Consultation Response

Salmon Scotland

Proposals for a risk-based framework for managing interaction between sea lice from marine finfish farm developments and wild Atlantic salmon in Scotland

Executive summary

Salmon Scotland is the trade body representing the Scottish salmon farming sector. Our response to SEPAs consultation represents the views of the entire sector, taken as a whole. Our full, detailed response follows this summary. It includes the following key points (provided in the order they appear within our response):

- From the outset, Salmon Scotland wish to state that we do not support the proposed framework and that we have significant concerns with the underpinning principles on which it is based.
- It is our firm belief that discussions relating to farm / wild interactions must now be transferred into the process recommended by Prof. Griggs and supported, in principle, by the Cabinet Secretary.
- We do not believe there is sufficient scientific evidence to support a claim that salmon farming is having a significant impact on wild salmon populations in Scotland, nor to quantify any impact.
- It is our view that sea lice may represent just one of a wide range of pressures on wild salmon, and that any risk assessment framework must consider the full range of pressures (locally and nationally, as relevant).
- We believe that the current framework places undue reliance on the proposed modelling framework and does not acknowledge areas of uncertainty, and their impact on the wider risk assessment process.
- We believe it is not possible to validate the proposed framework and that it is not acceptable to regulate a sector when the effectiveness of regulation cannot be determined.
- We believe the exclusion of sea trout and the lack of any scientific guidance from SEPA will lead to "double regulation" within the consenting regime.
- We believe SEPA have failed in their responsibility to consider the socio-economic impacts of the proposed framework, and we believe these impacts

to be extensive for the sector, the supply chain and for Scotland's rural and national economy.

- The salmon farming sector believe the introduction of the framework, as proposed, will result in a de facto moratorium on farm development on the west coast of Scotland and Western Isles.
- We believe that the introduction of the proposed framework does not align with the requirements of the Scottish Regulators' Strategic Code of Practice.
- The proposed framework will have significant negative impacts on farmed fish welfare, which do not appear to have been considered by SEPA.

In concluding, Salmon Scotland and the Scottish salmon farming sector do not support the current proposal for a sea lice risk assessment framework. We believe there are significant fundamental issues with the underpinning principles of the framework. We do not believe it is based on the most up to date science (including evidence of an impact on wild fish populations), that it will result in significant and unjustified impacts on our sector, and that the proposed controls are disproportionate and not representative of a truly risk-based approach.

The review of aquaculture consenting by Prof. Griggs outlines a clear framework for significantly improving the consenting regime for Scottish aquaculture. His recommendations have been accepted in principle by the Cabinet Secretary for Rural Affairs and Islands and the only logical way forward appears to be to divert any further discussion surrounding the hazard and potential risks posed by farmed salmon on wild salmonids (with any required mitigation) into the process proposed by Prof. Griggs.

Introduction

The Scottish Government and Green Party Shared Policy Programme (2021) made a commitment for a "*consultation on a spatially adaptive sea lice risk assessment framework for fish farms by the end of the year*". This commitment has been met by launch of the current consultation on 3rd Dec. 2021.

From the outset, Salmon Scotland wish to state that we do not support the proposed framework and that we have significant concerns with the underpinning principles on which it is based.

The salmon farming sector has engaged in numerous pre-consultation workshops on the proposed regulatory framework with both SEPA and Marine Scotland (MS) and we have repeatedly flagged significant concerns with the underpinning principles of the proposed framework as well as with aspects of its operational delivery. In reviewing the information provided in this public consultation, it is clear that our concerns remain, and we believe there are significant fundamental issues that require addressing. Furthermore, if implemented as proposed, we believe the framework will have significant, detrimental impacts on our members' businesses, on the wider supply chain, the communities in which we farm and on Scotland's national economy. All of this, when there is no evidence-led position on the level of risk salmon farming

poses to wild salmon populations or any clear way of assessing that risk, or the efficacy of the proposed regulatory framework.

The proposal for a spatially adaptive risk assessment framework was first presented to the sector, without warning, during early discussions of the Salmon Interactions Working Group (May 2019). At that stage the proposal was to provide a system that allowed new site developments to be assessed by local authorities for any impact on wild salmon in local rivers. It was to be science-based and properly constructed to support appropriate sustainable growth of the sector. The current proposal fails to meet these objectives, and it fails to acknowledge the significant developments the sector has made with sea lice management. Developments that have seen our aggregated sea lice average maintained at <0.5 adult females (combined gravid and non-gravid for the west coast and Western Isles) for the key months of April and May, over the last 5 years.

The Shared Policy Programme also included a commitment for "*an independent review to consider the effectiveness and efficiency of the current* [aquaculture consenting] *regime and make recommendations for further work*". Prof. Russel Griggs has now completed this review[1] and the Cabinet Secretary for Rural Affairs and Islands has accepted all recommendations in principle[2]. The review includes calls for a single consenting document and body, which oversees the entire consenting process, as well as recommendations around the use and improvement of science to inform decision making. It also recommends the formation of a Project Board to produce a 10-year framework for the aquaculture sector. Given this landmark review of aquaculture consenting in Scotland, which includes clear guidance on the way forward, and its acceptance in principle by the Cabinet Secretary, it seems thoroughly inappropriate to continue developing any new regulatory framework relating to farm consenting, without consideration of Prof. Griggs recommendations. Especially for the proposed sea lice risk assessment framework, which has fundamental challenges to overcome, and which will result in huge impacts for our sector and its value chain. Wild salmonid interactions are a hugely important, and in many instances pivotal, aspect of marine farm consenting. Given this, **it is our firm belief that discussions relating to farm / wild interactions must now be transferred into the process recommended by Prof. Griggs and supported, in principle, by the Cabinet Secretary** (noting Prof. Griggs' report also made it clear that "*Scottish Government sets regulatory policy and the frameworks that are created and others implement it*").

Our response considers the key fundamental principles of the proposed framework. We do not consider it appropriate to consider the fine detail of what has been proposed until the key (and in our opinion, flawed) principles are addressed.

We should note however, that many of the points made below are interconnected. One of the key issues we have with the proposed framework is that we do not believe it to be a balanced and proportionate way to manage the potential interaction between farmed and wild salmon. Although we cover this point in the specific sections of our response, the issue of proportionality is much larger and requires our entire response to be considered collectively.

Finally, where appropriate, we have referred to the relevant paragraph numbering included within the consultation document (in brackets).

Underpinning Science: Impact on wild salmon

We do not believe there is sufficient scientific evidence to support a claim that salmon farming is having a significant impact on wild salmon populations in Scotland, nor to quantify any impact.

The consultation makes bold statements that "*substantial impacts on the marine survival of wild Atlantic salmon from finfish farms have been demonstrated in Ireland and Norway*" and that it is "*clear from this work and the wider body of scientific evidence that sea lice from open net pen finfish farms in Scotland can pose a significant risk to wild salmon populations*".

Not only are these extremely bold statements but they are not substantiated by the scientific literature, the Irish position (at least) is being misrepresented, and they conflict not only with statements previously made by SEPA, and by the Scottish Government, but also with statements made within the consultation document itself.

In 2020, a SEPA official presented to the Rural Economy and Connectivity Committee and stated that sea lice from farmed fish were not responsible for the declines in wild fish that had been seen over the decades. Further, in the consultation document (6.3) it is stated that "*more information is needed to enable an assessment of whether the operation of existing farms is resulting in a hazard to wild salmon populations*". These statements are at conflict with a position that it is "clear" that farmed salmon can pose a "significant" impact to wild salmon populations.

SEPAs claim that substantial impacts have been demonstrated in Ireland is not supported by the relevant science. The studies assessing marine mortality due to sea lice were reported by Jackson et al. (2013)[3], who concluded that "*while sea lice-induced mortality on outwardly migrating smolts can be significant, it is a minor and irregular component of marine mortality in the stocks studied and is unlikely to be a significant factor influencing conservation status of salmon stocks".* To note, Jackson and his co-workers are Irish Government scientists.

Whilst Marine Scotland's Summary of Science relating to the impacts of salmon lice[4] does not provide all relevant studies in this field, it is notable in that it does not provide any clear position with regard to the actual population level impacts of farmed salmon on wild salmon populations. Indeed, this is not unsurprising. Despite 30+ years of research, and significant investment from public resources, there is still no numerical assessment of the population level impact (if any) of sea lice from farmed fish, on wild salmon populations.

In the United Stated, the National Oceanic and Atmospheric Administration (NOAA) has recently issued a biological opinion concluding that marine finfish farming in Puget Sound is "*not likely to jeopardise the continued existence of Chinook salmon, Steelhead [and] chum [salmon]…"* and is also "*not likely to result in the destruction or adverse modification of the designated critical habitats for any of the listed species*"[5].

Finally, the Aquaculture Stewardship Council (ASC) have recently undertaken a science-led review of their standards with regard to sea lice management. ASC have confirmed that they did not have a scientific justification to support their previous on-farm sea lice threshold and a Technical Group concluded there was no globally agreed "silver bullet" level for precautionary maximum lice levels on farms[6].

Taking all of this, and the wealth of science collectively, we do not believe there is a sound case that Scottish salmon farms are having a significant detrimental impact on wild salmon populations. We acknowledge, based on scientific theory and basic biological principles, that there is a potential hazard and that we must therefore have a balanced approach to considering that hazard at a local and national level. But we do not believe the precautionary approach proposed in the consultation is in any way proportionate.

Prof. Griggs, in his review of aquaculture consenting, states his view that Scottish Government sets policy. We would urge Scottish Government to clearly articulate its scientifically justified policy with regard to the risk posed by salmon farms to wild salmon populations. This will then allow a more informed discussion on this matter and further consideration of whether a sea lice risk framework is an appropriate regulatory tool.

Wider pressures on wild salmon

It is our view that sea lice may represent just one of a wide range of pressures on wild salmon, and that any risk assessment framework must consider the full range of pressures (locally and nationally, as relevant).

The Scottish Government has identified twelve high-level pressures affecting wild salmon populations[7]. These include "fish health", one component of which is sea lice, (noting that sea lice are not a high-level pressure in their own right). Scottish Government has also, recently, published its Wild Salmon Strategy[8].

Both documents articulate the fact that the pressures on wild salmon are numerous and vary significantly, both spatially and temporally throughout the salmon's life. When taking a proportionate approach to wild salmon conservation, it is neither appropriate nor acceptable to consider the risk posed by one pressure in isolation – this is what is being proposed by SEPA. Their proposed process does not balance the risk that may be posed by a farm development, with other pressures that may be far more significant on wild salmon populations, both locally and nationally.

By way of important context, in assessing the impact of coastal sea lice on wild salmon in Ireland, Jackson et al. (2013)[3] concluded that "*the level of sea lice-induced mortality is small as a proportion of the overall marine mortality rate*". Additionally, early results from the West Coast Tracking Project, of which Salmon Scotland are a funding partner, suggest that significant mortality can occur during the smolt migration in fresh water, prior to smolts reaching the ocean.

Any risk-based approach for wild salmon conservation must be more far reaching than the current proposal. It must acknowledge the diverse range of pressures on

wild salmon and include mechanisms for those to be included as part of the overall risk assessment.

Underpinning Science: modelling and science used within the framework

We believe that the current framework places undue reliance on the proposed modelling framework and does not acknowledge areas of uncertainty, and their impact on the wider risk assessment process.

The proposed framework relies on a complex lice dispersal model, that informs on the potential lice loads in defined wild salmon protection zones, with new farm developments assessed against a highly precautionary threshold of 0.7 lice per m^2.

Whilst the sector agrees with the use of models to support farm consenting and decision making, they should be used in exactly that manner – to support decision making. They should also only be used in regulatory decision making when they can properly be calibrated and validated with field data. At present, the proposed framework places undue reliance on the outcomes of modelling. These concerns are over and above any we have with regard to the detail of the model, which has not been provided in the consultation documentation and which appears to be the subject of a further consultation (1.6 / stakeholder engagement discussions).

Models provide predictions or estimations. There is no "right" answer from a model, rather choices and defensible decisions that lead to a level of confidence in model outcomes. At present, the outcomes of the proposed model lead directly to decisions around consenting without any further assessment of risk, proportionality or balance regarding other factors that may be relevant (other pressures on wild salmon, current and historical lice management, current and emerging lice management tools).

It is also extremely concerning that SEPA have opted to use significant components of a modelling framework developed for Norway, within a Scottish context. How can this be relevant for operation in Scotland? For example, a maximum sea lice threshold of 0.7 lice per m^2 is proposed within the salmon protection zones. This, figure, taken from Sandvik et al. (2020)[9], is a modelled figure, validated against field data collected within Norway. Aside from all the uncertainty within the modelling framework adopted and the fact that SEPA have chosen the most precautionary figures from Sandvik et al. (which equates to no increased risk or impact, noting our wider points about the proportionality), this threshold will only hold as reliable in Scotland if the exact same model architecture is used and if we make the very significant assumption that the principles that apply for Norwegian fjordic systems also apply for Scotland. It is noteworthy that all work relating to this threshold was undertaken in Hardangerfjord, a fjordic system renowned for containing the highest density of salmon and trout farms, globally, and for being atypical of Scottish loch systems.

The consultation document outlines some information on the proposed approach that companies will need to take regarding modelling, including an expectation for

companies to build their own hydrodynamic models (C.9). We will not make any detailed comments on the complexities of modelling, but instead refer SEPA to the consultation responses of individual salmon farming companies, as this is where modelling expertise resides. However, we do wish to note that ensuring alignment and consistency between models developed for different regions, sites and companies is a complex issue that will be required under the proposed framework. Such structure will ensure work packages can be appraised on a level-playing field. To establish such a framework it may be necessary to:

- Introduce a degree of standardisation by defining an accepted "standard" approach, including the hydrodynamics that are to be used to drive assessments.
- Undertake a centralised assessment of given areas compliance at defined intervals.

Forcing individual companies to develop models independently for the purpose of area classification will be unworkable for the sector and regulator alike. It is also noted that development of high-quality regional scale models for Scotland has taken many years and is still incomplete. The timescale of 1 year for implementation (8.4) will not be sufficient to develop and implement an appropriate modelling framework.

The proposed Scottish framework has similar objectives to that of the Norwegian Traffic Light System (NTS), although the NTS operates in a different way, setting area- rather than individual farm-based growth controls. The NTS has received considerable attention since its launch, including an ongoing legal challenge. A recent review of the scientific basis of the NTS has been completed by a group of internationally renowned academic experts[10]. Several of the key recommendations are relevant to the proposed Scottish framework. These were presented by the evaluation team, at a meeting with SEPA, Marine Scotland, FMS and the salmon and trout sectors on 1st Mar. 2022 (a recording of the meeting is available). Whilst we strongly advise SEPA to consider and take on board the findings of the review, we briefly cover some of the key findings, as relevant to Scotland, in the following paragraphs:

Dealing with uncertainty: Models inherently include uncertainty and as the complexity of a model increases, the level of uncertainty of the overall system multiplies. This in itself is not necessarily an issue but ensuring that uncertainty is properly characterised for each aspect of a model framework is vital, and it is also critical that the overall uncertainty of a model system is understood and informs how model outcomes are interpreted and used (i.e., informing the overall assessment of risk). The consultation document appears to acknowledge this (B.2) but then fails to provide a process by which uncertainty can be identified and how it will be handled in the wider framework. More concerning, however, is that despite what the consultation document states (B.2), the framework appears to use the outcomes of the model without any assessment of their reliability. The outputs appear to be taken as "fact" or as completely "accurate". This is not correct and represents a significant failing of the proposed system.

Incorporating expert judgement: The review of the NTS acknowledged the inclusion of expert judgement as a necessary part of the system. However, the review

criticised the lack of any explanation of how expert judgement had been used and justified, noting that there are recognised approaches for incorporating expert views. Expert judgement is inherent in the proposed Scottish system, and there is also a lack of any clear explanation and justification for the inclusion of expert judgement and no evidence of a formal, structured approach. These failings must be addressed. By way of examples, expert judgment seems to have been used in the below:

1. Wild salmon protection zones are narrow or constrained areas of sea that wild salmon post smolts have to pass through (4.2).
2. Salmon protection zones are identified taking account of advice from Marine Scotland and fisheries managers (4.2).
3. The protection zone for rivers entering the sea on open coastlines is arbitrarily set at 5km (A.8).

It is unacceptable to have significant aspects of the framework included through expert opinion, without any wider scientific scrutiny.

Knowledge inclusion: The review of the NTS recommended a clear framework for the inclusion or exclusion of sources of information and a more robust process associated with how knowledge is included within the framework. These are key requirements for any Scottish system and at present the sector is extremely concerned with the lack of any explanation as to how and why data sources and information have been included, and why others might not have been. It is critical that there is full transparency in decision making around this framework so that all stakeholders can be assured of objectivity in the process. At present, this is not the case. We would argue that the proposed system needs independent oversight, to ensure the most up to date and scientifically valid information is being used.

External validation: This subject warrants its own specific section, below.

Framing in an iterative framework: The Evaluation group identified that within the NTS there was no mechanism for assessing the effectiveness of actions nor any ongoing assessment of the framework assumptions or for informing expert judgment. They proposed an iterative framework to support such assessments.

This will, in part, be considered in the Validation section below. However, the current proposed framework offers no insight into how SEPA will assess the suitability of the framework, its core components and assumptions and whether they are "up to date". For any system to work correctly, there requires to be a clear and transparent process by which SEPA will appraise the framework in its entirety, at regular intervals.

Validation

We believe it is not possible to validate the proposed framework and that it is not acceptable to regulate a sector when the effectiveness of regulation cannot be determined.

The consultation document, and subsequent stakeholder one to ones, have provided no explanation of how SEPA will assess and validate the proposed framework.

Instead, in the consultation, SEPA have asked respondents to provide suggestions on a monitoring plan to assess the framework (Questions 14 to 16).

To date, despite many years of research (including by Marine Scotland) and considerable cost (including to the taxpayer) it has not been possible to quantify the actual impact the salmon farming sector (let alone an individual farm development) might (or might not) be having on wild salmon at a population level. The core remit of the proposed framework is to manage the risk to wild fish, posed by salmon farms. To do this we must only consider the proportion of wild salmon populations that are actually (if at all) being impacted by salmon farms (and not any proportion that is impacted by other pressures). Noting that, according to Jackson et al. (2013) "*the level of sea lice-induced mortality is small as a proportion of the overall marine mortality rate"* and according to SEPA's representation to the REC Committee in 2020 sea lice from farmed fish have not been responsible for the declines in wild fish we have seen over the decades. Furthermore, the independent review of the NTS considers any assessment of systems performance as "*non-trivial and fraught with uncertainties*". And Sandvik et al.[9] (the paper that has provided SEPA with the 0.7 lice per m^2 threshold) asserts that direct measurements of lice induced mortality on wild salmonids is "impossible".

Taking all of this collectively, SEPA must provide clear guidance on how they will assess the framework and its ability to protect wild salmon, specifically from the risk posed by salmon farm developments. At present we do not believe this is achievable, which is a significant failing of the current proposal.

In our view, it is not acceptable for a sector to have regulatory controls imposed upon it, unless there is a clear mechanism by which the effectiveness of those controls can be assessed. Without that, there is the real risk of significant detrimental impacts on the sector without there ever being the regulatory justification.

Sea trout

We believe the exclusion of sea trout and the lack of any scientific guidance from SEPA will lead to "double regulation" within the consenting regime.

SEPA have excluded sea trout from the proposed risk framework, and perhaps with good reason: according to the consultation documents catches of sea trout appear to have stabilised or even increased (9.2) in recent years. Furthermore, Scottish Government's Summary of Science[4] states that "*no information has yet been published to provide a quantitative estimate of the impact of lice on sea trout populations in Scotland*". Notwithstanding the fact we believe this to also be the case for salmon, the exclusion of sea trout from the framework, whilst welcome from the perspective of scientific principle, creates a challenge for the salmon farming sector on the west coast and Western Isles.

Scottish Government have confirmed SEPA as the lead body responsible for managing the risk to wild salmonids (both salmon and sea trout) from sea lice from marine finfish farms (1.1). But SEPA have provided no insight as to how they will provide advice to Local Authorities to support their decision-making in relation to sea

trout. Currently, Local Authorities require applicants to develop an Environmental Management Plan (EMP) to support the management of interactions between farmed salmon and wild salmonids – these EMPs currently cover both salmon and sea trout.

With the proposed introduction of a risk framework for salmon, and the likelihood that Local Authorities will have no option but to continue its requirement for EMPs to cover sea trout, finfish farmers face the prospect of "double regulation". This is in direct conflict with the principles of Better Regulation, as required by the Scottish Regulators' Strategic Code of Practice[11] (of which SEPA is a signatory), as well as the sentiment of the recommendations from Prof. Griggs' review of aquaculture consenting.

SEPA need to clearly articulate how, as the lead regulator for farmed / wild salmonid interactions, they will manage the risk (if any) posed to sea trout, provide advice to Local Authorities and avoid "double regulation" of the salmon farming sector.

We believe the only sensible way forward is to transfer all discussions relating to farmed / wild salmonid interactions (both salmon and sea trout) into the streamlined single consenting process recommended by Prof. Griggs.

Impacts

We believe SEPA have failed in their responsibility to consider the socio-economic impacts of the proposed framework, and we believe these impacts to be extensive for the sector, the supply chain and for Scotland's rural and national economy.

Before introducing any new regulatory framework through CAR, SEPA are legally required to consider its social and economic impacts, and therefore to undertake a Business and Regulatory Impact Assessment (BRIA). A BRIA is not included in the consultation documentation and instead the consultation asks respondents to highlight areas where they believe there will be impacts arising from the proposed framework (Q.18-20).

Our view is that it is not appropriate nor acceptable to progress any further with the proposed framework until a detailed BRIA has been completed. SEPA and Marine Scotland have already invested significant public resources into the development of this framework (notwithstanding the resource the sector has also committed to date). It is clear from the consultation documentation and engagement with SEPA that there is still a huge amount of work to be completed before any framework could be launched. Given that the scale of any impact of salmon farming on wild salmon populations has not been quantified, it is difficult to see how SEPA can assess the proportionality of the proposed system until a BRIA is completed. We now face the prospect of significant further investment of public resources into the development of this system, without any clear understanding of how the framework will affect businesses and Scotland's rural communities that rely so heavily on fish farming. SEPA have intimated that a BRIA will form part of a subsequent, final consultation on the proposed framework. It is difficult to see how, at that stage, a published BRIA

will be anything more than a "box ticking exercise" and that by that stage the framework will be a "done deal".

The salmon farming sector believe the introduction of the framework, as proposed, will result in a de facto moratorium on farm development on the west coast of Scotland and Western Isles – not a system to aid Local Authorities in their decision making to support the sustainable development of the sector, as initially envisaged. It is difficult to understand the rationality of a decision to implement a regulatory control that could lead to a moratorium on development, when a defined impact of salmon farming on wild salmon populations has not been quantified. We should also note that the development activity of our members is not necessarily about growth but about improving the efficacy and sustainability of the portfolio of farms that are already in production.

Each new salmon farm provides social and economic contribution within its immediate vicinity and also across Scotland through an integrated supply chain. Scottish government figures identify aquaculture as a significant contributor to multiplier effects from investment. Specifically, the knock-on impacts from salmon farming investment are the third most valuable in Scotland in terms of returns on investment. For every £1 million investment a further £789,000 is generated in indirect and induced impacts across the economy[12].

On average every active farm in Scotland (and thus every new farm) provides local jobs for 8 people in farming roles and a further direct 5 support staff within the relevant farming business (e.g., health, environment, management etc.). The farm will support local facilities, shops, schools, road infrastructure, businesses and housing in some of the most sparsely populated areas of Scotland. On average, each farm will provide over £3m to the Scottish economy in direct, indirect and induced impacts.

Estimated economic contribution by producing region:

Region	Gross value added	Direct employees
Argyll & Bute	£138 m	540
Na h-Eileanan an Iar	£121 m	420
Skye, Lochaber and Badenoch	£120 m	440
Shetland	£114m	410
Caithness, Sutherland and Ross	£90 m	340
Orkney	£56 m	190
		Source: Salmon Scotland

Furthermore, there are in excess of 3600 supply chain businesses operating across Scotland, with such businesses found in every Local Authority area and in every parliamentary constituency across Scotland – all of these businesses are dependent on a thriving and sustainably growing Scottish salmon farming sector.

Suppliers across Scotland:

Spend with Scottish suppliers	£373m
Scottish suppliers to the sector	3,600
Of which are located in:	

Highlands and Islands	2,300
North East Scotland	270
West Scotland & Glasgow	340
Lothian	250
Mid Scotland and Fife	180
Central Scotland	150
South Scotland	100

Scotland has a cost of production that is higher than other salmon farming nations[13], and the costs attributable to regulatory activities are also higher. This already places considerable pressure on Scotland's salmon farmers, when operating within a global market. Alongside a more general stagnation in growth of the sector, this has seen Scotland experience a decreasing global market share. Added uncertainty and costs associated with the new framework will further increase uncertainly for external investors, including for those supply chain businesses that already operate within the sector, but also for potential new investors, including those bringing "green" investment and innovation to Scotland, which can support Scotland's goal of becoming net zero by 2045 – how can such businesses confidently invest in business growth and new jobs in Scotland, when such uncertainty exists in the Scottish salmon farming sector?

As outlined below (Fish Welfare Implications), the proposed framework will lead to a requirement to treat fish more frequently, in order to maintain legally prescribed (within CAR licences) lice loads on farms. Putting to one side the fact that the model framework includes significant uncertainty in how lice loads on a farm relate to lice on wild fish, and thereafter to any population level impact on wild salmon, the requirement to treat more frequently will lead to added costs for salmon farmers, again, when it is not clear what the overall benefit of the proposed framework will be in terms of protection for wild salmon. These costs are not to be underestimated. Not only will there be operational costs associated with any intervention activity, but there will also be capital expenditure costs, for example the purchase of hydro- / thermo-licers, treatment vessels / equipment, contract hire of well boats. Furthermore, the requirement to manage lice to lower levels may also lead to an increased need to use licenced veterinary medicines, which aside from the added direct costs associated with using those medicines, comes with undefined, but significant reputational costs for our sector (i.e., rightly or wrongly, the increased use of licenced veterinary medicines is viewed negatively from a sustainability perspective). For a sector that relies significantly on its global reputation as a sustainable producer of the highest quality salmon, such reputational impacts could be significant for Scotland as a whole, impacting not only those companies affected by the regulatory controls (i.e., farmers on the west coast and Western Isles), but those not currently affected by the framework (i.e., farmers on Orkney and Shetland).

Finally, but importantly, a thorough and detailed BRIA is vital to fully understand the implications for Scotland's smaller salmon farming businesses. Due to the high costs associated with the increased requirements of site development (e.g., modelling expertise) and sea lice management, it is likely that Scotland's smaller salmon

farming businesses will be disproportionately affected by the introduction of the proposed framework, noting also that these businesses are vitally important to the communities in which they operate. For example, Wester Ross Salmon are the largest private employers within Ullapool, where they are based.

Scottish Regulators' Strategic Code of Practice

We believe that the introduction of the proposed framework does not align with the requirements of the Scottish Regulators' Strategic Code of Practice.

SEPA are signatories of the Scottish Regulators' Strategic Code of Practice[11]. Although we appreciate the consultation has not concluded, we believe the proposed approach does not align with the requirements of that code. Some examples of where this is the case are provided below, along with references to relevant sections of this consultation response:

Requirement: Adopt a positive enabling approach in pursuing outcomes that contribute to sustainable economic growth. We do not believe the proposed framework to be enabling, nor do we believe it will contribute to sustainable economic growth. In fact, we believe it will prevent growth (see Impacts).

Requirement: In pursuing their core regulatory remit be alive to other interests, including relevant community and business interests; taking business factors appropriately and proportionately into account in their decision-making processes. No BRIA has been completed and there appears to have been no proportionate consideration of the impacts of the proposed framework on communities or Scottish business interests (see Impacts).

Requirement: Adopt risk and evidence-based protocols which help target action where it's needed and help to ensure the achievement of measurable outcomes. There is no quantifiable evidence of an impact of salmon farming on wild salmon populations and as such the proposed approach does not adopt risk or evidence-based protocols (see Underpinning Science: Impact on wild salmon). SEPA have not defined how they will achieve measurable outcomes from the framework (see Validation).

Requirement: Recognise, in their policies and practice, a commitment to the five principles of better regulation: regulation should be transparent, accountable, consistent, proportionate and targeted only where needed. We believe the current proposal will lead to regulation that is not transparent (at present, see Underpinning Science: modelling and science used within the framework), accountable (see Validation and elsewhere), proportionate (see entire response) nor targeted only where needed (see Underpinning Science: Impact on wild salmon).

Requirement: Pursue continuous improvement in regulatory practice based on the principles of better regulation. e.g., the likely "double regulation" for salmon and sea trout conflicts with the principles of Better Regulation (see Sea Trout).

Fish Welfare Implications

The proposed framework will have significant negative impacts on farmed fish welfare, which do not appear to have been considered by SEPA.

It is not by chance that the last section of our response considers the impacts of the proposed framework on the welfare of our fish. All too often regulatory controls are implemented that disregard the fact we farm a living, sentient animal and that as farmers we have moral, ethical and legal obligations to protect the health and welfare of our fish. At most, many regulatory controls consider fish welfare as an afterthought. Unfortunately, the proposed sea lice risk framework is no different.

The proposed framework will place, within CAR licences, a requirement for new farm developments to maintain lice loads at a certain, prescribed level, defined through the consenting process (C.14). It will also introduce permit controls that restrict the numbers of juvenile sea lice emanating from existing farms, unless prior authorisation is sought (6.2). Putting to one side for the moment the somewhat bizarre concept of seeking "prior notification" before farms are legally permitted to exceed levels of a dynamically changing population of sea lice, these controls will undoubtedly lead to a requirement to treat fish more regularly. This has a number of significant implications for fish welfare.

Decisions to intervene and to treat fish should always be made in the best interests of those fish. Vets are duty bound to consider the benefits of any intervention with the risks to the animals being treated – the "first do no harm" principle. The proposed regulatory framework will lead to pressure to treat fish, when treating may not be in the best interests of those fish, and when treatment may lead to further health and welfare issues or mortality.

A recent analysis of the causes of mortality in Scottish salmon farming, conducted for the Farmed Fish Health Framework, identified that some of the main causes were associated with handling or treating our fish. Further, it is well known that farmed salmon can experience complex health challenges, in particular complex gill health challenges, which further complicate the handling and treatment of fish for sea lice, especially when it is not necessary to treat those fish for any other reason than to meet a regulatory control that seeks protect wild fish.

We would also like to note potentially competing regulatory controls that fish farmers are bound by, specifically the Animal Health and Welfare (Scotland) Act 2006, and the very real potential for conflicts of law in that regard.

Again, given all the uncertainty inherent within the currently proposed framework (e.g., the lack of scientific evidence for the scale of impact on wild fish, uncertainty within the proposed modelling framework, significant socio-economic impacts, the absence of a mechanism to validate the framework), it is difficult to see how the proposed approach is proportionate, when considering our duty to protect the health and welfare of our fish.

Conclusion

In conclusion, Salmon Scotland and the Scottish salmon farming sector do not support the current proposal for a sea lice risk assessment framework. We believe there are significant fundamental issues with the underpinning principles of the framework. We also do not believe it is based on the most up to date science (including evidence of an impact on wild fish populations), that it will result in significant and unjustified impacts on our sector, and that the proposed controls are disproportionate and not representative of a truly risk-based approach.

The review of aquaculture consenting by Prof. Griggs outlines a clear framework for significantly improving the consenting regime for Scottish aquaculture. His recommendations have been accepted in principle by the Cabinet Secretary for Rural Affairs and Islands and the only logical way forward appears to be to divert any further discussion surrounding the hazard and potential risks posed by farmed salmon on wild salmonids (with any required mitigation) into the process proposed by Prof. Griggs.

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Response to consultation questions:

Your Details

1. What is your name?

Iain Berrill

2. What is your email address?

iain@salmonscotland.co.uk

3. What is your organisation? (if applicable)

Salmon Scotland

Wild Salmon Protection Zones

4. Do you think that there are important areas for wild salmon post-smolt migration that we have not identified as wild salmon protection zones?

☐ Yes
☒ No
☐ Not sure

5. If yes, please identify these areas, explaining why they should be protection zones and the evidence to support this.

At this stage, we do not believe it is correct to ask whether or not the proposed areas are right (i.e., whether there should be others, fewer areas etc.). The fundamental question is whether the correct process has been used to determine those areas.

At present, it is unclear if that is the case. The selection of areas and their delineation appears to have been made through a process of expert judgement, but the actual formal process used has not been provided. Our view is that such decisions must take a formalised and transparent process so all stakeholders can fully understand the decisions that have been made and that there is sound scientific justification for those decisions. The scientific evaluation of the Norwegian Traffic Light System (Revie et al. 2022) flagged concerns around the level of transparency, and the apparent lack of a defined process, with regards to how expert judgement was included with the Norwegian system. The current proposal seems to be following the same path.

In particular for the proposed system:

Are we sure that wild salmon have to pass through the narrow areas of sea that have been identified (4.2)? How has that judgment been made?

How have the proposed zones been identified taking account of advice from Marine Scotland and Fisheries Managers (4.2)?

Has a formal, structured and internationally accepted process been adopted for the inclusion of expert opinion? If not, why not?

What is the scientific justification for a 5km radius as a zone for rivers that flow into open coastline (A.8)? Is this based on expert opinion or published science?

Only when the answer to this more fundamental question is made public, and there is an agreed mechanism to assign areas as protection zones, can we then move to consider if all possible zones have been included in the framework.

6. Do you think that any of areas we are proposing as wild salmon protection zones should not be so identified?

☐ Yes
☐ No
☒ Not sure

7. If yes, please identify these areas, explaining why they are not important for wild salmon post-smolt migration and the evidence to support this.

See response to Q.5

Proposed Sea Lice Exposure Threshold

8. Do you have any scientific evidence that should be considered to ensure the sea lice exposure threshold is effective in protecting wild salmon populations? This includes any evidence for a refinement of the threshold.

Please note our overarching response, which covers fundamental underpinning issues with the overall sea lice risk assessment framework. There is reference to the sea lice exposure threshold within our overarching response.

Implementation

9. Which groups and organisations do you think we should include on technical advisory groups to assist us with the development of the detailed working arrangements and methods needed to implement the framework?

We believe that discussions surrounding the need and potential approach for any new framework relating to the consenting of Scottish aquaculture must (from now onwards) be guided by process recommended by Prof. Russel Griggs in his review of consenting in Scottish aquaculture.

Prof. Griggs' report articulates the need for a consenting framework that includes a single licencing document and body, which is developed through a defined Project Board. Any further discussions relating to wild/farmed salmon interactions in farm consenting must be managed through that process, as a key component of the overall consenting process for marine fish farms.

Furthermore, Prof. Griggs' report states that decisions relating to farm consenting must be science-led. The development of any framework must follow a completely transparent, science-led process and any implementation process (managed through the overarching consenting framework proposed by Prof. Griggs) must include relevant academic and sector representatives / oversight, with a defined structure that manages the inclusion and use of appropriate data and science.

The implementation of any new framework must also include a system of regular review and assessment – to ensure the most relevant science is included and that the efficacy of the framework is continually assessed. The Scientific Evaluation of the Norwegian Traffic Light System proposes an iterative process for such assessment.

Modelling Protocols

10. Do you have relevant expertise or experience that you would be happy to share with us during implementation planning to help us develop modelling protocols?

☐ Yes
☐ No
☒ Possibly

11. If yes, please tell us about your area of expertise:

Please note our overarching response, which considers the use of modelling within a wider risk-based framework.

But also, to re-iterate our previous point (covered also in our overarching response), we do not believe it is appropriate to progress with the implementation of any new framework, until Scottish Ministers have responded to the recommendations of Prof. Griggs' report into the consenting of Scottish aquaculture, and until those recommendations are delivered, noting that the recommendations have been agreed in principle by the Cabinet Secretary for Rural Affairs and Islands. Thereafter, any new framework must be developed and implemented through the processes and procedures put in place by the overall consenting framework and body, that the Prof. Griggs' report identifies as required to improve the overall consenting process.

12. If you would like to be involved, are you happy for us to contact you by the email address you have provided?

☒ Yes
☐ No

Permitting and Site Regulation

13. Do you have any suggestions for how SEPA could most efficiently and effectively assess compliance?

Please see our overarching response, which covers this area.

The consultation document clearly proposed a period of implementation where the "detail" of the framework will be established. It is our view that it is not possible to consider compliance against controls that are not yet determined.

Monitoring the Effectiveness

14. Do you have any suggestions on how we should develop a monitoring plan to assess the effectiveness of the framework and what it should include?

☐ Yes
☐ No
☒ Not Sure

Please see our overarching response, which covers this area (see Validation section).

However, to note, this is a critical issue within the current proposed framework. We do not believe it will be possible to assess the effectiveness of the current framework in protecting wild salmon populations from any impact arising from salmon farming (if there is one), at a national or individual farm / development level.

Although it is acknowledged that salmon farming may present a hazard to wild salmon (through theoretical assessment of the potential sea lice dynamics between farmed and wild fish), despite decades of scientific research purporting to report on the "impacts" of farmed salmon on wild populations, it has not been possible to establish the (numerical) scale of any impact at a population level (if there is indeed an actual quantifiable impact). This is what is required to validate the framework. But to clarify, to validate the framework, any assessment must be able to separate and quantify the relative impact of salmon farming from the impacts from all other pressures on wild salmon, and to be able to do that at an individual farm / development level.

If this detailed and focused assessment is not possible, we will be operating a regulatory framework without actually knowing whether it is achieving its core objective. We believe it is not appropriate to operate any regulatory framework, unless it can be properly assessed against its underpinning objective(s).

15. Do you think there are components that should be included in an effectiveness monitoring programme that you would be able to help deliver?

☐ Yes
☐ No
☒ Not Sure

See overarching response, as well as our response to Q14.

16. If you would like to be involved in the development of a monitoring plan, are you happy for us to contact you by the email address you have provided?

☒ Yes
☐ No

Adaptive Approach

17. Are there other types of information that you think could usefully inform the adaptive development of the proposed framework?

☒ Yes
☐ No
☐ Not Sure

We disagree with the concept of placing constraints on the types of information that could potentially inform an adaptive management process. Adaptive management, by its very nature, must embrace appropriate, scientifically derived and quantified variables.

The Proposed Framework's Implications for You

18. Do you think the design of the proposed framework, or how it is implemented, could affect your community or business interests?

☐ Yes, in a positive way
☒ Yes, in a negative way
☐ I'm not sure
☐ No

Please see our more detailed, overarching response.

19. Do you have suggestions how any potential negative effects could be reduced or avoided without compromising the environmental protection purpose of the proposed framework?

☐ Yes
☒ No
☐ Not Sure

We believe there will be very significant, detrimental impacts arising from the implementation of the proposed framework (see our overarching response). However, to understand how any impacts could be reduced or minimised without compromising the environmental protection provided by the proposed framework, we must first assess the level of environmental protection provided by the framework – how this will be achieved has not been evidenced in the consultation documentation. Further, in reference to our response to Q14 and in our overarching response, we do not believe it is possible to assess the efficacy of the framework – no scientific studies to date have quantified the impact (if any) of salmon farms on wild salmon, including separating out the impacts of other pressures on wild salmon populations.

20. Do you have any suggestions how potential positive effects delivered or enhanced without compromising the environmental protection purpose of the proposed framework?

☐ Yes
☒ No
☐ Not Sure

See response to Q19

Overall Framework Proposal

21. Do you have any additional feedback on the proposed framework?

Yes – see our overarching response, covering in more detail key principles that are considered within the consultation.