



## **Atlantic Salmon Trust**

Company registered in England: Reg No. 904293  
Registered Charity No. England 252742 & Scotland SCO 37902

# **Response to Scottish Environmental Protection Agency (SEPA) on:**

**Detailed proposals for a risk-based, spatial framework for managing interaction between sea lice from marine finfish farm developments and wild salmonids in Scotland.**

### **Introduction**

The Atlantic Salmon Trust is a charity which designs, develops and delivers evidence-led research and restoration projects. This work is aimed at halting and reversing the decline in wild Atlantic salmon and sea trout by implementing the solutions these species need to have a thriving future. By working in partnership with other NGOs in the Missing Salmon Alliance, and communicating with international research and conservation bodies, industry and government, the Atlantic Salmon Trust believes that, if wild salmonids are to have a thriving future, constructive engagement is essential.

### **Background**

#### Why Wild Salmon and Sea Trout Need Better Protection from Sea Lice

Across their range, wild Atlantic salmon numbers have fallen by over 70% in the last 25 years.<sup>1</sup> In Scotland, a similar general downward trend has been observed.<sup>2</sup> The effects of the decline in wild Atlantic salmon and sea trout are now being felt by rural communities, local economies and the wider environment, not to mention the loss to our shared natural heritage and culture.

As indicator species, the wild salmonid decline, including both Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*), is telling us all is not well with our rivers, coastal environment and seas. Scotland's ecosystems, its biodiversity and its people cannot afford to suffer any further decline in wild salmonids. The restoration of these species is essential and will bring far reaching benefits to the environment and society.

There are a number of factors accepted by international bodies and governments known to be negatively impacting salmon<sup>3</sup>. Many of these pressures are exacerbated by the effects of climate change, including pressures occurring in the coastal and marine zones. The rate of marine survival of salmon and sea trout has seen a significant reduction in recent decades, linked to changing conditions in the Atlantic Ocean and contributing to their overall population decline, highlighting the urgency to work to reduce harm from those coastal and marine pressures.

Among those pressures are impacts associated with aquaculture, the effects of which are detailed by the North Atlantic Salmon Conservation Organization (NASCO) as follows: *'Aquaculture impacts Atlantic salmon stocks through the genetic effects of farmed salmon escaping into wild populations, and mortality from sea lice and diseases spreading to wild salmon. Containment, proper siting and sea-lice control are important considerations for aquaculture operations.'*<sup>4</sup>

Both Atlantic salmon (*Salmo salar*) and brown/sea trout (*Salmo trutta*) are listed as priority fish species in the UK Biodiversity Action Plan and are a Marine Priority Species<sup>5</sup> (in their marine life stage), and their recovery is a national priority.<sup>6</sup> Both species are now in a position where risk should not simply be *managed* but eliminated altogether.

Given the urgency of the present situation for these species, and the impacts of climate change exacerbating known salmonid pressures, we ask regulators who have the ability to act on any of those accepted pressures to take bold and meaningful action to address this situation immediately. There is now an historic opportunity for Scotland to make progress on the aquaculture-related impacts from sea lice.

## A Reminder - Government and Regulator Commitments

### **Scotland's Wild Salmon Strategy Commitment**

In the Scottish Government's Wild Salmon Strategy and Implementation Plan (2022)<sup>7</sup>, Cabinet Secretary for Rural Affairs, Land Reform & Islands, Mairi Gougeon, laid out the urgency of taking decisive action to better protect wild salmonids. The Cabinet Secretary's Ministerial Foreword states, *'We must now reinvigorate our collective efforts to ensure a positive future for wild salmon. This will require the Scottish Government, Agencies, the charity and private sectors to work together and coordinate action to prioritise the protection and recovery of Scotland's wild Atlantic salmon populations.'*

Within the Wild Salmon Strategy are a list of 13 specific high-level pressures acknowledged to be negatively impacting wild salmonids, reflecting the pressures identified by NASCO. At least 4 of these pressures relate, either directly or indirectly, to finfish aquaculture activities. These include: sea lice, genetic introgression, disease and parasites, and marine development.

### **Scottish Parliamentary Inquiry Commitment**

Previously, the findings from two Scottish Parliamentary inquiries<sup>8</sup> in 2018 had highlighted concerns over the environmental impacts of finfish aquaculture in Scotland. In particular, these related to the dangers posed by salmon farms to wild salmonids through sea lice and genetic introgression via inbreeding with escaped farmed fish. These inquiries concluded that **the status quo was not an option** and that changes to the regulation of the sector were required. The Scottish Government subsequently agreed to move beyond the status quo in its response.<sup>9</sup>

### **Scotland's International Commitment**

These sentiments echo the commitment made by the UK Government to fulfil its international obligations through NASCO, when it became a signatory to the Williamsburg Resolution through the European Union in 2003.<sup>10</sup> This resolution states “100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms”. In the Salmon Interactions Working Group (SIWG) report (2020)<sup>11</sup>, the report strengthens this commitment in a Scottish-specific context when it states, ‘*Scottish Ministers are committed to the implementation of this international obligation.*’

It is therefore important to Scotland that it upholds its commitment along with other global NASCO partners.

### **Scotland's Salmon Interactions Working Group Commitment**

The aforementioned SIWG was established to look at ways to minimise or eliminate the negative impacts that the finfish aquaculture sector was having on wild salmonids. In May 2020 this group delivered a set of 40 recommendations<sup>12</sup>, all of which were subsequently agreed by the Scottish Government.

Firstly among these agreed recommendations are:

*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;*

In the context of our response to this consultation which deals with *risk* to wild salmonids, it is worth highlighting the following passage from the Scottish Regulators' Strategic Code of Practice relating to 'Risk and Evidence': *'The emphasis where possible should be on preventing problems from occurring in the first place.'*<sup>13</sup>

In the Scottish Government's response to Section 1 (Wild/Farmed Salmonid Interactions Recommendations)<sup>14</sup> it stated, *'SEPA will become the lead body responsible for managing the risk to wild salmonids from sea lice emitted from fish farms in Scotland.'* SEPA is to act on this through the Water Environment (Controlled Activities) (Scotland) Regulations 2011.

It is therefore SEPA's duty to deliver effective and meaningful regulation of the finfish aquaculture industry which delivers on the Scottish Government's wider commitments to wild salmonids.

### **Scotland's Environment & Biodiversity Strategy Commitments**

As well as the salmonid-specific commitments which the Scottish Government has made through the Wild Salmon Strategy and Implementation Plan, its NASCO commitment, and by accepting the recommendations of the Salmon Interactions Working Group, it is worth also contextualising the need to achieve better protection for wild salmonids with reference to the Scottish Government's Environment Strategy<sup>15</sup>. As part of its 2045 vision, the Scottish Government and its partners aim to deliver on 6 outcomes. Notably, the first outcome listed in the Environment strategy reads: *'Scotland's nature is protected and restored with flourishing biodiversity and clean healthy air, water, seas and soils.'*

The Scottish Government also has a draft Biodiversity Strategy<sup>16</sup>, and its first five year delivery plan. Within the draft Biodiversity Strategy, Lorna Slater MSP, Minister for Green Skills, Circular Economy and Biodiversity, states; *'The Scottish Government is committed to restoring Scotland's natural environment and supporting thriving communities and wildlife alike.'*

Furthermore, the recently published Vision For Sustainable Aquaculture<sup>17</sup> states within the Environment section of its Guiding Principles: *'Scotland's marine ecosystems are healthy and functioning, with nature protected and activities managed using an ecosystem-based approach to ensure negative impacts on marine ecosystems are minimised and, where possible, reversed.'*

## A Summary of Scotland's Commitments and an Opportunity for Regulatory Progress

In summary, if the Scottish Government is to achieve its commitments and uphold the promises and ambitions it sets out, SEPA, with its regulatory responsibility, must not delay in introducing a new and effective regulatory framework for finfish aquaculture with immediate effect.

The Atlantic Salmon Trust is supportive of the underlying principle of managing the overall number of infective-stage sea lice in the marine environment attributable to aquaculture at a level below which sea lice would not be expected to cause any mortality in wild salmonids. We believe that this principle, if it can provide adequate protection for wild salmonids, is the correct approach to managing interactions related to sea lice, and we encourage SEPA to continue to work on and improve its proposals. Our response will highlight where we recommend SEPA considers alternative approaches and makes amendments to the framework.

The introduction of a suitably effective, enforceable and enforced regulatory framework governing finfish aquaculture on the West Coast of Scotland has the ability to mark an historic, positive turning point for wild salmonid protection in Scotland, and could greatly reduce the impacts from one of the important high-level pressures affecting wild Atlantic salmon and sea trout: sea lice.

If however a new regulatory framework proves to be ineffective, unmonitored, unenforced, and not implemented with urgency, it is the Atlantic Salmon Trust's view that Scotland will struggle to deliver the Wild Salmon Strategy, Biodiversity Strategy, Blue Economy Vision and Outcomes, and its wider global environmental and biodiversity commitments, and SEPA will have failed in its duty as the delivery body.

We encourage SEPA to not let this historic opportunity for positive change pass by.

### **Our Response - Guiding Principles**

What follows is our detailed response to each of the consultation sections, in the context of, and with specific reference to, the Scottish Government's strategic and policy commitments detailed below. Our conclusion will summarise whether, in our view, the extent to which the proposals for Wild Salmon Protection Zones (WSPZs) as described in the consultation document, meet these commitments:

**Commitment 1.** Ministerial commitment to '*Prioritise the protection and recovery of Scotland's wild Atlantic salmon populations.*' Wild Salmon Strategy – Cabinet Secretary for Rural Affairs, Land Reform & Islands, Mairi Gougeon.<sup>18</sup>

**Commitment 2.** Scottish Government commitment to not permit a continuation of the status quo in relation to farmed/wild fish interactions – Salmon Interactions Working Group Report: Scottish Government Response.<sup>19</sup>

**Commitment 3.** UK and Scottish Government global NASCO commitment for ‘100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms.’ - Williamsburg Resolution, NASCO.

**Commitment 4.** Uphold the commitment to accept the agreed recommendations from the Salmon Interactions Working Group (SIWG), most notably to bring in regulation which is ‘comparable with the highest international and domestic regulatory standards.’

**Commitment 5.** Uphold the commitments in Scotland’s Environment Strategy and Biodiversity Strategy to ensure that; ‘Scotland’s nature is protected and restored.’<sup>20</sup>

Finally, there are three key positions we have on the implementation of WSPZs which lie behind all of our responses.

1. **WSPZs must protect wild salmonids year-round**, not merely within the short window of April-May as proposed. Apart from this period offering weaker protection than even the finfish aquaculture industry’s Code of Good Practice<sup>21</sup> (which highlights the sensitive period for wild fish as 1<sup>st</sup> Feb – 30<sup>th</sup> June), this time period fails to account for the risk posed year-round to sea trout and to returning adult salmon which can enter rivers during every month of the year. It also fails to take into account the increasing impact of climate change and the requirement to ensure salmon and sea trout have sufficient scope to adapt to warming seas. The framework and associated regulation should be implemented to protect wild salmonids throughout the year, and provide an elevated level of protection within the sensitive period of 1<sup>st</sup> Feb – 30<sup>th</sup> June.

Year-round protection for wild salmonids would demonstrate a step towards achieving the Scottish Government’s Biodiversity Strategy goal to ‘halt biodiversity loss and be Nature Positive by 2030 and to have restored and regenerated biodiversity across the country by 2045.’<sup>22</sup>

2. In order to fulfil the commitment in the SIWG to have a regulatory regime which is comparable to the highest international standards<sup>23</sup>, it is our current view that **sea lice threshold levels should be set at a maximum of 0.2 adult mature female lice per farmed fish during the sensitive 1<sup>st</sup> Feb – 30<sup>th</sup> June period, and at no more than 0.5 for the remainder of the year.**

SEPA needs to explain more clearly how the 0.2 adult mature female lice per farmed fish and the lice per 0.75m<sup>2</sup> in the environment are used in the model to delineate the thresholds for sea lice. Furthermore, SEPA needs to make clear the way in which the

model and framework will be implemented throughout the year, with reference to appropriate and fully justified thresholds.

3. **WSPZs must immediately bring in regulatory reform for existing farms.** We wholly oppose the proposed approach to only apply WSPZ sea lice regulations to ‘new and expanding’ sites. Failure to adequately control sea lice on the 200+ existing sites in Scotland is a clear breach of commitments.

It is our view that WSPZs need to demonstrably align with the highest international standards currently in place for sea lice regulation. The way in which ongoing monitoring, and consequent refinement of the model informing the framework, is being undertaken to ensure this highest standard, needs to be better and more clearly explained by SEPA. In giving this explanation, SEPA should also demonstrate how the regulation will apply to current finfish aquaculture sites, thus ensuring delivery on the fundamental commitments made by the Scottish Government.

## **RESPONSE TO THE CONSULTATION SUBSECTIONS**

### **WILD SALMON PROTECTION ZONES**

To reiterate our position, the Atlantic Salmon Trust is supportive of the underlying principle of managing the overall number of infective-stage sea lice in the marine environment at a level below which sea lice attributable to farms would not be expected to cause any mortality in wild salmonids, and we see the implementation of WSPZs as an encouraging concept providing they can adequately protect wild Atlantic salmon and sea trout.

Firstly, as stated in the main introduction to our response, we disagree with the implementation of WSPZs as only effective in April and May of each year. WSPZs should operate 365 days per year (thus providing the best level of protection for salmon and sea trout, particularly in the context of rapid climate change). The highest level of protection afforded to wild fish should be implemented during the most sensitive wild salmonid migration period, defined as 1<sup>st</sup> February – 30<sup>th</sup> June. In line with the highest international standards (Norway), new regulation should set threshold limits of 0.2 adult mature female lice per farmed fish during the aforementioned 5-month sensitive period, and no greater than 0.5 adult mature female lice per farmed fish for the remainder of the year.

It is of important note that the management of sea lice on a given year class of farmed salmon must start the previous August, if satisfactory lice control is to be achieved the following spring.

In order to meet lice threshold targets in the spring, farms must make sure that the fish are free of lice going into the winter period (in cold water conditions the chemical control of lice is

less effective) and fish due for harvest in late winter or spring need to be very closely monitored to make sure that lice levels are well below the defined thresholds before the sensitive period. This explains why WSPZs must implement year-round lice threshold levels to provide adequate protection for wild salmonids.

It is our view that the location and extent of the WSPZs should be reconsidered; the 5km minimum distance from river mouths is insufficient in protecting wild salmonids from the impacts of sea lice from finfish aquaculture sites. The implication is that, outside these limited areas, no sea lice threshold limits will be set whatsoever, which suggests a further deviation from the highest international standards that the process aims to align with. WSPZs should be expanded beyond 5km from river mouths, and they should also extend protection beyond sea lochs. Modelling has indicated that the distribution of infective stage sea lice around Scotland goes beyond sea lochs and further than 5km from shore.<sup>24</sup> Other evidence (a 10 year study which comprised data from 4,600 sea trout)<sup>25</sup> demonstrated a statistically significant relationship between lice infestation on sea trout and distance to the nearest salmon farm, with highest infestations and variation in infestation at sites less than 20km from farms. The mean total lice infestation was lower at sites between 20-30 km from farms, and beyond 30 km, very low mean lice levels were recorded. Infective 'chalimus' lice stages dominated the sea lice population structure at distances of <20km and 20-30km. At distances <60km and <100 km, chalimus and post chalimus were equally represented; and at sites >100km post chalimus stages predominated.

Protection for wild salmonids around the coastal environment, informed by evidence, indicates 20km as a threshold upon which SEPA should model dispersal patterns of lice, to ensure that there are no increases of infestations from fish farm sites. This approach would align with the Scottish Government's promise to uphold the UK Government's NASCO commitment to have no '*lice-induced mortality of wild salmonids*' attributable to salmon farms.

We strongly oppose the premise that WSPZs should not be identified for rivers which do not have 'notable' or 'significant' salmon populations. All accessible rivers draining into the sea on the West Coast of Scotland are salmon rivers, either by the historical presence of salmon or for their ability to achieve salmon restoration. In the context of rapid climate change, salmon require all rivers within their native distribution to be potential refuges and ultimately strongholds for resilience and adaptation in the face of that rapid climate change. Given the Scottish Government's commitment to restoring salmon and sea trout populations, all rivers with the capacity to have salmon and/or sea trout should be fully protected from the risk of any sea lice impacts from finfish aquaculture, also aligning with the Government's NASCO commitments. The current proposal to exclude rivers without 'significant' salmon populations from WSPZ planning, demonstrates an unacceptable approach to rivers which have suffered the greatest declines and may indeed have the greatest potential for restoration.



The AST is supportive of the concept to introduce a network of WSPZs if they are able to provide an adequate level of protection for wild salmonids, to include all sea lochs into which salmon rivers drain and is supportive of WSPZs encompassing all sounds through which salmon populations are likely to migrate, including juvenile fish and adult fish. Salmon are likely to migrate through all sounds located on the West Coast of Scotland, and therefore all should be afforded protection from sea lice emanating from finfish aquaculture sites.

With regards to the revisions highlighted in the consultation, and as mentioned above, we believe that such a network of WSPZs should include all sea lochs into which salmon rivers drain. It is vital however that the definition of 'salmon rivers' includes all rivers with populations, no matter the population size, of Atlantic salmon, as well as those which had salmon in the past but do not at present. If the Scottish Government is committed to restoring salmon and their environment, all rivers with the potential to have salmon should be adequately protected by WSPZs.

With regard to the second question in this section relating to sea trout, we disagree entirely with its framing. Ample evidence exists to indicate that all accessible rivers capable of supporting brown trout also either contain, or have the potential to contain, sea trout, and therefore should be offered protection from sea lice emanating from finfish aquaculture sites. The concept that only sea trout rivers which are 'important' enough, is a significant diversion from Government commitments and the UK Biodiversity Action Plan. Retaining the biodiversity of the unique small coastal streams lying within individual catchments, should also be a key conservation objective along the West Coast of Scotland.<sup>26</sup> As the impacts of climate change increase, preserving the individual and unique genetic makeup of salmon and sea trout inhabiting small systems may also be of significant importance.

The lack of proposals for WSPZs for the Northern Isles is a significant omission for this regulatory approach. Wild salmonids, whether native or transient, to the Northern Isles should be protected from elevated lice levels emanating from finfish aquaculture sites and must come under the remit of the regulatory framework.

To frame the necessity for WSPZs on whether or not a river has a 'significant' population of salmon or sea trout, and then to cite a lack of knowledge on population data, is of great concern. Not only is this contradictory, but also demonstrates a failure in SEPA's duty to protect all wild salmonids from **risk**. To reiterate our response to the previous question, all accessible rivers draining into the sea in Scotland either are, or have the potential to be, salmon and/or sea trout rivers, and therefore require full and immediate protection from the impacts of sea lice attributable to finfish aquaculture.

## In Summary

1. We ask that SEPA clarifies its proposals for WSPZs in terms of measurement of lice per m<sup>2</sup> and 0.2 adult mature female lice per farmed fish, and to fully explain how their proposals will deliver the highest international standards.

2. WSPZs should cover all sea lochs, sounds and areas of open sea likely to be used by wild salmonids at any stage of their lifecycle.
3. SEPA should model the size of WSPZs using the 20km dispersal of lice as the minimum protective distance from river mouths, sea lochs, sounds and areas of open sea through which wild salmonids are likely to migrate.
4. WSPZs should regard all accessible rivers draining out from the West Coast as salmon and sea trout rivers, regardless of their current salmonid population size.
5. WSPZs should immediately protect sea trout in the Northern Isles where sufficient evidence already exists for their presence.

## SCREENING MODELS

Whilst we support the three-factor approach to modelling being taken by SEPA, in terms of hydrodynamics, particle tracking of sea lice, and virtual post-smolt modelling, we expect that newly-generated real-world data on smolt movements will also inform and improve that modelling process.

The Atlantic Salmon Trust is currently gathering important data on the movements of acoustically tagged salmon smolts as part of the West Coast Tracking Project – a partnership with the Marine Directorate and Fisheries Management Scotland. When published and peer reviewed, we expect this real-world smolt movement data to support improvements to SEPA's virtual post-smolt models.

We also consider it important that post-smolt modelling takes into account variation in migratory behaviour, in terms of pathways, swimming speed and duration, and we ask that SEPA provides more detail on how these natural variations will be incorporated.

We also ask SEPA to explain whether they have consulted with their counterparts in Norway regarding sea lice dispersal modelling, what their approach is, what they learned, and what their counterparts are planning for the future.

### **In Summary**

1. We support the initial approach to modelling which combines hydrodynamics, sea lice particle tracking, and virtual post-smolt modelling.
2. We are committed to working productively with SEPA to enable the data from the West Coast Tracking Project to contribute to the refinement and improvement of their post-smolt modelling.
3. We ask that SEPA details how it has consulted with its counterparts abroad working on sea lice modelling, such as those in Norway and Canada.

# RISK ASSESSMENT FRAMEWORK FOR SEA TROUT

We agree that WSPZ frameworks should also include sea trout, and we understand the value that the development of sea lice dispersal models specific to the Northern Isles will bring to improving the process. However, this should not mean that WSPZs cannot be brought in for the Northern Isles in line with the rest of the West Coast while this development takes place. The Precautionary Principle should apply.

We disagree with the proposed planning of the Northern Isles framework using the period of 1<sup>st</sup> April – 30<sup>th</sup> June, and believe that such WSPZs in the area must offer protection year-round for sea trout. Studies have shown that sea trout, while predominantly migrating out from freshwater in spring, in some areas also display an autumnal migration<sup>27</sup>. Sea trout can also spend variable amounts of time at sea and even return to freshwater or estuaries intermittently.<sup>28</sup> Sea trout can also be at sea for one or more years and often close inshore and over-wintering in bays and estuaries that have large freshwater discharges remote from their catchment of origin.<sup>29</sup> This highlights how marine residence period of sea trout must also be taken into account, not merely the migration period.

Further research also indicates the necessity to protect coastal areas year-round for sea trout *‘as they may be especially vulnerable to lice given that they spend so much time in coastal environments where planktonic salmon lice are distributed, and the potential habitat available to them may be reduced if they must avoid high risk areas where lice are abundant.’*<sup>30</sup>

We also oppose the exclusion of the Northern Isles from the first round of WSPZ implementation and its stated aims, on the mainland West Coast, to only provide *‘a level of protection for early post-smolt sea trout.’* It is our view that, given the urgency and perilous state of this priority species, any level of protection for sea trout from sea lice attributable to aquaculture less than complete protection, does not enable the Scottish Government to meet its commitments.

With these points in mind, following a suitably precautionary approach to this priority species, means that WSPZs should immediately be brought in for all areas of the Northern Isles within 20km of a river mouth, and all sea lochs, sounds and areas of open sea through which sea trout are likely to migrate at any stage of their lifecycle.

## **In Summary**

1. WSPZs should be brought in for the Northern Isles straight away, in line with the rest of the West Coast, while Northern Isles-specific models continue to be refined.
2. WSPZs for the mainland West Coast, Western Isles and Northern Isles should provide complete protection to sea trout from sea lice attributable to finfish aquaculture.

# THE PROPOSED TIMETABLE

Whilst we understand that the proposed work timetable highlights opportunities to continue to refine models, and this takes time, we urge SEPA to implement a regulatory framework for sea lice with urgency, and that such a framework should be effective, transparent, enforceable and enforced.

Work could then continue to refine specific models for Orkney and Shetland while preliminary WSPZs are already in place.

## **In Summary**

1. WSPZs which provide adequate protection from sea lice attributable to aquaculture should be immediately implemented for all areas of Scotland where wild Atlantic salmon and sea trout are, or could be, present.
2. Within that context, providing that WSPZs are already in place, we would support the timetable's ability to refine modelling specific to the Northern Isles.

# RISK ASSESSMENT MATRIX

It is our view that current risk assessment methodology appears overly complicated and does not reflect the commitments made to align regulation with the highest international standards. Again, we ask for clarification from SEPA on the use of infective stage lice per m<sup>2</sup> and mature adult female lice per farmed fish in the way the model is used, in order to determine the 'capacity' for further risk to wild salmonids, to ensure delivery of the highest international standards for protection of wild salmonids.

We believe the risk assessment matrix requires simplification. Either there is a risk to wild salmonids or there is not. We request that the four categories are combined to either "At Risk" or "Not At Risk." This is so that they can be regulated as appropriate and avoid the ambiguity of the additional categorisations. We ask SEPA why the risk assessment matrix cannot be simplified into those two categories: 1. At Risk, and 2. Not At Risk.

The initial matrix shows the risk to wild salmonids from existing finfish farm sites in Scotland and those which have already been authorised but are not yet operational, based on an initial screening assessment. This results in 80 farm sites (or 49% of the total number of farms) categorised as presenting medium, considerable or high risk to wild salmonids. Each of these risk levels is unacceptable in terms of protecting wild salmonid stocks and wider biodiversity.

As the evidence indicates that within 20km from a finfish aquaculture site wild salmonids are at risk from sea lice attributable to those farms, any sites located within 20km of a river mouth, sea loch, sound or area of open sea in which wild salmonids are likely to migrate, should be deemed to be presenting a risk.

We recognise the need for a separate approach with regard to sea trout due to their different behaviour in remaining resident in coastal waters throughout the year. However we recognise that whilst this will take time and resources to develop, these fish should be protected in the interim period based on the proposed salmon system. As such we would urge SEPA to review the threshold levels for sea trout to reflect their year-round presence.

### **In Summary**

1. Again, we seek clarification from SEPA on how lice thresholds are modelled to inform the framework.
2. We consider any risk to wild salmonids greater than none/negligible to be unacceptable and feel that the matrix could be simplified to reflect this in 2 categorisations: 1. At Risk, and 2. Not At Risk.
3. We agree with a separate risk assessment for sea trout but recognise that the salmon matrix would suffice until one has been developed and adequately tested to ensure no adverse impacts on migratory trout.

## **PRE APPLICATION PROCESS**

We support the need for a preapplication process for any new or expanding farms, but strongly believe that this process should be applied via review to all existing farms, given that the initial matrix identifies 49% of current sites as presenting an unacceptably high risk to wild salmonids.

The proposals demonstrate a lack of alignment with international standards and indeed the finfish aquaculture industry's Code of Good Practice by requiring farms to submit the maximum number of fish to be held *between '16<sup>th</sup> March and the end of the wild salmonid migration period'*; rather than reflecting the accepted sensitive period of 1<sup>st</sup> February – 30<sup>th</sup> June referred to earlier in our response.

Also in this section, the proposals ask that the developer states the maximum average level of female lice per fish to which they intend to manage. In our opinion, this approach is counterintuitive to that which should happen. The regulator should set the maximum permissible level of mature adult female lice per farmed fish to 0.2 during the 5-month sensitive period and 0.5 at all other times of the year, and the developer should then demonstrate how they intend to stay within those limits.

We are concerned that, if a proposed development demonstrates a high risk of sea lice to wild salmonids, the process gives provision for the developer to provide a refined model which demonstrates this is not the case. This raises serious concerns around accountability and further clarification is required on how this model refinement process will be scientifically independent.

We also raise the issue of the auditing of the pre application process, and request further information on how this process will be audited and by whom.

### **In Summary**

1. We support the concept of a pre application process.
2. The principles of the pre application process should be applied to all existing finfish aquaculture sites via review.
3. The new model should be tested further in real world trials and the results published. In the meantime the pre application process should be explicitly clear in the sea lice threshold levels not to be breached: a year-round limit of 0.5 adult mature female lice per farmed fish, and 0.2 adult mature female lice per farmed fish in the 5-month sensitive period of 1<sup>st</sup> Feb – 30<sup>th</sup> June.
4. Farms should demonstrate how they will remain within these limits.
5. We ask that SEPA clarifies how the refinement processes for screening models which indicate a high risk to wild salmonids is to be rigorously scientifically independent.
6. We ask that SEPA provides information on how the pre application process will be audited.

## **APPLICATIONS FOR NEW OR EXPANDING FARMS**

We recognise the advantages that the new approach to modelling sea lice exposure for wild salmon and sea trout brings. This should be with the emphasis on protecting the environment and meeting national and international commitments to restore stocks of salmon and sea trout. To ensure that the framework meets this objective it is important that it is implemented and adequately resourced so that the model is constantly reviewed and improved with new information. This should be done in conjunction with reviewing the impact of the implementation of the framework on wild salmonids.

Within this section of the consultation, we must firstly express our concern that the two principles behind SEPA's approach appear contradictory. The first objective aims to prevent 'deterioration of the environment', whilst the second objective aims to ensure 'efficient use of environmental capacity to avoid unnecessarily limiting scope for future development.' This section goes on to imply that strict lice controls will be necessary for new developments 'where capacity is under significant pressure'. It is our view that, if an area is deemed to be under significant pressure in terms of sea lice, allowing any new open pen finfish farming developments represents a risk to the deterioration of the environment via an elevated risk to wild salmonids.

We must again draw attention to the misalignment of plans with the highest international standards and the Government's NASCO commitments, and indeed the finfish aquaculture industry's own Code of Good Practice. This section again refers to a sensitive period as April-May, rather than 1<sup>st</sup> Feb – 30<sup>th</sup> June.

The consultation papers allude to the fact that migratory salmonids may swim through multiple WSPZs and must take into account this cumulative impact upon them. We would request that more information is provided on how this cumulative impact is gauged.

The consultation papers switch between a lice threshold per fish within salmon farms and lice densities over an area per day. We would ask that SEPA provides more clarity and demonstrates the relationship between these two thresholds.

Notwithstanding our comments made about the shortfalls of the current proposals for lice threshold levels, this section then concludes that 'Applications for farm developments likely to result in the sea lice exposure threshold being exceeded, or further exceeded, are unlikely to be granted authorisation.' It is recommended that more definitive wording is used in this statement if the Scottish Government's commitments to wild salmonids and their environment are to be upheld.

The risk assessment matrix which again appears is also contrary to the highest international standards, and the finfish aquaculture industry's own Code of Good Practice. It does not impose any lice limit whatsoever on the majority of finfish farms, imposes a woeful level of 2.0 adult mature female lice per farmed fish in locations deemed to have a 'medium risk' to wild salmonids, 10 times higher than the aforementioned standards within the sensitive period, and only demands the 0.2 adult mature female lice per farmed fish threshold be met when the risk is deemed 'considerable'. These threshold levels are not compatible with the highest international standards, nor Government commitments to adhere to NASCO resolutions.

Question 11 - We request that SEPA justifies the 0.75 lice m<sup>2</sup> per day rather than a particular threshold and how this relates to the commitment to protect wild salmon and sea trout to exposure to elevated lice levels from salmon farms. At the moment the justification is not well explained, either technically or in a non-technical fashion. This will raise questions on how robust, transparent and enforceable this approach is.

The example used in this section raises an alarming prospect – that permit limits *could* in theory allow a farm to *increase* its adult female lice per fish during the sensitive wild salmonid migration period, if they reduce the total number of fish on the farm. Again, this deviates from international standards and the finfish aquaculture industry's own Code of Good Practice which stipulates that lice levels should be managed solely in terms of no more than 0.2 adult mature female lice per farmed fish during the sensitive period.

We therefore ask for clarification on the scientific, regulatory and enforcement merits of managing sea lice on a lice per farm or area basis rather than adult mature female lice per farmed fish, with stronger controls during the sensitive period.

With regards to Question 12, we disagree with the proposal for rolling 28 day lice limits. Firstly, to adequately protect wild salmonids, farms should remain within lice limits at all times and a simple daily limit should apply. A rolling 28-day average basis not only allows for dangerously elevated lice levels for a given period of time, but also raises questions around the efficacy

and timeliness of any enforcement action that could be taken against farms that breach daily lice limits due to the delay.

We take issue with the statement, *'Occasional small peaks do not drive the exposure risk. This is because exposure risk is dependent on the accumulation of infective-stage sea lice from multiple farms.'* This incorrectly implies that risk to wild salmonids is only possible from multiple farm sites, and that an individual farm cannot pose a risk. While overall numbers of lice in a given area are clearly important, it is our view that a simpler system of management, based on thresholds of adult mature female lice per farmed fish, and in line with international standards, would be a preferable system.

We therefore argue that finfish aquaculture sites should remain within maximum daily lice limits at all times, and any single breach of these limits constitutes an unacceptable risk to wild salmonids. The fact that this consultation proposes to set that maximum daily limit *'at a value equivalent to greater than 4 times the allowed 28-day average'* is wholly incompatible with Government commitments.

This section proposes that the limit of 0.2 adult mature female lice per farmed fish should apply to farms deemed to be 'high risk', though interestingly then goes on to say, *'A substantial proportion of farms in Scotland achieve levels of 0.2 adult female lice per fish or fewer during the Spring. In 2021 and 2022, close to 60% of reported weekly averages were less than or equal to 0.2 adult female lice per fish. In Norway, large numbers of farms report compliance with the mandatory average of 0.2 adult female lice per fish in sensitive areas during the main migration period. Performance of farms in Norway against this limit is published on the Barents Watch website. Basing controls on this standard of good practice (i.e., an average of 0.2 adult female sea lice per fish or fewer) that has been demonstrated as achievable will ensure that developments use environmental capacity efficiently and so do not unnecessarily limit scope for future development.'* If these levels are so achievable, and have been 'demonstrated as achievable' it seems logical that WSPZs should implement this threshold level across the board. The proposal to only suggest these levels of compliance for 'high risk' sites demonstrates misalignment with the highest international standards and Government commitments.

With regard to monitoring, we support the implementation of automated lice counting systems for the greatest level of accuracy. We disagree that these should only be required by 'high risk' sites, believing that all sites, regardless of their risk level, should be required to implement such automation, reporting directly to the Regulator on lice levels in real time.

Finally in this section, with regards to sea trout, we again highlight the requirement to regard the sensitive period as 1<sup>st</sup> Feb – 30<sup>th</sup> June, as well as the necessity to offer adequate year-round protection to sea trout. Given the points we made above regarding the figure of 0.2 adult mature female lice per farmed fish being 'achievable', there appears no reason not to impose this threshold level for the extended sensitive period.



## PERMITTING TIMETABLE

We do not believe that the timetable is fit for purpose and question how it upholds any of the Scottish Government's commitments outlined in our introduction.

Wild salmon and sea trout are in decline and, as stated by the Cabinet Secretary for Rural Affairs, Land Reform & Islands, '*the pace and scale of action across the many other pressures affecting salmon must be stepped up*'.<sup>31</sup> This includes impacts from aquaculture. We do not see this aspiration translated in this timetable.

Given that a number of existing farms have been identified as posing a risk to wild salmonids now, we believe that these should be resolved before new applications are processed. We are concerned that the process will only include those which contribute significantly to the concentrations of sea lice rather than all licences having conditions to ensure the inclusion of the basic condition not to impact wild salmonids (e.g. similar to Controlled Activity Regulations – General Binding Rules).<sup>32</sup> The statements in this section imply that the process will *maintain* the current levels of management *not* that the process will remove the impact.

We are concerned that the process for assessing impact on wild salmon post-smolts is based on SEPA having information – '*We will act to protect wild salmonid populations as soon as we have good evidence they are being impacted*' rather than preventing risk. This is contrary to the Precautionary Principle and a breach of the Scottish Government's Response to the Salmon Interactions Working Group Report to not permit a continuation of the status quo.

## REGULATION FOR EXISTING FARMS

The initial matrix shows that 41 existing salmon farms are within either the 'high' or 'considerable' risk categories, representing 25% of all fish farms incorporated into the matrix. It is clear therefore that these sites should be assessed and regulated as a matter of urgency. We are concerned that the regulation of existing farms implies no deterioration of the current situation rather than a requirement that the risk of impact on wild salmonids is reduced and eliminated. This is contrary to the Scottish Government's commitments outlined in the introduction. We believe that resources should be made available to resolve the current issues *before* being applied to any new salmon farm applications.

This framework, by not prioritising existing impacts before applying the system to new applications, displays a lack of ambition for change. It accepts the continuation of impacts on wild salmonids despite commitments to work to reverse their decline and deviates from international standards and the Scottish Regulators' Strategic Code of Practice which states, '*The emphasis where possible should be on preventing problems from occurring in the first place*'.

Existing farms are either already impacting wild salmon and sea trout, or at least presenting a risk, and should be brought forward in the process. Failure to apply regulation to existing finfish aquaculture sites first and foremost represents possibly the most significant breach of all the commitments outlined in the introduction – a clear continuation of the status quo.

## REDUCING PRESSURE ON WILD SALMON POPULATIONS

Contrary to the title of this section, the emphasis appears to be not on putting wild salmonids first, but rather on economics. This is apparent in such statements as: *‘This type of regulatory action has the potential to impose major costs on operators,’* and *‘We will consider the timing of the actions, taking into consideration the operator’s business plans.’*

Questions 19 and 20 ask for assistance in identifying areas where proposed WSPZs may exceed lice thresholds. For the avoidance of doubt, *all* wild salmon populations are declining and require protection from sea lice attributable to aquaculture.

As previously mentioned in our response, the Atlantic Salmon Trust, along with its project partners at the Marine Directorate and Fisheries Management Scotland, is in the process of gathering important data via the West Coast Tracking Project. When available, we expect that this data will further assist the process of improving virtual post-smolt modelling based on the input of real-world smolt tracking data.

Importantly, we also ask SEPA to communicate how it intends to measure success in relation to a reduction of pressure on wild salmonids from sea lice attributable to aquaculture.

## EXISTING FARM TIMETABLE

We agree that existing sites should be regulated to ensure that they do not have a negative impact on wild salmonids. We are therefore confused by the statements that existing farms which are already known to be imposing a pressure are not being targeted for compliance in the timetable, given that 21 farm sites have been identified in the ‘considerable’ risk category in the initial matrix. We see no reason why these would not be reviewed immediately. These sites are already presenting a risk and this should be addressed as the first priority. These impacts should be resolved *before* any new licences are contemplated for new or expanded farms.

We are also concerned that *‘suitable conditions to ensure the activity is managed to prevent an increase in pressure’* does not go far enough. This would not remove or even reduce the pressure of sea lice on wild salmonids and therefore does not change the status quo.

The framework does not address the current sea lice risk and impacts on wild salmonids attributable to finfish aquaculture and therefore, unless this is addressed, the proposed regulatory framework is not fit for purpose.

Most alarmingly of all in this section is the statement, *'We expect it will take several production cycles before we have generated sufficiently robust evidence from refined models and monitoring to determine if and where action is required to reduce pressures on wild salmon populations from sea lice.'*

'Several production cycles' means several years without taking action to prevent or reduce risk and is completely incompatible with the Scottish Government's national and international statements and commitments.

## COMPLIANCE ASSESSMENT

We are concerned that the main statement in this section is that SEPA will only protect the environment in line with overarching support for sustainable economic development. We believe that this compromises SEPA's ability to act robustly to protect the environment and wild salmonids.

Throughout this process, it could be argued that SEPA puts business first and the environment second. We support the process of SEPA supporting businesses to compliance as we firmly believe that prevention is better than cure, however there doesn't seem to be much logic in prioritising inspections of existing farms in the high risk categories but not changing the licence conditions – there is nothing to check for compliance with until that is done.

As stated above we believe that the existing farms should be reviewed as a priority to allow SEPA to regulate and ensure the risk of impact on wild salmonids from sea lice attributable to the farms is removed. All farms should have a minimum standard of compliance (as per the General Binding Rules) and whilst we accept the principle of prioritisation we also believe that SEPA should have a process to monitor all farms to ensure compliance. This is mainly because, and until this process is proven to be effective, the possibility remains that impacts are not identified in the system.

Compliance with regulation is clearly essential, and it is our view that this must come in the form of periodic, unannounced checks on farm compliance by the Regulator. This should not be limited to farms deemed only to be 'high risk', but to all farms, and farms should not be permitted to self-report as this raises serious concerns around accountability, transparency and enforceability.

For reference, the compliance monitoring system currently employed in the Republic of Ireland is widely regarded as a high international standard whereby The Marine Institute carries out regular inspections of sea lice levels on all fish farms in Ireland in accordance with

the Department of Agriculture, Food and the Marine's Sea Lice Monitoring Protocol (2000) and Strategy (2008). All stocks of fish are inspected by Marine Institute Inspectors on 14 occasions throughout the year. Results from the programme are reported each month to stakeholders and all the data is published on an annual basis. This monitoring programme has been in operation since 1991.

In Ireland the control protocols in respect of sea lice are operated by the Marine Institute on behalf of the State. The inspection regime is totally independent of the industry, data obtained as a result of inspections is published, and treatment trigger levels are set at a low level.

We seek clarification from SEPA on how exactly their own compliance assessments and farm visits will take place, including a step-by-step process.

We entirely oppose the proposal to use the risk assessment matrix to determine where 'the greatest regulatory effort' should be focussed, as this leaves an open door to certain farm sites never being visited or assessed by the Regulator. Given our view that effective regulation should apply to all farm sites, the Regulator should treat all farm sites with equal importance in terms of compliance, not just those categories as 'substantial' or 'high' risk to wild salmonids. The concept that farms deemed to pose a 'medium risk' to wild salmonids fall under a category of 'secondary focus for inspections' is unacceptable. Any level of risk to wild salmonids beyond no risk, warrants priority focus.

Given that we oppose the approach to compliance assessment protocol, we cannot support its timetable.

## **ENVIRONMENTAL MONITORING AND MONITORING PLANS FOR WSPZs**

We would assume as a principle that the cost of monitoring to SEPA would be funded by the fees associated with the applications and licences. Whilst we see the value in other bodies contributing to the process, this process must be led by SEPA as the lead Regulator. If the Regulator does not lead, this has the potential to dilute their regulatory powers. The Atlantic Salmon Trust is willing to work constructively to contribute skills and expertise, however this would be on the basis that the funding of such a work programme would be sourced and managed by SEPA or the Scottish Government, ensuring that the risks of such a programme remain with the Regulator.

Environmental monitoring should be put in place so that the operator can be sure that they are not negatively impacting the environment and are compliant with any regulatory duties. We believe therefore that the monitoring regime should be funded by the industry which is to be licensed and regulated.

The issuing of a licence presumes that there is the potential to impact on the environment, and as such the Polluter Pays Principle should be followed.

Whilst we see the importance in combining knowledge and skills that comes with a collaborative environmental monitoring approach, we are concerned that this may allow SEPA to outsource its legal responsibility to monitoring the environment. It is our view that channels should exist for other bodies to input into the monitoring process, but this must ultimately be controlled by the Regulator.

## MAKING DATA AVAILABLE

The Atlantic Salmon Trust supports making data available and freely accessible and sees the publication of that data on both Scotland's Aquaculture website and within Scottish Wild Salmon Strategy annual reports as appropriate platforms. We also support the publication of data on Scotland's Environment website.

## ANALYSIS OF IMPLICATIONS

We welcome SEPA's statement that their role is to protect *and improve* the water environment.

Given this statement, it is disappointing that there appears to be no real urgency within the proposed framework to improve the current situation with regard to existing finfish farms. Even more troubling is that the framework for the licencing of existing finfish farms appears to stop short of even improving the situation with only an aspiration to prevent further deterioration. This is not in line with the requirements of the SIWG which was to not allow a continuation of the status quo.

As such, whilst welcoming the principle of a sea lice regulatory framework for the finfish aquaculture industry which protects wild salmonids from risk, we do not consider the current proposals to go far enough, or that they uphold the Scottish Government's commitments and responsibilities.

Our concerns that the current proposal will not change the status quo, and therefore not reduce the risks to wild salmonids, is summed up in the following paragraph: '*The proposed framework aims to help prevent further deterioration in the condition of wild salmonids by managing risks to wild salmonid post-smolts from sea lice from farm developments. It will also allow action to be taken to reduce pressure from sea lice where impacts are identified.*'

The case for protecting wild salmonids from the impacts of sea lice emanating from finfish aquaculture sites has already been made. This regulation is supporting the status quo and therefore not improving the environmental conditions for wild salmonids. We do not believe that 'preventing further deterioration in the condition of wild salmonids' will allow the Scottish Government to meet its commitments and promises of *reversing* the decline of wild

Atlantic salmon and sea trout. SEPA needs to review the current proposals and make the required changes.

## DO THE PROPOSALS UPHOLD THE COMMITMENTS?

**Commitment 1.** Ministerial commitment to *‘Prioritise the protection and recovery of Scotland’s wild Atlantic salmon populations.’* – Cabinet Secretary for Rural Affairs & Islands, Mairi Gougeon.

*COMMITMENT NOT YET MET*

**Our Reason:**

Proposing a regulatory framework for sea lice emanating from finfish farms, a known and accepted threat to wild salmonids, without applying it to existing finfish farms is clearly at odds with the prioritisation for the protection and recovery of Scotland’s wild Atlantic salmon populations.

**Commitment 2.** Scottish Government commitment to not permit a continuation of the status quo in relation to farmed/wild fish interactions - Scottish Government Response to Salmon Interactions Working Group Report.

*COMMITMENT NOT YET MET*

**Our Reason:**

Not bringing in the framework for existing finfish farms is a continuation of the status quo, as are the prolonged timetables for implementation.

**Commitment 3.** UK and Scottish Government NASCO commitment for *‘100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms.’*- Williamsburg Resolution, NASCO.

*COMMITMENT NOT YET MET*

**Our Reason:**

Not applying the framework to existing finfish farms, and stipulating only the prevention of further deterioration, is a significant breach of the NASCO Williamsburg Resolution to have effective sea lice management for 100% of farms.

**Commitment 4.** Uphold the commitment to accept the agreed recommendations from the Salmon Interactions Working Group, most notably to bring in regulation which is *‘comparable with the highest international and domestic regulatory standards.’*

**COMMITMENT NOT YET MET**

**Our Reason:**

The proposed framework diverges from the highest international standards in many ways, including but not limited to: its applicability to existing finfish farms, its definition of the ‘sensitive period’ for migratory fish, and its lice threshold levels and measurements.

Furthermore, it is not aligned with domestic regulatory standards, notably the Scottish Regulators’ Strategic Code of Practice, nor with the finfish aquaculture industry’s Code of Good Practice.

**Commitment 5.** Uphold the commitment in Scotland’s Environment Strategy to ensure that; *‘Scotland’s nature is protected and restored.’*

**COMMITMENT NOT YET MET**

**Our Reason:**

For Scotland’s wild salmon and sea trout to be protected from the risks and impacts of sea lice attributable to aquaculture, it is clear that all finfish farms should be bound to adhere to a regulatory framework which adequately protects wild salmonids from harm.

With regards to the commitment to *restoring* wild salmon and sea trout populations, this quite simply cannot be achieved if the framework proceeds with the following aim: *‘The proposed framework aims to help prevent further deterioration in the condition of wild salmonids.’*

Preventing further deterioration does not represent protection, nor restoration.

## FINAL REMARKS

The Atlantic Salmon Trust remains committed to engaging constructively with the process of development for Wild Salmon Protection Zones on the West Coast of Scotland.

Our extensive and detailed response to this consultation is indicative of the potential we see in supporting the underlying principle that numbers of sea lice emanating from finfish farms should be managed within a regulatory framework which adequately protects wild salmonids.

However, in its current form, the proposals lack clarity and require fuller explanation. This should be in both a technical capacity but also a non-technical version so that members of the public can fully understand the measures being taken.

We ask SEPA to reflect on our response, its responsibilities as a regulator, and the Scottish Government's commitments, to ensure that the next iteration of its proposals aligns with those commitments. Effective regulation would mark a positive turning point for our wildlife, our shared natural and cultural heritage, and help to restore wild salmonids for the benefit of the environment and future generations of people.

The Atlantic Salmon Trust is committed to putting wild salmon first, and so to must this process.

---

<sup>1</sup> NASCO, [SoS-final-online.pdf \(nasco.int\)](#)

<sup>2</sup> Adams, C. E., Honkanen, H. M., Bryson, E., Moore, I. E., MacCormick, M. & Dodd, J. A. (2022). A comparison of trends in population size and life history features of Atlantic salmon (*Salmo salar*) and anadromous and non-anadromous Brown trout (*Salmo trutta*) in a single catchment over 116 years. *Hydrobiologia*, **849**, 945 – 965.

<sup>3</sup> NASCO, [SoS-final-online.pdf \(nasco.int\)](#)

<sup>4</sup> [Pressures Facing Salmon - NASCO](#)

<sup>5</sup> <https://www.nature.scot/doc/priority-marine-features-scotlands-seas-habitats>

<sup>6</sup> [List of UK BAP Priority Fish Species \(excluding purely marine species\) \(2007\) \(jncc.gov.uk\)](#)

<sup>7</sup> [Wild salmon strategy: implementation plan 2023 to 2028 - gov.scot \(www.gov.scot\)](#)

<sup>8</sup> [Environmental Impacts of Salmon Farming Cover Note \(parliament.scot\)](#)

<sup>9</sup> <https://www.gov.scot/publications/salmon-interactions-working-group-report-scottish-government-response>

<sup>10</sup> Council CNL(06)48 Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks. The Williamsburg Resolution (Adopted at the Twentieth Annual Meeting of NASCO in June 2003 and amended at the Twenty-First Annual Meeting of NASCO in June 2004 and at the Twenty-Third Annual Meeting of NASCO in June 2006)

<sup>11</sup> [Salmon Interactions Working Group report - gov.scot \(www.gov.scot\)](#)

<sup>12</sup> [Salmon Interactions Working Group report - gov.scot \(www.gov.scot\)](#)

<sup>13</sup> Scottish Regulators' Strategic Code of Practice

<sup>14</sup> [2. Licensing and Enforcement Recommendations - Salmon Interactions Working Group Report: Scottish Government Response - gov.scot \(www.gov.scot\)](#)

<sup>15</sup> [Environment Strategy Overview \(data.gov.scot\)](#)



---

<sup>16</sup> <https://www.gov.scot/publications/tackling-nature-emergency-consultation-scotlands-strategic-framework-biodiversity/>

<sup>17</sup> [Vision for Sustainable Aquaculture - gov.scot \(www.gov.scot\)](#)

<sup>18</sup> [Scottish wild salmon strategy - gov.scot \(www.gov.scot\)](#)

<sup>19</sup> [Salmon Interactions Working Group Report: Scottish Government Response - gov.scot \(www.gov.scot\)](#)

<sup>20</sup> [Protecting Scotland's environment - gov.scot \(www.gov.scot\)](#)

<sup>21</sup> [chapter-4-seawater-lochs.pdf \(thecodeofgoodpractice.co.uk\)](#)

<sup>22</sup> [Biodiversity strategy to 2045: tackling the nature emergency - gov.scot \(www.gov.scot\)](#)

<sup>23</sup> Council CNL(16)41 Norway – Measures introduced to meet NASCO goals of reducing impacts from sea lice and escapees on wild salmon (Tabled by the Norway)

<sup>24</sup> [Modelling parasite impacts of aquaculture on wild fish: The case of the salmon louse \(\*Lepeophtheirus salmonis\*\) on out-migrating wild Atlantic salmon \(\*Salmo salar\*\) smolt - ScienceDirect](#)

<sup>25</sup> Tully, O., Gargan, P., Poole, W.R. & Whelan, K.F. (1999). Spatial and temporal variation in the infestation of sea trout (*Salmo trutta* L.) by the caligid copepod *Lepeophtheirus salmonis* (Kroyer) in relation to sources of infection in Ireland. *Parasitology* 119; 41-51.

Gargan, P.G., Tully, O. & Poole, W.R. (2003). Relationship between sea lice infestation, sea lice production and sea trout survival in Ireland, 1992-2001. In: Mills, D. (ed.) *Salmon at the Edge Proc. of Conference organised by the Atlantic Salmon Trust*, Blackwell Publishing, Oxford. p119-135.

<sup>26</sup> Whelan, K.F. (2014) Sea-trout populations in small coastal streams. *Biology and Environment. Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 114b, No. 3, 199-204.

<sup>27</sup> [Contents | 2nd International Sea Trout Symposium](#)

<sup>28</sup> Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout – Thorstad and Finstad 2018

<sup>29</sup> ( McCully and Whelan – 2013 – *Nomads of the Tides – Fishing for Irish Sea Trout* – Medlar Press)

<sup>30</sup> Development of a risk assessment method for sea trout in coastal areas exploited for aquaculture Bengt Finstad<sup>1,\*</sup>, Anne D. Sandvik<sup>2</sup>, Ola Ugedal<sup>3</sup>, Knut W. Vollset<sup>4</sup>, Ørjan Karlsen<sup>2</sup>, Jan G. Davidsen<sup>5</sup>, Harald Sægvog<sup>6</sup>, Robert J. Lennox<sup>4</sup>

<sup>31</sup> <https://www.gov.scot/publications/scottish-wild-salmon-strategy>

<sup>32</sup> <https://www.sepa.org.uk/regulations/water/>