during catch and release;

5.6 The SIWG recommend that the data available for conservation assessments is improved through investment in a strategic network of fish counters, improved information on fecundity and sex ratios, and the integration of juvenile data from the National Electrofishing Programme for Scotland into the conservation assessment process;

5.7 Scottish Ministers should establish a working group, as part of the process of delivering the wild salmon strategy to:

- Oversee the delivery of SIWG recommendations and coordinate with working groups established or to be established to oversee interactions with other sectors that may impact upon wild salmonids;
- Assess and review the performance of the reformed regulatory structure;
- Support local engagement structures and consider the results of local wild fish monitoring.

5.8 Scottish Ministers should, in recognition of the lack of resources for salmonid management and conservation in Scottish waters, urgently explore new means to improve investment in Scotland's rivers. Experience from other countries should be used to inform a reformed funding mechanism for fisheries management in Scotland, to deliver restoration and conservation programmes to support natural populations of wild salmon and sea trout;

5.9 Scottish Ministers should, in recognition of the significant resource required to manage wild-farmed interactions appropriately through joint working at a local level, urgently identify means to increase capacity within Fisheries Boards and Trusts in

the aquaculture zone and in particular establish an appropriate mechanism for undertaking this function in Orkney and Shetland.

Scottish Government Response to Section 5; Wild Salmonids

Wild salmonid conservation is a national priority.

The Scottish Government currently works with a dedicated Stakeholder Advisory Group to develop an ambitious Wild Salmon Strategy to support wild salmon conservation efforts. This advisory group is building on the previous and ongoing initiatives put in place to address the wide range of pressures impacting on wild salmon. The Scottish Government continues to refresh annually the [legislation](#) brought in in 2016 which guides the mandatory system of catch and release and has committed to continuing the ban on coastal netting.

Covering a range of areas including, for example, threats in rivers and at sea, research, governance and funding, the Wild Salmon Strategy will provide an overarching framework to bring the wide range of cross-cutting policies relevant for salmon conservation together.

It is envisaged that the Strategy will identify high level outcomes which are needed to achieve our vision to protect and enhance Scotland's wild salmon populations and to develop and boost the environmental, social and economic benefits arising from it.

A Strategy Advisory Group, comprising a range of stakeholders, was convened in the autumn of 2020 and has met on several occasions since. We aim to publish the Strategy later in 2021.

A prioritised action/delivery plan will be developed by a Wild Salmon Strategy Delivery Group following publication.

The plan will include actions relating to all of the recognised 12 high level pressures groups, including the commitments on farmed and wild fish interaction published here, and it is planned that the implementation of actions will be overseen by the dedicated Delivery Group.

The Wild Salmon Strategy will also identify and provide a mechanism for the coordination of wild salmonid research and conservation efforts.

Conclusion

The Parliamentary Inquiries into salmon farming in Scotland focussed on the environmental impact of this vital economic and food industry, drawing out some of the significant challenges, including the interaction with wild salmonids. The SIWG has demonstrated that both sectors are serious about addressing this matter, protecting the environment and delivering change, while also ensuring the sustainable development of Scotland's most important and valuable food producing sector. We welcome this.

Above all, the SIWG report and recommendations show that when partnership working between the farmed and wild fish sectors happens, it is an empowering process, ensuring all points of view are considered in order to effect positive change. Helpfully, it demonstrates that we all share an ambition to do all we can to conserve, protect and restore, if possible, Scotland's wild salmonid population.

We are committed to ongoing engagement with the SIWG membership and others in delivering our response to the recommendations in this report on sea lice and escapes, in addition to engagement with all parties interested in the aquaculture regulatory framework and through our regulatory review process, the first stage of which will report in December 2021.



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