

Salmon farming in Scotland

One year on from the RAIC's review of progress on the 2018 Rural Economy and Connectivity Committee Inquiry's recommendations

The Coastal Communities Network Scotland represents more than 30 community-led coastal groups that aim to protect, restore, and sustainably use coastal & marine resources for the benefit of nature, people, and climate.¹ CCN participated in the 2018 Inquiry into salmon farming, and the RAI Committee's follow up in 2024.

Salmon are farmed in open nets, using the sea for free waste and pesticide disposal. The farms also discharge huge quantities of parasitic sea lice, which impact wild salmon and sea trout. Escapes, such as the 75,000 salmon that escaped from Mowi's Gorsten farm in October 2025, do further harm to their wild relatives, which are in crisis. The farms impact other local business and communities, as detailed by a recent socio-economic CBA.² The feed system is also unsustainable, adding a huge carbon-footprint to each fish, along with the widespread air freighting to distant markets.

Tens of millions of farmed fish are suffering unnecessarily in Scotland. The Government's 2024 Fish Farm Production Survey³, published since the RAIC's report, shows that mortality has reached previously unseen levels, with 21,109,702 salmon of the latest (2022) complete smolt cohort dying at sea before harvest. That is more than five million higher than the previous record.

In total, the Survey's Supplementary data tables show that more than 329,000,000 salmon have died in Scotland's marine farms alone, since 1984.

Farmed salmon also die in their freshwater stage, before they are put to sea. In 2024, one in two fish died in Scotland's hatcheries, according to the Government's 2024 Survey; that is 89,264,000 ova and young salmon - the largest number since published records began, in 1987.

The figures above exclude the deaths of cleaner fish, of which at least seven million have died prematurely in Scotland's salmon farms since 2020, according to FHI figures, painstakingly extracted from the opaque and incomplete records kept by the Scottish Government.⁴ This excludes the millions that were slaughtered along with the salmon, to prevent disease transmission.

Since the RAIC published its recommendations a year ago, the Scottish Government has made some slight progress to tackle the environmental impacts of salmon farming, but, coupled to the minimal changes made in response to the 2018 REC Committee's report, it is clear that neither the fish farmers nor their regulators want to alter the industry's harmful but highly profitable business model.

CCN believes that a pause in the expansion of salmon farming is essential until the industry has proved that it can solve its many problems.

¹ <https://www.communitiesforseas.scot/>

² Tregear, A. & Moxey, A, Assessing the Economic Impact of Salmon Farming in Skye & Lochalsh University of Edinburgh Business School An Exploratory Scoping Study. November 2025. https://wildfish.org/wp-content/uploads/2025/11/24.11.25_Economic-Impact-of-Salmon-Farming_Skye-and-Lochalsh.pdf

³ <https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2025/10/scottish-fish-farm-production-survey-2024/documents/scottish-fish-farm-production-survey-2024/scottish-fish-farm-production-survey-2024/govscot%3Adocument/scottish-fis>

and the 2024 Survey's *Supplementary Tables*

<https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2025/10/scottish-fish-farm-production-survey-2024/documents/scottish-fish-farm-production-survey-2024-supplementary-tables/scottish-fish-farm-production-survey-2024-supplement>

⁴ <https://www.theferret.scot/million-lice-eating-fish-died-at-salmon-farms/>

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Salmon farming is losing its social licence to operate, to the detriment Scotland's reputation as a world-class food producer. Operators could restore some social licence by following their own Community Engagement Charter, and withdrawing new farm plans when a community's residents clearly do not want them. A current example of their failure to do this is at Fish Holm in Shetland, where SSF is pushing on with its proposal for Scotland's largest salmon farm, despite the well-evidenced objections of Shetland's fishers.

The main bank that lends to Norway's salmon farmers has said that the global industry is losing its social licence, as a result of hitting "its biological ceiling".⁵ This is the case in Scotland, where climate change is an existential threat to farming salmon; warmer seas allow pathogens and parasites to thrive.

The Government's 2024 Fish Farm Survey shows that mortality in the sea phase of production reached new heights for the most recent complete salmon cohort (put to sea in 2022), with 48.6% dying in SW Scotland (Argyll), and 46.6% in the Western Isles - the highest rates where the sea is warmest, as has happened often in recent years.

The clear consequences of climate change for animal welfare are still being ignored by the planning system. For example, Argyll & Bute Council recently gave Bakkafröst consent for a huge new salmon farm west of Gigha, where the same company's existing farms had experienced record-breaking levels of mortality, fuelled by some of the warmest seas in Scotland. Mowi has now applied for a new farm at Sanda, even further south.

The Government has failed to adopt the RAIC's recommendations (para 278 & 279) in this respect:

"...the Committee emphasises that ... marine spatial planning ... should aim to inform an adaptive planning approach flexible to respond to both short-term acute environmental events and the long-term trajectory of climate change impacts on the sustainability of salmon farming".

Instead, the Government has refused to assess the overall impacts of this industry, at it is now and post-expansion, and has postponed considering a new National Marine Plan, which might or might not include a comprehensive marine spatial plan.

The 2024 Fish Farm Production Survey shows that mortality for the 2022 smolt cohort averaged 38.2% across the whole industry - the worst death rate since 1989 and the third-worst ever.

This deterioration undermines the Cabinet Secretary's statement to the RAIC that marine mortality rates had stayed relatively consistent, "at a level of about 25%", adding, "of course, that is not where we or the industry want those figures to be..."

For how much longer can the Cabinet Secretary maintain her position that: "I do not want to get into [setting limits on acceptable levels of mortality]. The Committee asked me during my previous appearance about what an optimum target would be, but I do not think that that is a helpful conversation to have."?

It is vital to set a cap on acceptable levels of mortality.

Given that a third of a billion salmon have died in Scotland's marine salmon farms alone, it is clearly impossible that high animal welfare standards are being maintained, yet the welfare inspection system run by the UK's Animal and Plant Health Agency, on behalf of the Scottish Government, is so deeply flawed that there has never been a prosecution of a fish farm operator under the 2006 Animal Health and Welfare Act, for allowing unnecessary suffering.

In the Marine Directorate's briefing notes for the Cabinet Secretary, ahead of her session with the RAIC in November 2024⁶, Mairi Gougeon was advised to tell the Committee only "if pressed", that APHA has never issued "a formal warning letter, Care Notice or reported a case to the COPFS for consideration in relation to farmed fish".

APHA routinely fails to even visit farms where up to a million fish have died (e.g. at Mowi's Seaforth/Noster farm in the Western Isles).⁷

⁵ <https://www.undercurrentnews.com/2024/03/20/dnb-salmon-farming-at-biological-ceiling-risks-losing-social-license/>

⁶ Page 53: "If pressed: APHA has not yet issued a formal warning letter, Care Notice or reported a case to the COPFS for consideration in relation to farmed fish." <https://www.gov.scot/binaries/content/documents/govscot/publications/foi-eir-release/2025/01-a/foi-202400440742/documents/eir-202400440742---information-released---item-1/eir-202400440742---information-released---item-1/govscot%3Adocument/EIR%2B2024004407>

⁷ <https://www.theguardian.com/environment/2024/oct/22/more-than-1m-farmed-salmon-die-at-supplier-to-leading-uk-retailers>

Contrary to APHA's, FHI's and the Cabinet Secretary's assertions to the RAIC, fish farm mortality, fish welfare and the system for regulating them are out of control.

The RAIC was correct to say that it, "believes further action is needed to improve the governance of fish health and welfare on farms to address gaps in accountability and enforcement around mortality", and to recommend that, "the Scottish Government provide powers to the Fish Health Inspectorate (or another appropriate body) to limit or halt production at sites which record persistent high mortality rates. The Scottish Government should work with industry and regulators to agree appropriate criteria and mortality thresholds for the use of these powers."

This has not happened.

It is clearly not sufficient for the Cabinet Secretary to respond that the Fish Health Inspectorate has the appropriate powers to deal with mortality resulting from fish health issues, and that she did not see how an intervention mechanism could effectively work, saying: "If, for example, an environmental challenge arises that could not be predicted, how does a farm deal with that? How does a farm deal with a situation that could lead to an increase in mortalities that is outwith its control?"

This implies that all mass mortality events are rare and unpredictable, but that is not the case. Many fish die from gill-related problems, especially when the farm operators subject them to treatments for sea lice.

While some gill issues are caused by "environmental challenges", such as jellyfish, many are due to disease.

If farmers repeatedly fail to keep their fish healthy in certain farm locations, then they should downsize, or close those farms.

Persistent high mortality in some farms

The Scottish Government's September 2025 interim update commits it to analysing the data to check whether some farms experience persistent high mortality. This is good, but the proposed methodology is flawed, as its criteria are too conservative, likely filtering out most of the farms that often experienced high mortality. CCN has written a note on this topic which will be sent to the RAIC separately.

The Government's own methodology acknowledges that the official mortality data is incomplete and hard to analyse, yet the Government has refused to act on the RAIC recommendation (para 76) that it "must publish comprehensive, consistent and transparent mortality figures that include the number of fish at a farm, the freshwater mortality and seawater mortality, per facility, with accurate numbers of dead salmon, wrasse and lumpsuckers per week and with cumulative mortality totals at the end of each cycle".

The Government has not agreed to the RAIC's recommendation (para 77) to publish an annual fish health report, detailing the health and welfare status of all farmed aquatic finfish, including wild caught wrasse, in Scotland, including annual statistics on, and the causes of, finfish mortalities, as happens in Norway. Nor has detailed mortality reporting been made mandatory (para 78), although this is essential in order to understand the full extent of the problem.

Production value and employment

Despite detailing the record-breaking levels of mortality, the latest Fish Farm Production Survey also shows that the sector's "Production Value" reached a record high in 2024, giving the lie to the industry's claim that it has strong economic incentives to address its animal welfare issues. Clearly, even the latest, record-breaking number of deaths do not impair its ability to make a profit.⁸ Reducing supply raises the price of salmon.

Despite the rising value of production, the number of direct jobs on salmon farms continues to fall year-on-year, dropping to 1,362 on seawater farms, a decrease of 118 employees (8%) compared with 2023.

The figure fell in the two previous years as well. The total is now roughly the same as in 2015.

Another 280 people worked in freshwater hatcheries in 2024, a decrease of 25 jobs (8%) since 2023.

⁸ Table 45 in the 2024 Survey's *Supplementary Tables* shows that the highest value per tonne of salmon since 2015 occurred in 2022 and 2023, the two worst years for production.

There are some administrative and sales jobs elsewhere (estimated by CCN to be around 250 for the four largest companies) and an unknown number of processing jobs (presumably many more), which are often far from the farms. These are less well-paid and they employ a high proportion of workers from overseas, who presumably send some of their earnings home, rather than contributing most of them to the Scottish economy.

The industry also claims that there are up to 10,000 additional jobs in the supply chain. That figure depends heavily on the use of economic multipliers, which are notorious for double-counting indirect and induced jobs that are due, in part, to other sectors.

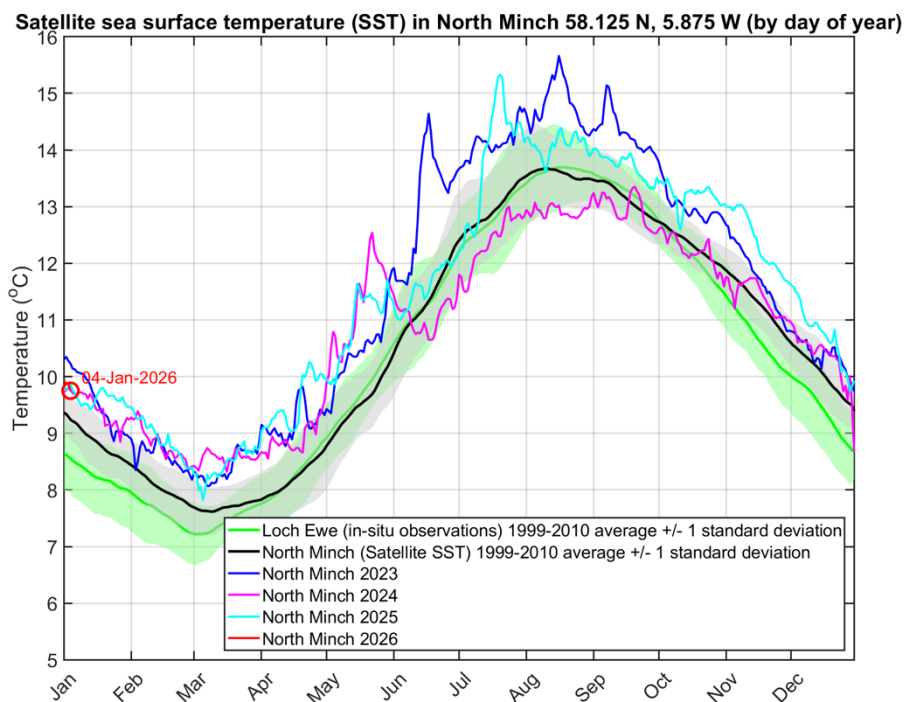
Rising sea temperature is driving mortality upwards

In September 2025, Salmon Scotland wrote to the RAIC, saying that monthly average mortality had improved.⁹ However, the monthly mortality figures for the last few months have once again risen to near record-breaking levels¹⁰, for the simple underlying reason that the sea is becoming warmer.

The graph below¹¹ shows the marine heat wave in 2023 (dark blue line) and in the first half of 2024 (pink line), which contributed to the awful mortality figures reported in the 2024 Survey.

In June 2024, the sea temperature dropped below the long-term average, which helped the farmers for a while, but the reprieve was brief. The turquoise line shows that the sea surface temperature was again above the long-term average for almost the whole of 2025. As of 4th January 2026, the sea is still far warmer than historic levels. This has probably caused the high sea lice levels seen on many salmon farms since October 2025. Combined with gill disease, this is resulting in the high mortalities that are now being reported - over a million salmon died in Scotland's marine farms in November 2025.

The Government and industry must plan for this new normal, rather than acting as if it is not happening.



⁹ "Significant improvements in overall biological performance, fish growth, and productivity during 2025...Record survival figures for January-August 2025". <https://www.parliament.scot/-/media/files/committees/rural-affairs-and-islands-committee/correspondence/2025/salmon-farming-salmon-scotland-29-september-2025.pdf>

¹⁰ October 2025 monthly mortality, reported by Salmon Scotland, was a near-record 4.78%. November's death rate was 3.52% - the third highest November figure since records began 2018.

66% of the fish in Mowi's East of Papa Little farm died in November 2025 (160,158 fish, according to FHI). Loch Duart's Gob na Hoe and Badcall sites registered 34% (190,202 fish, according to FHI) and 32% monthly deaths respectively.

¹¹ Loch Ewe data: Marine Scotland <https://data.marine.gov.scot/dataset/scottish-coastal-observatory-loch-ewe-site>. Satellite Sea Surface Temperatures (SSTs): NOAA <https://downloads.psl.noaa.gov/Datasets/noaa.oisst.v2.highres/>

Industry expansion and streamlining consenting

Despite the clear link between climate change and rising mortality in salmon farms (proven by Scottish Government researchers¹²), proposals for huge new fish farms are still being submitted and then fast-tracked, thanks to the Scottish Government's determination to streamline consenting.

The Government is even reconsidering the "Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) processes, again seeking to identify potential opportunities to streamline those aspects of the consenting process", according to the Cabinet Secretary's September 2025 update to the RAIC. This should ring alarm bells for Committee members. The Habitat Regulations are a vital backstop for protecting the species and ecosystems on which much of Scotland's marine economy depends.

The need to pause expansion

The RAIC's report was right to be concerned that "preventing high mortality events is not currently within the operational capability of industry as a whole and its fish farmers individually".

The salmon farming industry must know this but it will continue to ignore its biological and societal limits unless it is obliged to do so by its regulators.

The reason given for the Committee not recommending a pause of expansion was that the socio-economic cost of doing so was unknown. This is nonsensical as a pause of expansion would have no impact on existing jobs or on the existing level of business. Only the industry's relentless push to increase its profits would have to wait, while it sorts out its many problems, in order to become a responsible neighbour to coastal communities.

CCN urges the Rural Affairs and Islands Committee to recommend a pause on the expansion of salmon farming until the industry can prove that it has solved its problems.

Please make provision for the successor to the Rural Affairs and Islands Committee to continue its scrutiny of salmon farming in the next Parliament.

Further comments on the Scottish Government's interim update on activities in response to the Rural Affairs and Islands Committee report on 'Salmon Farming in Scotland', September 2025

Spatial Planning

The RAIC report recognised that marine spatial planning is desperately needed, including an assessment of the overall impact of the salmon farming industry on the environment and the jobs of others who depend on the sea.

The Scottish Government's initial response was that it "will explore, through the development of National Marine Plan 2, a commitment to bring the range of management measures and spatial constraints data for salmon farming into one place beyond the expected adoption of the plan in 2027, in addition to continued progress of our Regional Marine Plan programme. Further, we will explore support for 'relocation' of salmon farms through the development of NMP 2 and how it can work to underpin adaptive management approaches".

However, the Government has backtracked in its September interim update, saying instead that, "we have made the decision to postpone the upcoming consultation on a draft MMP2 to allow for further consideration of the feedback received during the Planning Position Statement (PPS) consultation and our approach to NMP2. An update on anticipated timing will be communicated in due course."

With this poor decision, and its postponement of the PMF/MPA consultations, the Scottish Government has kicked the can on spatial planning even further down the road, just when it is most needed.

¹² Moriarty et al. Preventive Veterinary Medicine 178 (2020) 104985. Modelling temperature and fish biomass data to predict annual Scottish farmed salmon, *Salmo salar* L., losses: Development of an early warning tool <https://doi.org/10.1016/j.prevetmed.2020.104985>

SEPA's Sea Lice Risk Assessment Framework

The Government's response to the RAIC report was that it "will continue to work with SEPA and the sector to support development of the monitoring strategy underpinning SEPA's Sea Lice Risk Assessment Framework (including introduction of sentinel cage monitoring in 2025) and to manage the transition of governance of this issue under existing local authority Environmental Management Plans by the end of 2025. Scottish Government will publish updated working arrangements guidance for fish farm developments by the end of 2025".

The updated working arrangements have not yet been published.

The update confirmed that the first pilots for monitoring sentinel pens, to test sea lice dispersions models, were completed in spring 2025. The results were being assessed. SEPA has a new charging scheme for monitoring the impacts of sea lice on wild fish and has started an initial programme of sea trout monitoring on the west coast, Western Isles and Orkney, with a national programme due to start in 2026, replacing the Environmental Management Plans for sea lice that are currently imposed as planning conditions.

This would have represented some progress towards protecting wild fish, but SEPA also has to add new terms to fish farm licences before it can make any improvements. These require farmers to report sea lice numbers on their fish every week, and would cap their numbers at historic levels (which still might be very high) in a few farms that pose the highest risk to wild fish. These terms are the bare minimum and are far from sufficient but, instead of complying, every salmon farm company has appealed against the new licence terms, blocking the new regulatory framework until the 200+ appeals for all their farms have been decided.

The Government is in no position to claim that wild salmon and sea trout are any better protected now than they were at the time of the RAIC's review, or indeed of the RECC's 2018 Inquiry. It is beholden on Ministers to defend SEPA's sea lice regulatory framework and not to cave in to industry pressure.

SAWC report on the use of wrasse and lumpstickers as cleaner fish in salmon farms

In her interim update, the Cabinet Secretary informed the RAIC that the Scottish Animal Welfare Commission's report on cleaner fish was being finalised. It was published in November 2025.¹³ Shamefully, the SAWC has concluded that cleaner fish can be used for at least another decade, despite a minimum of seven million wrasse and lumpstickers having died in Scottish salmon farms, since 2020.⁵

The SAWC did not fully acknowledge the scale of cleaner fish deaths, misconstruing the conclusion of one research paper (Geitung et al., 2020¹⁴) that found mortality rate of 57% for ballan wrasse in an 18-week period and 27% for lumpfish in just 12 weeks, by putting this down to "poor food intakes". Geitung et al. also wrote that "individual farms [had been] observing up to 100% mortality or loss (Nilsen et al., 2014). A recent study reported > 65% mortality of ~193,000 cleaner fish in 12 commercial salmon sea cages during most of a production cycle (Bui et al., 2018)".

The SAWC did acknowledge that "the mortality and the explained and unexplained losses of cleaner fish are a major concern" and that, "high mortalities and incidence of disease in cleaner fish have also been reported by the industry in Norway and high rates of mortality have been shown in experimental studies".

It correctly stated that the causes of cleaner fish deaths are largely unknown, that, "the losses may be very high" and crucially, that "the missing animals ... likely experienced poor welfare before death due to disease or predation".

¹³ Report on the welfare of cleaner fish used in the Scottish salmon industry Scottish Animal Welfare Commission November 2025 <https://www.gov.scot/publications/welfare-cleaner-fish-used-scottish-salmon-industry-scottish-animal-welfare-commission/documents/>

¹⁴ Geitung, L., Wright, D.W., Oppedal, F., Stien, L.H., Vågseth, T., Madaro, A., (2020). Cleaner fish growth, welfare and survival in Atlantic salmon sea cages during an autumn-winter production. *Aquaculture* 528, 735623

Given this starting point, the SAWC then conducted an ethical review.

It admitted that, “to our knowledge, this situation is unique in aquaculture and terrestrial livestock production”. This bears repetition - no other farming system uses other vertebrate species to remove parasites from farmed animals, and then kills them all.

This is clearly unethical, and the SAWC seemed to agree, writing that “ethically, it seems wasteful to sacrifice healthy cleaner fish because of difficulties with biosecurity”, but then it hedged, recommending that there should be no changes to the practice of using cleaner fish in salmon farming in Scotland, with only the aim, “preferably”, to phase out their use over ten years.

The only justification given by the SAWC for allowing this unethical system to continue for at least another decade, is that, “the use of cleaner fish reduces the need for more aversive treatments such as chemotherapeutics and thermal delousing treatments, which are stressful for the salmon, and may be associated with higher mortality”.

Surely this is unacceptable; one unethical system (cleaner fish) cannot be justified because it is deemed less unethical than the alternative (i.e. causing larger numbers of deaths of salmon through chemical, physical and thermal treatments for sea lice).

The deaths of salmon due to sea lice treatments are a symptom of a flawed production and business model that results in infestations of sea lice and then excuses the widespread suffering caused by treating them. This should be addressed by farming fewer salmon, not by co-opting other vertebrates to become cleaner fish, then allowing millions of them to suffer and die, before slaughtering the survivors.

Incidentally, while the SAWC has clearly followed what the industry wants, its report is one of the few official documents to spell out that many farmed salmon die due to the treatment choices made by fish farmers.

The SAWC noted that some companies are stopping using lumpsuckers as cleaner fish because of “problems with their robustness, separating them from the salmon and managing them during interventions”.

Even though these “interventions” routinely cause so many deaths that hundreds of thousands of lumpsuckers have died in single production cycles in some Scottish farms, the SAWC still made no criticism of fish farming companies for having persisted in using them as cleaner fish for many years, despite knowing that many would suffer and die as a result.

Nor did the SAWC recommend that the companies that still use lumpsuckers should stop doing so immediately.

As advisors on ethics and animal welfare, the members of the SAWC should be ashamed.

Official guidance on welfare standards for cleaner fish

There has been some progress with regard to welfare standards for cleaner fish. Thanks mainly to the RAIC’s report, the Government has now said that it intends to introduce official guidance under Section 38 of the Animal Health and Welfare (Scotland) Act 2006, to progress farmed fish welfare standards. This will apply to all fish species used in Scottish finfish production. It will be “robust and workable”.

As this guidance is to be developed in partnership with the industry (note “workable”), it remains to be seen whether it will make any material difference to the tens of millions of salmon, wrasse and lumpsuckers that are currently suffering unnecessarily in Scotland’s fish farms.

The wild wrasse fishery

Wild wrasse are caught almost entirely for use as cleaner fish in salmon farms. Removing millions of these keystone species has a profound environmental impact on the kelp forests and rocky reefs where they live.

For years the Scottish Government has ignored its legal obligations under the Habitats Regulations, to assess the impact of removing wrasse from Special Areas of Conservation for reefs and kelp. It finally did so in 2025, and, on finding a significant impact, it has closed wrasse fisheries within the relevant SACs. This represents real progress since the RAIC report.

However, as explained by the Sustainable Inshore Fisheries Trust¹⁵, the action taken so far is not enough to make the wrasse fishery sustainable, as no stock assessments are undertaken for wrasse species, no Total Allowable Catch (TAC) has been set, there is negligible monitoring and enforcement, and, especially, because the Scottish Government permits the fishery to occur during the wrasse spawning season, as well as permitting Ballan wrasse to be caught before they have reached maturity. Landing records are also inadequate – landings directly to fish farms are not included, for instance.

The Government's progress towards a Fishery Management Plan (FMP) for the Scottish wrasse fishery is painfully slow. To be effective, the FMP must close the fishery while wrasse are spawning (April-August), it must require all wrasse fishing vessels to be equipped with Vessel Monitoring Systems, it must review the Minimum/Maximum Landing Sizes for wrasse species, and collect data to assess the stock and to set a TAC.

Fish farm escapes

The Scottish Government's initial response to the RAIC report says: "We will prioritise progress on financial penalties for fish farm escapes in 2026/2027, and a revised technical standard for finfish escapes in 2027/2028". This was confirmed by the September interim update: "We have committed to prioritise progress on penalties for fish farm escapes in 2026/2027, however some initial scoping work has commenced to consider options for the introduction of penalties". This sounds good but it is happening far too slowly.

Streamlining Consenting

The Government's plans to streamline the fish farm consenting process are largely irrelevant to the RAIC's recommendations, and they seem to be directly at odds with them, in respect of the Government's intention to look at streamlining the Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA) processes.

The process of streamlining fish farm consenting involves plenty of "liaising with fish farming businesses", but there seem to have been no consultations about the streamlining of this process with the coastal communities that will be directly affected. CCN has not been asked for feedback, despite requesting this.

Coastal communities remain excluded from the Cabinet Secretary's Scottish Aquaculture Council.

¹⁵ <https://sift.scot/wp-content/uploads/2019/02/SIFT-Mismanagement-of-the-Scottish-Wrasse-Fishery-Sept2025.pdf>