Assessing the Economic Impact of Salmon Farming in Skye & Lochalsh An Exploratory Scoping Study

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Cover image: a salmon fish farm in Loch Ainort, Isle of Skye.

Highlights

Headline estimates of the economic impacts of Scottish salmon **exaggerate economic benefits** by focussing on **gross rather than net effects** and disregarding counterfactuals. This exploratory study examines evidence for net effects on **Skye & Lochalsh**. It finds that:

- Rigorous economic impact assessment of net benefits is hampered by an **over-reliance on self-reporting** and the **absence of granular economic data** for sectors other than salmon farming.
- Headline estimates do not take account of **displacement effects** on other businesses e.g. additional costs, reduced revenues and more difficult recruitment.
- In Skye and Lochalsh, **c.9% to 28% of reported salmon farm jobs may not be net additions to local employment** due to such effects.
- Equally, centralised government systems mean that **public revenue** raised from the salmon sector is **not ring-fenced back to communities hosting salmon farms**, including those in Skye & Lochalsh.
- Moreover, aggregate **public revenue** raised from salmon farming is at least **partially offset by tax breaks, grant aid and expenditure by public bodies** for the industry.
- Increased **revenue raising** and/or **ring-fencing** back to communities with a greater say over its allocation could increase local **democratic accountability** and local **community benefit sharing**.
- Other factors constraining local net benefits include long-term **environmental externality costs**, sectoral **volatility**, potential **profit leakage** under foreign ownership, and limited **voluntary community contributions**.
- Greater **adherence to published official guidance for economic appraisal, monitoring and evaluation would be helpful** for scrutinising policy coherence and benefit sharing.

Executive Summary

E1. Headline estimates of the economic impacts of Scottish salmon **exaggerate economic benefits** by focussing on **gross rather than net effects** and disregarding counterfactuals. This exploratory study examines evidence for net effects on **Skye & Lochalsh**. It finds that:

E2. Rigorous economic impact assessment of net benefits is hampered by an **over-reliance on self-reporting** and the **absence of granular economic data** for sectors other than salmon farming.

E3. Headline estimates do not take account of **displacement effects** on other businesses competing with salmon farms for marine and coastal space, environmental resources and labour. For example, other firms experience additional costs, reduced revenues and labour recruitment difficulties.

E4. In Skye and Lochalsh, salmon farms are estimated to account for c.137 jobs. Of these, stakeholder testimony suggests that **c.9% to 28% may not be net additions to local employment** due to displacement effects.

E5. Equally, centralised government systems mean that **public revenue** raised from the salmon sector is **not ring-fenced back to communities hosting salmon farms**, including those in Skye & Lochalsh.

E6. Moreover, aggregate **public revenue** raised from salmon farming is at least **partially offset by tax breaks and grant aid** to salmon farming itself plus **expenditure by public bodies** on behalf of the industry.

E7. Current **voluntary community benefit sharing**, both in cash and in-kind, is relatively small compared to industry profitability and typically not determined by communities themselves.

E8. Additional **environmental externality** costs also arise, albeit they are not easily quantified in financial terms. Full externality effects may take further time to become apparent.

E9. The predominance of foreign ownership of Scottish salmon farming increases the scope for leakage of economic benefits rather than their retention locally through recycling of profits.

E10. In addition, exposure to **global markets, pests and diseases**, and international consolidation results in a degree of **volatility** for output and employment.

E11. Increased public **revenue raising** and/or **ring-fencing** back to communities with a greater say over its allocation could increase local **democratic accountability** and local **community benefit sharing** to more fully compensate for negative economic and environmental effects.

E12. **Governance arrangements** for the sector could be improved. For example, at the operational level, reliance upon **self-reporting** by farms, lack of clarity about respective **roles and responsibilities** for different public bodies, and the consultation response burden on communities could all be reviewed.

E13. At the **strategic level**, the Scottish Government could more clearly **articulate the trade-offs** between **different policy objectives** and how these should translate into spatial prioritisation and targeting for Local Authorities reacting to license applications.

E14. Greater **adherence to published official guidance for economic appraisal, monitoring and evaluation would be helpful** for scrutinising policy coherence and benefit sharing.

Salmon farm at Cairidh, Loch Ainort, Isle of Skye

1. Introduction & Methods

1. The economic benefits of salmon farming to Scotland are widely reported. They include the creation of direct and diversified employment in remote areas, the positive multiplier effects of wages spent in local economies, and the stimulation of activities along related supply chains.

2. Although headline figures are impressive, their derivation and presentation can neglect important factors, such as taking account of counterfactuals and negative externalities. For example, direct and indirect government support for the salmon industry means that it and its associated supply-chain are bigger than might otherwise be the case, but the corollary is that other sectors may be smaller than they might otherwise be, which reduces overall net benefits.

3. The purpose of this study was to explore the feasibility of estimating under-reported negative economic effects arising from salmon farming. Using Skye and Lochalsh as an illustrative example, it sought to (i) estimate the magnitude of these under-reported effects in the local area (as far as possible), and (ii) draw together insights on the measurement issues and data collection needs required for future economic impacts assessments of salmon farming in defined local areas.

4. The study was conducted on behalf of WildFish Scotland, a charitable body that campaigns for the recovery of wild fish populations and their habitats, and the Sustainable Inshore Fisheries Trust (SIFT), a Scottish charitable trust which promotes the sustainable management of Scottish inshore waters. In common with other environmental and community advocacy groups, both these organisations have long been concerned that assumptions about the economic benefits of salmon farming are based on incomplete evidence and are often subject to a lack of critical scrutiny in public debates and in policy circles.

Fish farm in Uig, Isle of Skye

5. The work involved scoping out the often-overlooked features of the economic impacts of salmon farming in Skye & Lochalsh, and associated measurement and data collection issues, as an example case. Therefore, although the study did seek to quantify economic impacts as far as data would allow, the aim was also to raise critical questions and issues often ignored in public and official reporting of the economic impacts of salmon farming. Drawing these together in the form of a summarizing framework can support more robust economic assessments in future. For the critical scrutiny and framework, the authors drew from the UK Treasury's own best practice "Green Book" and "Magenta Book" guidance on economic appraisal and evaluation.[1]

6. The study began with a literature review of salmon farming and its economic impacts, using a combination of web-based search tools and University of Edinburgh library resources, applying relevant keywords. Over 40 studies were reviewed in total, comprising a mix of journal articles and reports commissioned by industry and third-sector bodies. The results of the review are presented in Section 2, and the full list of studies is in Appendix A.

7. In addition, the authors reviewed several recent reports on salmon farming from different Committees of the Scottish Parliament, including transcripts of the oral evidence and the written evidence submitted.[2]

8. The authors also reviewed an archive of local and national press articles relating to salmon farming in Scotland (the "Andrew Currie Archive"), dating from 1963 to 1997. This archive was kindly shared by a local stakeholder. Press articles from 1998 to 2025 were accessed online via the National Library of Scotland.

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[1] e.g. The Green Book (2022) - GOV.UK and The Magenta Book - GOV.UK

[2] ECCLR 2018 Environmental Effects of Salmon Farming. Environment Climate Change and Land Reform Committee Report. The Scottish parliament.
https://webarchive.nrscotland.gov.uk/20240327055237/https://archive2021.parliament.scot/parliamentarybusiness/CurrentCommittees/107592.aspx
REC 2018. Salmon Farming in Scotland. Rural Economy and Connectivity Committee Report. The Scottish Parliament.
https://bprcdn.parliament.scot/published/REC/2018/11/27/Salmon-farming-in-Scotland/REC-S5-18-09.pdf
REC 2021 Rural Economy and Connectivity Committee: Session 5 Legacy Report. The Scottish Parliament.
https://digitalpublications.parliament.scot/Committees/Report/REC/2021/3/23/1254bf5f-3247-4a40-83f3-d7d97073fc66-1#1bf82f94-3943-4d81-8480-81b84e9a0102.dita
RAIC 2025 Follow-up inquiry into salmon farming in Scotland. Rural Affairs and Island Report. The Scottish Parliament.
https://www.parliament.scot/-/media/files/committees/rural-affairs-and-islands-committee/salmon-farming-in-scotland-report.pdf

9. For the scoping study in Skye & Lochalsh, the authors undertook a combination of documentary analysis and in-depth interviewing of local stakeholders. The documentary analysis comprised review of (i) the content of websites of salmon farming companies and local stakeholders, and (ii) content of selected planning applications for salmon farms in the area, and any subsequent oppositions/appeals.

10. Interviews were conducted with 10 local stakeholders. These took in representatives from different parts of the community, including inshore fishing, tourism, local enterprises and wildlife/conservation trusts. The sample did not include representatives from the salmon farming sector.

11. Interviewees were asked for their views on the economic benefits and costs of salmon farming, drawing from their own experiences where appropriate. Interviews also included discussion of policies and governance arrangements that shape the economic impacts of salmon farming. The discussion guide is in Appendix B.

12. Over the data collection period for this study, two stakeholders declined to be interviewed, while others were willing to discuss their views only on condition of strict anonymity. The authors came to understand that the main reason for stakeholders' reticence was the polarised nature of the debate on the impacts of salmon farming in Skye and Lochalsh, which had led to heightened tensions in the community.[3] Hence, interviewees consulted for this report are not named and (to avoid inadvertent identification) insights elicited from them are presented in-the-round alongside other evidence collated from other sources.

[3] In this, the authors were reminded of the comments of Russel Griggs, author of the 2022 report "A Review of the Aquaculture Regulatory Process in Scotland", Supporting documents - Aquaculture regulatory process: review - gov.scot when he noted in his opening statement to the RAIC Parliamentary Committee: 'an almost complete breakdown of institutional and personal trust across interested parties'.

2. Literature Review

13. The economic benefits of salmon farming to Scotland are reported routinely in the press and within governmental policy literature. For example, in terms of creating direct and diversified employment in remote areas plus the direct, indirect and induced multiplier effects of how wages are spent and how further activities are stimulated along the supply-chain.[4] Salmon farming companies may also make voluntary financial and/or in-kind contributions to community infrastructure and activities.

14. Such headline effects are potentially significant. However, their reporting typically neglects a range of important factors, all of which are essential to rigorous and robust economic assessments. First, the value and employment created by salmon farming is not necessarily all additional. That is, some existing activities and jobs may be displaced if their viability diminishes. Hence headline effects should be expressed net of other changes.

15. Second, estimating net effects by comparing outcomes solely to a fixed historical baseline may be less appropriate than using an alternative counterfactual. That is, consideration needs to be given to what might otherwise have happened in the absence of salmon farming (e.g. deterioration or improvement from the historical baseline).

16. Third, the pattern of benefits is often uneven. That is, not all members of society experience the creation of an economic activity in the same way. This relates both to the geographical distribution of impacts (e.g. local vs. regional vs. international) and to their structural distribution (e.g. across different community groups or household income levels).

17. Fourth, the magnitude and pattern of benefits may change over time. For example, as market conditions evolve and new technologies emerge, impacts may intensify or weaken. Hence it is important to consider the duration over which (counterfactual) comparisons should be made.

[4] e.g. Imani and Westbrook (2017), Biggar Economics (2020)

18. The importance of recognizing such factors is emphasized in the UK Government's 'Green Book' and 'Magenta Book': the official guidance for best practice in economic assessment of proposed projects and evaluation once projects have been delivered. The guidance exists to encourage objective analysis and to guard against overly optimistic and promissory partial interpretations of evidence, for example by parties with commercial interests in gaining approvals for projects.

19. However, accommodating additional analytical considerations is constrained by data availability.[5] For example, the displacement of existing activities and jobs is rarely recorded explicitly and changes recorded in aggregate are challenging to attribute to specific causes. Equally, counterfactuals are (by definition) unobserved and hence speculative.

20. Nonetheless, some international studies have attempted to explore the nuanced effects of salmon farming and/or aquaculture more broadly. Typically, this has involved gathering additional survey data, sometimes on a repeated, longitudinal basis. Results vary with context but confirm that gross headline benefits can exaggerate local net benefits.

21. In particular, the distribution of benefits depends on ownership and the extent to which profits are retained locally or flow to other regions or countries. For example, the predominance of foreign ownership provides scope for profits to flow abroad through dividend payments but also internal transfers within parent companies, although identification of such flows from published accounts can be challenging. Similarly, wider supply-chain benefits depend on where upstream and downstream activities are located. In particular, the tendency within the salmon farming sector towards larger-scale and global consolidation of operations reduces the extent of associated local activities over time.

Salmon farm feed mill near Kyleakin, Isle of Skye

[5] e.g. Neiland et al. (1991), Mikkelsen et al. (2021), Samat et al. (2024)

22. Equally, whilst on-farm jobs are local, the workforce filling the jobs is not necessarily drawn from the existing local population. For example, it may be deployed on a rota basis (e.g. two weeks on, two weeks off), allowing staff to be ordinarily resident (and hence spending their wages) elsewhere. Moreover, economies of scale and new production technologies have decreased the number of jobs associated with a given volume of production. In all cases, the effect is to diminish de facto local benefits.[6]

23. Local economic disbenefits may also arise, which can at least partially offset any beneficial impacts. Environmental damage (e.g. pressure on other species and habitats, pollution, altered aesthetics) is the most cited cause of disbenefits, impinging on the productivity and economic viability of other activities, including alternative forms of aquaculture, inshore fishing and also tourism.[7] The viability of other activities may also be constrained by increased competition for access to resources (e.g. sites, labour, workforce accommodation).

24. Hence, unless workers in affected businesses transfer to salmon farming or its associated supply-chain, their livelihood trajectories are unlikely to be enhanced by its arrival. Moreover, if those negatively affected are in lower income households, they often have less capacity to adjust to changing circumstances.[8] Local disbenefits of increased reliance on salmon farming may also include increased exposure of the local economy to volatile global markets, and disease outbreaks, with associated risks of sudden downturns and divestments in activity.[9]

25. Community and wider public perceptions of salmon farming reflect headline benefits but also anxiety about unintended social and environmental effects. For example, recognition of the contributions to employment and food security is matched by concerns about pollution, loss of existing and/or traditional occupations and the undermining of local economic resilience.

[6] e.g. Bustos-Gallardo (2017), O'Higgins et al. (2019), Knott & Mather (2021)

[7] Although the two are clearly related, the focus here is on the economic impacts of environmental damage rather than the environmental science of such damage. For example, the loss in market value felt through reduced sales or expressed via non-market valuation of less tangible effects.

[8] e.g. Carenas-Retamal et al., (2021), Thanh et al., (2021)

[9] e.g. McCausland et al. (2006), Graziano et al. (2018)

26. The experience of salmon production in Chile illustrates the risks to local economic resilience. Chile's salmon farming industry experienced a dramatic boom-and-bust trajectory following its emergence in the 1980s. Initially hailed as a development success story, the sector expanded rapidly to become the world's second-largest producer of farmed salmon. However, the industry was hit hard in 2007 by an outbreak of Infectious Salmon Anemia (ISA). This exposed fragility of its production model and led to widespread job losses and bankruptcies with a sharp decline in output. The crisis revealed systemic weaknesses and led to significant changes to policy and regulatory approaches, but also a shifting of narratives around the role and prioritisation of salmon farming in supporting rural communities.[10]

27. International supply-chains for inputs to salmon farming mean that associated costs and benefits can be felt far-and-wide. For example, fish feed is sourced globally. Whilst this may stimulate wider global economic activity it may also create social inequities and environmental pressures in other places, notably developing countries. Consequently, the trade-offs involved in domestic salmon farming extend to consideration of commitments to sustainable international development (albeit that quantification of such trade-offs is difficult).[11]

28. To address increasingly polarised debates about the impacts of salmon farming, suggested governance improvements include: greater transparency and understanding of the trade-offs involved; greater involvement of local communities in decision-making and defining counterfactuals; and increasing the share of profits retained locally through different ownership structures and/or regulatory obligations.[12]

29. Such suggestions are sometimes framed in terms of reviewing or renewing salmon farming's social license to operate and/or expanding the 'blue economy' concept to one of 'blue communities'. This requires a joined-up, overarching strategy that encompasses multiple policy objectives across multiple sectors. Parallels are also drawn with the licensing conditions of operators in other sectors, e.g. mining and wind farms, which may be subject to making mandatory financial contributions to local communities.[13]

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[10] e.g. see Bustos-Gallardo (2017), Outeiro et al. (2018), Cárdenas-Retamal et al. (2021), Carrasco-Bahamonde and Casellas (2024), Ceballos

[11] e.g. see Thiao and Bunting (2022)

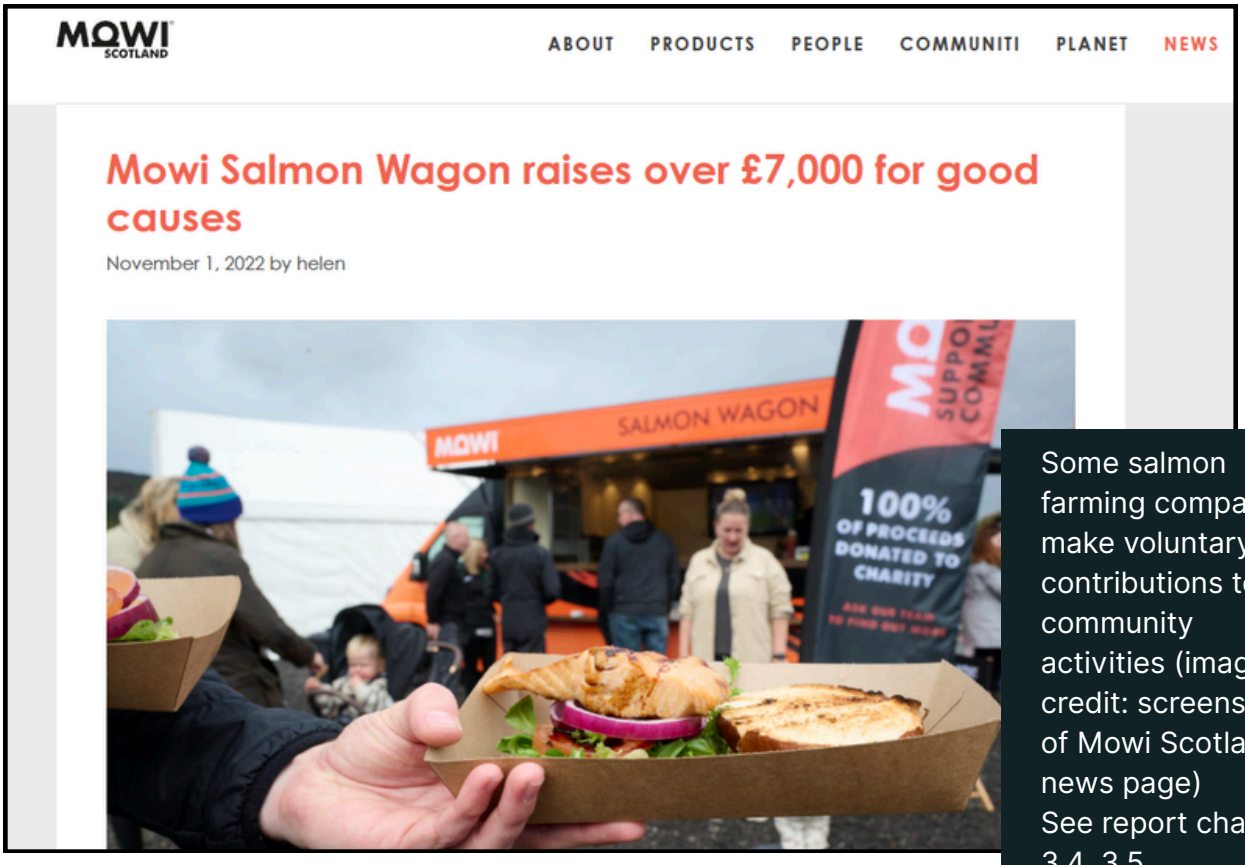
[12] e.g. Campbell et al (2021), Misun et al. (2023)

[13] e.g. Campbell et al. (2021), Carrasco-Bahamonde and Casellas (2024), Olsen et al. (2024)

30. These insights from the international literature resonate with the situation in Scotland. Specifically, whilst farmed salmon producer groups and government bodies emphasise headline economic gains, comprehensive cost-benefit analysis remains elusive due to a lack of empirical data on other effects.[14]

31. This hampers open debate about priorities and trade-offs. It also frustrates environmental and community groups who perceive that their concerns are not given sufficient weight, as well as producer groups subject to regulatory constraints that may not actually address underlying problems and criticisms.[15]

32. Attempts to gather relevant data are challenging, but worthwhile if they can contribute to a better shared understanding of the relative patterns and magnitudes of salmon farming's economic effects. Ideally, additional surveys would be conducted routinely to augment existing official and industry statistics. However, in the first instance, the approach of identifying affected businesses and communities and using their experiences to try to scope unquantified effects is an appropriate one.



Some salmon farming companies make voluntary contributions to community activities (image credit: screenshot of Mowi Scotland news page)
See report chapters 3.4, 3.5

[14] e.g. Riddington et al. (2020), Bridge Economics (2020)
[15] e.g. Anderson et al. (2019), Young et al., (2019), Condie et al., (2021)

3. Case Study of Skye and Lochalsh

33. Skye and Lochalsh lies on the western edge of mainland Scotland, within the Highland Council region. It encompasses several islands (of which Skye is the largest) plus a small part of the mainland approximately north of Knoydart, south of Loch Carron and west of Glen Affric (see Figures 1 and 2).

34. The area covers a wide range of landscape and environmental characteristics, ranging from coastal features to moorland and mountain tops.[16] Salmon farming currently occurs at 20 sites across the area but there are also a number of inactive former sites (see Figures 3 and 4).

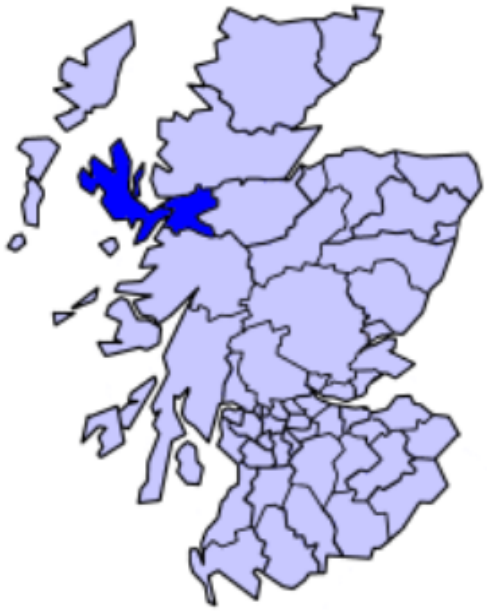


Figure 1: Location of Skye and Lochalsh
Source: https://commons.wikimedia.org/w/index.php?curid=12837096

Figure 2: Map of Skye & Lochalsh
Source: Landscape Character Assessment: Skye and Lochalsh - Landscape Evolution and Influences | NatureScot

[16] Source: Landscape Character Assessment: Skye and Lochalsh - Landscape Evolution and Influences | NatureScot

35. The population census of 2022 estimated the area's ordinarily resident population to be 13.4k, up from 12.4k at the start of the century.[17] Within this, excluding agriculture, approximately 6.4k people are employed or self-employed, with over 25% of such jobs being in accommodation and hospitality and more than 10% in each of education and health.[18] Agriculture accounts for a further c.1500 jobs, taking the total to c.7900 or c.6030 Full Time Equivalents (FTE).[19]

3.1 Background[20]

36. The first salmon farms were created on Skye in the late 1970s/early 1980s, with two small pilot projects at Loch Eishort and Loch Slapin. They were set up independently by a local estate owner. However, by the mid-80s, larger corporates had already begun to invest in the sector, with Marine Harvest, then owned by Unilever, owning three farms and Highland Fish Farmers, owned by Wood Group, owning two.

37. By that time, salmon farms on Skye were reported to provide 65 Full Time Equivalent (FTE) jobs and produce 2,000 tonnes p/a. However, into the late 80s, controversies grew over disease outbreaks and use of chemical treatments, coinciding with local oppositions to applications for new sites.

38. The early years of the 1990s saw salmon farms on Skye face two periods of financial crisis, in the wake of collapses in prices on the international market. Norwegian dumping behaviour was largely blamed for this. A mystery disease also reportedly killed 150,000 salmon in Raasay and Portree Bay in this time period.

[17] Source: Scotland's Census 2022 - UV101b - Usual resident population by sex by age (6 categories) - Dataset - UK Data Service CKAN and Landscape Character Assessment: Skye and Lochalsh - Landscape Evolution and Influences | NatureScot

[18] Source: Your Data - Nomis - Official Census and Labour Market Statistics

[19] See SkyeAndLochalsh-PopulationAndDemography.pdf and Microsoft Word - Lochaber, Skye and Wester Ross key statistics 2019 - draft (A3153192).docx but also Business Register and Employment Survey estimates available via NOMISS Nomis - Query Tool - Business Register and Employment Survey : open access. Excluding agriculture, the latter cites a 2023 headcount figure of 3885 full-time plus 2440 part-time workers. If part-time is weighted as 0.5 of full-time, this implies a total FTE workforce of c.5100. The June Agricultural Census suggests a further 205 full-time and 1045 part-time owner-occupiers and spouses plus 200 employees. Adding these to the BRES estimates gives an indicative total FTE workforce figure of c.6030. This denominator is subject to a degree of uncertainty, as is the estimated numerator of 137 of jobs on salmon farms.

[20] This section draws primarily upon archive Scottish press reports.

39. Throughout the 1990s, salmon farm numbers and sizes increased on Skye as multinational enterprises (MNEs) continued to view the sector as an investment opportunity. Unilever sold Marine Harvest to a US company with its headquarters in New Jersey; in turn it was purchased by Booker in 1994, who pledged to bring the headquarters back to Scotland.

40. Also during the 1990s, the license application process for new salmon farms was subject to debate both locally and nationally. The Crown Estate, in particular, was the target of much criticism, being accused of feudalistic behaviour, and decision-making that lacked transparency and local consultation. In 1996, there was also a stand-off dispute on Skye between two local crofters and McLeod Estates, when the latter sought to impose high charges for shore use to service the small salmon farms of the former (the crofters won the subsequent court case). In the same year, permission was granted for the use of ivermectin as a sea lice treatment, a move opposed by fishing and wildlife groups.

41. The 2000s saw further expansion and corporatisation of salmon farms in the area. Marine Harvest, which received approval for a 500-tonne production farm in Loch Snizort in 2002, was subsequently sold to Grieg Seafoods and later merged with Hydro Seafood, eventually to be rebranded in 2019 as Mowi,[21] headquartered in Bergen, Norway. The Scottish Salmon Company Ltd (which had started life as a Scottish owned business in the late 80s), was, in the early 2000s, owned by a Jersey-registered holding company, before being bought by Faroese investors and renamed Bakkafrost. Approvals were eventually granted for farms at Loch Poolteil by Kames Fish Farming in 2016 and at Flodigarry and Balmaqueen in 2024 by Organic Sea Harvest. Opposition to these developments centred on pollution of and disruption to the marine environment, as well as visual impacts and restrictions on local access. In the case of Loch Snizort, impacts on existing economic activities (tourism and angling) were also voiced.

[21] The rebranding was to honour one of the company's founders, but in fact against his wishes, as he disagrees with the current ethos of the company Marine Harvest to rebrand as Mowi – but relatives of the company's namesake are unhappy about the move - Cowichan Valley Citizen

42. Despite these oppositions, some local responses to the developments were positive, and centred on anticipated economic benefits. This is evident, for example, in the Staffin Community Trust's (SCT) response to the development application by Organic Sea Harvest:

"The SCT is supportive of the proposed fish farms at Tote and Culnacnoc and has highlighted the economic and social benefits to the district, which is classed as "fragile" by the Scottish Government. Fourteen fish-farming jobs will be created along with direct community benefit and additional infrastructure investment at Staffin's harbour if the planning outcome is positive. As a coastal crofting community, Staffin has a rich affiliation with the sea but has now seen a generation who have not benefited from employment associated with fishing. This development presents a real and exciting opportunity for the community to re-establish those ties and create sustained economic growth for years to come."[22]

43. In recent years, there have been several controversial incidents within salmon farming across Skye & Lochalsh. These include: the accidental killing of 95,000 fish in Loch Greshornish by a thermolicer device and further 20,000 killed by chemical treatment in the same loch, both in 2016 (Marine Harvest site); an escape of c.21,000 fish from a cage in Loch Snizort in 2018 (Grieg Seafoods site); the sinking of a feed barge at Bakkafrost's Portree site in 2021, leading to contamination incidents at that location and at Reraig Bay[23]; and the discovery of thousands of wounded and dead fish at Bakkafrost's Portree site in 2023, revealed by activists' drone footage.

44. The volatility of international markets re-emerged in the mid-2010s, when prices slumped due to Russia banning food imports from Europe, before rallying again a year later due to toxic algal blooms reportedly killing 23 million fish in Chile, leading to a global supply shortfall. In 2019, Grieg Seafoods closed its 5 farms on Skye (affecting 21 employees) due to financial problems and high mortality blamed on jellyfish blooms.[24] In the same year, Mowi constructed a feed mill at Kyleakin at a cost of $100m, to employ 80 people.[25] Organic Sea Harvest was finally granted additional licences for Flodigarry and Balmaqueen in 2024, but these came too late for the company, and it suspended operations in early 2025; its stock of fish were subsequently purchased by Mowi.

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[22] Jobs, community benefit and Slipway opportunities: SCT backs new fish farms | Skyecomuseum

[23] The Story of the Bakkafrost Barge Sinking - Bylines Scotland

[24] Press reporting at the time of the closures claimed Grieg Seafoods received >£600k in public funding 7 years previously.

[25] In March 2025, BBC News reported that Mowi was considering selling this operation, however no further news of this issue was identified by this study.

45. There are currently 20 active (i.e. stocked with fish) salmon farms around Skye and Lochalsh (Figure 3). In terms of ownership, Mowi has the largest presence with 10 sites, Bakkafrost owns two, and Loch Duart Ltd owns three.

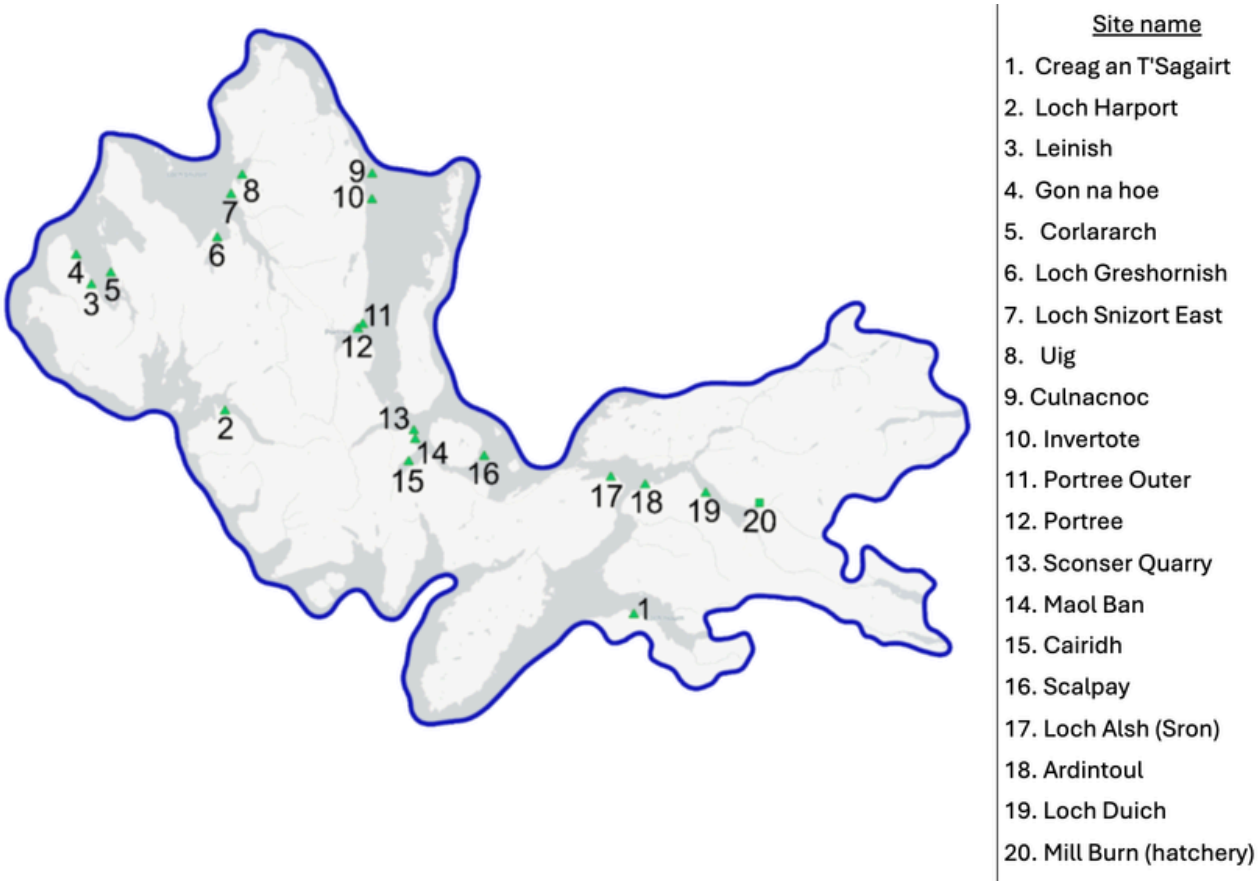

Figure 3: Map of named active salmon farm sites across Skye and Lochalsh
Source: edited by hand from map derived from Marine Scotland - National Marine Plan Interactive

46. Figure 4 shows the number and location of fallow or otherwise inactive sites plus deregistered sites (separately for seawater finfish, freshwater finfish and shellfish). These include some sites where pens have been relocated a short distance away but also genuine closures. The number of deregistered sites reveals a degree of volatility in the precise location of production and associated employment.

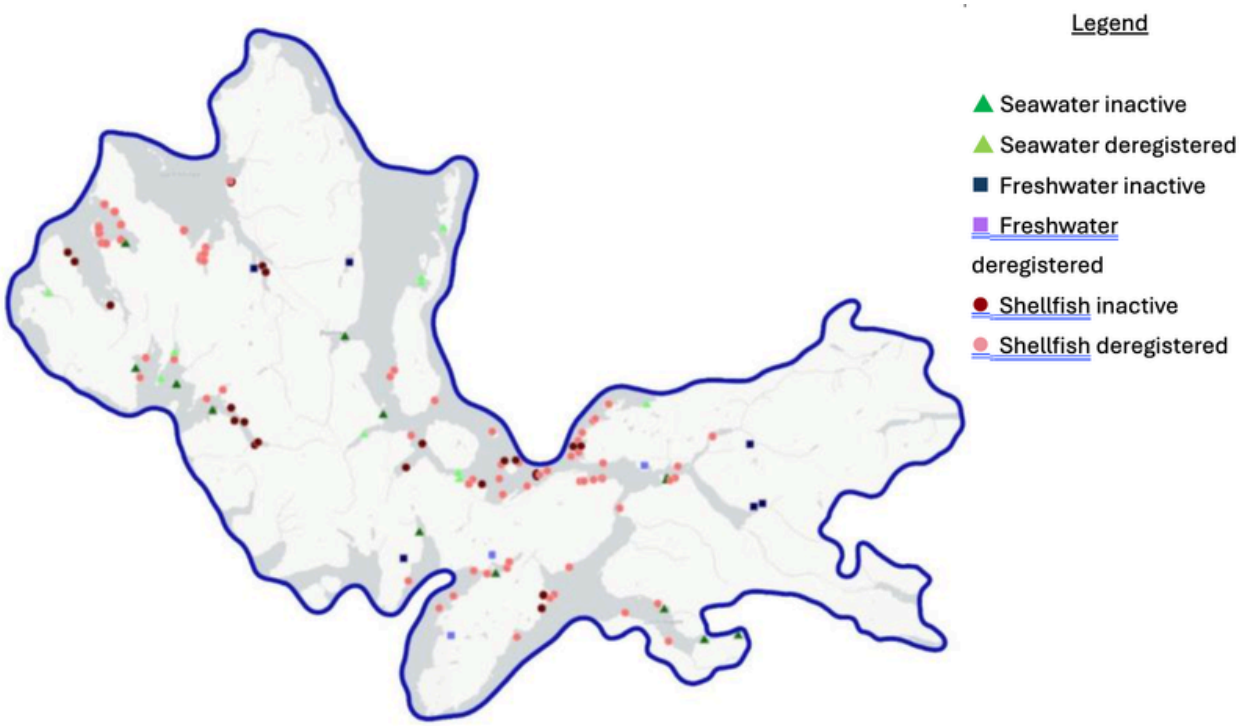

Figure 4: Map of inactive and deregistered aquaculture sites across Skye and Lochalsh
Source: edited by hand from map derived from Marine Scotland - National Marine Plan Interactive

47. Overall, the background to the salmon farming sector in Skye & Lochalsh, and its current status, bear witness to the headline claims about beneficial economic impacts, in terms of employment, revenue flows and investments in the local area. However, they also bear witness to evidence of overlooked disbenefits, including displacement effects on jobs and productivity in other local sectors, the costs of disease and production problems, risks of exposure of the local economy to volatile world markets, and controversies over regulation and governance. The next sections explore these themes in more detail.

3.2 Headline Figures Relating to Employment

48. Proponents of salmon farming routinely cite employment as a major economic benefit of the sector, particularly for rural areas with limited job opportunities. This relates to direct employment on salmon farms themselves and associated sites (e.g. feed mills, hatcheries). In both, claims are made about the quality and security of the jobs offered, relative to alternative sources of local employment. Benefits are also claimed for indirect employment along the supply chain, both upstream and downstream (e.g. construction and maintenance providers, haulage firms), and for the induced multiplier effects of wages being spent within the local area.

49. For example, at the national level, headline figures are published for total farm employment and associated supply chain jobs in the salmon sector. Scottish Government statistics[26] report 1,480 direct jobs (c.1,418 full-time equivalents) in Atlantic salmon production in 2023, whilst Salmon Scotland cite 2,500 on-farm plus 10,000 supply chain jobs across 3,600 upstream and downstream businesses (for an unspecified year).[27]

50. Equivalent figures for Skye and Lochalsh alone are not published separately, but pro rata[28] could be in the order of 137 on-farm jobs. Associated upstream and downstream supply-chain jobs are not surveyed and may not be located locally (e.g. fish processing, transport providers). However, the feed mill at Kyleakin is reported to provide 60-70 part-time and full-time jobs and the existence of local upstream suppliers was noted by stakeholders.

51. As the active workforce across Skye and Lochalsh is approximately 6,030, this implies that salmon farming itself directly represents c.2% of local employment across the area.[29] Associated supply-chain jobs will amplify this, but are not reported in official statistics. Biggar Economics (2020) use a Type 1 multiplier of 1.68, which would imply c.93 additional upstream jobs – although these would not necessarily all be located within Skye and Lochalsh.

52. At farm-level, individual planning applications in Skye and Lochalsh typically refer to a set of jobs to be created per open-cage pen, plus additional ancillary jobs for upstream suppliers of input goods and services (e.g. feed, cleaner fish) and additional jobs (e.g. haulage) in downstream businesses handling farm outputs. For example, the application by Organic Sea Harvest for expansion of operations at Balmaqueen and Flodigarry on Skye cited creation of seven on-farm jobs and two boat jobs, plus increased contracting opportunities for other local businesses.[30]

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[26] Scottish Fish Farm Production Survey 2023 - gov.scot The total excludes processing and marketing jobs.

[27] How the Scottish salmon sector supports rural communities | Salmon Scotland Blog and https://committees.parliament.uk/publications/45995/documents/228665/default/ Differences to government statistics may reflect categorisation of types of jobs and/or different methodologies.

[28] Scottish Government salmon production survey reports employment and output only at the larger scale of the North West region. Maps and listings of salmon farms indicate that Skye and Lochalsh accounts for about one-third of sites in the North West region, implying c.137 salmon farm jobs on a pro rata basis (pers. comm. Scottish Government). Although subject to a degree of uncertainty, this is broadly consistent with the separate Business Register and Employment Survey estimate (available via NOMIS) of 160 jobs for marine aquaculture (including shellfish) in the area. Nomis - Query Tool - Business Register and Employment Survey : open access

[29] For comparison, the Business Register and Employment Survey estimates c.1600 jobs are in accommodation and food service, with 700 in each of health services and retail services.

[30] Scottish Government - DPEA - Case Details

53. In the case study interviews, stakeholders readily accepted that salmon farming had provided employment in Skye and Lochalsh, both on-farm and along the wider supply chain (noting, in particular, employment reported at Mowi's Kyleakin feed mill). They also acknowledged that fish farming jobs can be less seasonal than some other occupations (e.g. tourism) and potentially offer more regular working hours, better pay and better career progression opportunities than some other occupations.

54. However, drawing on their own experiences and insights from networks of contacts, they also suggested that not all salmon farms jobs were necessarily 'high quality'. For example, work can be physically demanding and potentially dangerous, and not all positions necessarily attract the same opportunities for progression.

Above image: workers dispatch live salmon on a Scottish farm site

3.3 Critical Scrutiny of Headline Figures Relating to Employment

55. This section draws from HM Treasury's UK-wide guidance on best practice in economic appraisal, the "Green Book" and the "Magenta Book".[31] This guidance is well established and designed to encourage the provision of objective information to decision-makers on economic costs and benefits. Importantly, it encourages focus on economic rather than purely financial metrics, and on overall value rather than narrower impact (i.e. to consider opportunity costs, what is foregone by allocating resources in a particular way). These considerations matter since they force consideration of the net rather than purely gross effects (i.e. taking account of losses as well as gains), market effects on prices for inputs and outputs, and market imperfections and failures that cause prices to deviate from social worth (e.g. as with unpriced pollution externalities).

56. When estimating impacts related to employment and associated multiplier effects, the guidance highlights the importance of three things. First, source data quality should be scrutinised, including for transparency, granularity, the timeframes of collection and the geographical scales data relate to. For example, data on employment and wages should be collected both prior to and after expansion of a salmon farm, to evaluate actual changes. Second, figures should be calculated not gross, but net of displacement effects on other sectors. These could include reductions in productivity and job losses in activities competing for the same resources as salmon farms, taking account of the wider employment and population profile of the area. Third, figures should take account of the counterfactual, i.e. to reflect on what would have happened to other sectors without the presence of salmon farming in the area.

3.3.1 Data Quality

57. For salmon farming in Skye and Lochalsh, the quality of data underpinning employment figures has been questioned repeatedly in media reporting and Scottish Parliamentary Committee evidence. Official statistics do not offer the necessary detail to compare reported jobs in salmon farming with those in other sub-sectors, mainly because the latter are not reported separately but instead aggregated together with other sectors. A consequence of this is a risk of positive information bias towards employment rates for salmon farming in the area.

[31] The Green Book is official UK government guidance on how to use social cost-benefit analysis to appraise proposed policies, projects, and programmes before they are implemented. The Magenta Book complements this by guiding evaluation after implementation. Both are cited in Scottish Government documentation e.g. Scottish Public Finance Manual - gov.scot and Evaluation - gov.scot

58. Furthermore, job creation figures can be exaggerated by salmon farming companies in applications for new farm licenses. According to interviewee testimony, this may happen in two ways. First, at least some applications (e.g. the Organic Sea Harvest application at Floddigary and Balmaqueen in 2024) inappropriately apply per-pen job numbers to all pens regardless of whether rotational fallowing is followed or not. This means more jobs are proposed per pen than are created in practice. Second, despite evident economies of scale (e.g. more and bigger pens) and automation (e.g. via feed barges) reducing labour requirements, the number of jobs envisaged per pen, in license applications, is typically held constant rather than declining as a given farm expands. Moreover, contrary to Magenta Book guidance, our study finds no official ex post scrutiny by planning authorities of how actual job creation compares to ex ante assertions in such applications at the individual farm-level. Therefore exaggerations, where they happen, are not subsequently brought to account.

59. In official statistics, data are also lacking on actual wage rates and job quality. This is because headline figures do not separate out higher skilled, higher paid job types from lower skilled, lower paid work that is more seasonal, physically demanding and sometimes dangerous. Moreover, the conversion between simple headcounts and Full Time Equivalents (FTEs) can be difficult. Consequently, coarse averages may mask variation and exaggerate pay and conditions for the bulk of workers. Furthermore, some interviewees pointed to reported average wage rates being higher than actual rates deduced from employment costs presented within companies' formal published accounts.

60. Data are also lacking on the types of persons filling the vacancies in salmon farming. Echoing themes identified in international literature, interviewees in this study were concerned that the local residents most in need of secure income and employment were not those recruited into the sector. Opinion was divided on the extent to which non-resident labour was deployed in salmon farming across Skye and Lochalsh, but from our review of press archive material, and interviewee testimony, it appears that at least some positions are taken by non-residents.

61. Reliance upon possibly inaccurate averages for on-farm activities, and stakeholders' subsequent concerns about exaggerated reporting of employment rates, also extends to the ways in which multiplier effects of salmon farming are reported. These effects stem from local businesses, in the upstream and downstream supply chain, experiencing growth in jobs and revenues due to the presence of salmon farming, which are recycled back into the local economy through wages spent and revenues banked. Crucially, local multiplier effects require supply chain businesses to be located in the local area, and for their revenues to be spent in the local area.

62. In Skye and Lochalsh, as described previously, interviewees did acknowledge arrangements between salmon farming companies and some local contractors, e.g. cleaner fish suppliers, which represent positive multiplier effects (albeit that the sourcing and management of cleaner fish has raised additional environmental and animal welfare concerns). However, for many other operational areas, such as processing facilities, logistics support and transport companies used for the removal and disposal of mortalities, salmon farming companies use suppliers headquartered outside the area.[32] For example, well-boats used for cleaning and/or transporting fish are often operated by third-party contractors headquartered outside the UK. These operational choices diminish local multiplier effects and should be reflected in headline figures.

63. Finally, in estimating multiplier effects, Green Book guidance emphasises the importance of isolating supply chain jobs and revenues uniquely attributable to salmon farming, from those attributable to other sectors. Official statistics do not capture this, but in this study, interviewees pointed out that some upstream suppliers and logistics firms service other marine sectors alongside salmon farms (e.g. shellfish and recreation operators). This means the jobs (and economic multiplier contributions) of those upstream suppliers are not attributable to salmon farming alone. Hence care needs to be taken to avoid double-counting and to consider counterfactual possibilities for effects in the absence of salmon farming.

3.3.2 Displacement Effects

64. The next section discusses the ways in which the creation and operation of salmon farms have negative impacts on the productivity, jobs and revenues of other sectors in Skye and Lochalsh. This issue generated amongst the most extensive testimony from interviewees and has also been a regular subject of local press coverage, both historic and recent. In terms of Green Book guidance, the concern throughout is that headline figures for employment from salmon farming are quoted gross, taking no account of how salmon farming may displace existing and potential future jobs in other sectors. Therefore, these displaced job numbers, as discussed below, need to be subtracted from the gross salmon-related jobs, to generate a more accurate net figure.

[32] A point also made in relation to negative impacts beyond Skye and Lochalsh from closure of the Organic Sea Harvest sites Fish farm refusals create ripple effect | organicseaharvest.co.uk

65. The possibility of displacement is noted in the international literature, press coverage (both historical and contemporary) and in evidence submitted to Scottish Parliamentary Committees. However, it is important to note that Scottish evidence is unavoidably anecdotal since there have been no official surveys of displacement effects. This is despite official guidance for appraisals stressing the need to consider net effects, and counterfactuals more generally.

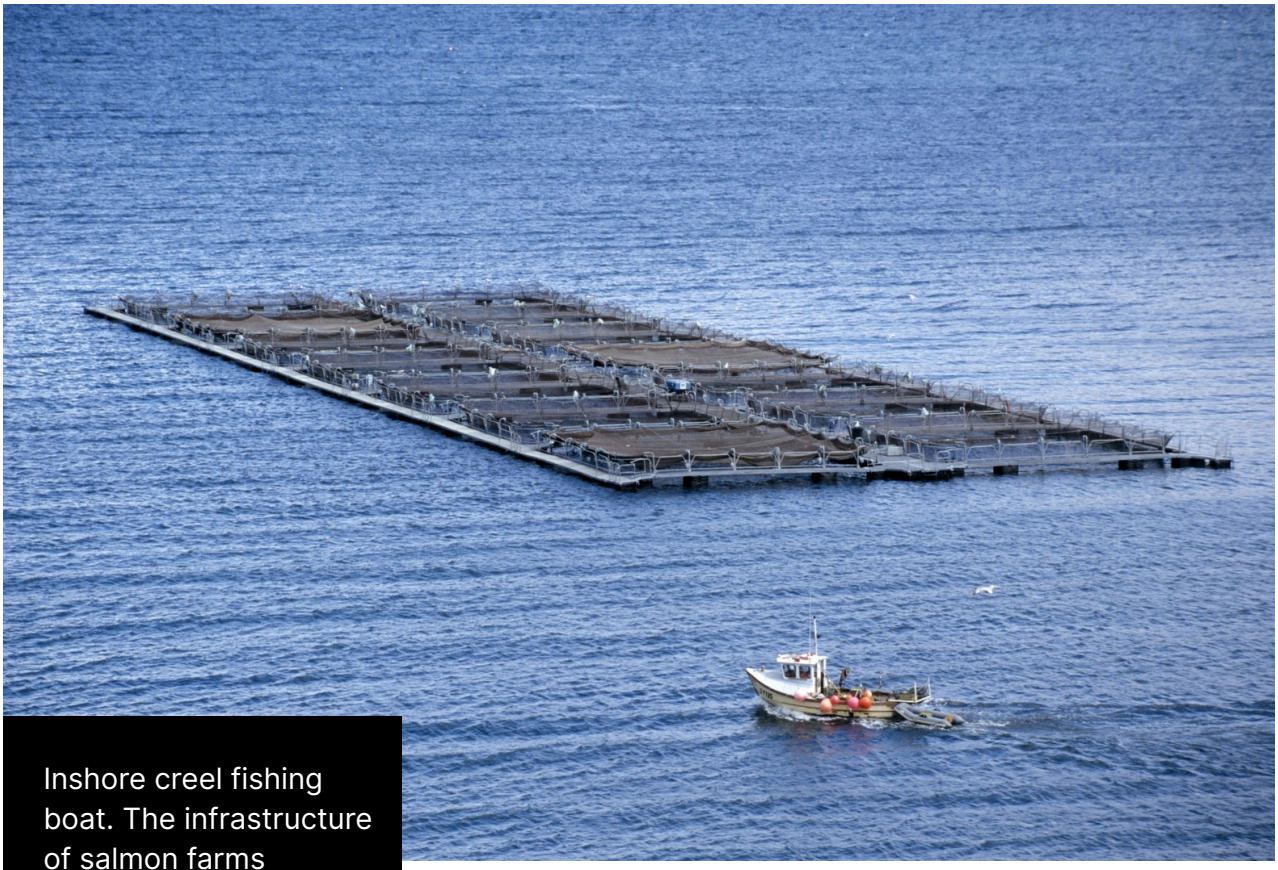
66. Interviewee testimony pointed to three different ways in which salmon farming may displace other economic activities and jobs. First, most directly, the infrastructure of salmon farms competes for space with other sectors. For example, open-net pens themselves have a physical footprint that effectively excludes other marine users from the occupied surface, but also in some cases the underlying water column and seabed. Equally, salmon landing sites and handling facilities occupy coastal land which is then not available for alternative uses.

67. To illustrate, testimony from inshore fishermen explained how open-net pens around Skye and Lochalsh occupied previously productive and sheltered fishing sites. Consequently, creelers had lost direct access to some locations, both because they were excluded physically by the presence of pens and associated underwater gear but also because nutrient and chemical loadings reduce catches in the vicinity of pens. This resulted in having to fish in different waters, thereby incurring additional time and expense but also additional risk. Increased competition for remaining favourable sites led to some tension between different fishers.

68. Fishing sector testimony also explained how acute chemical spills from salmon farms cause problems, through an immediate loss of catches and therefore either loss of income and/or additional effort elsewhere to compensate for losses. Moreover, the effects of an acute incident may be extended by making fishermen wary of returning to an affected site, thereby prolonging relative losses incurred.

69. In terms of quantification, interviewees referred to the loss of two creeling boats in recent years, impacting four jobs and the livelihoods of four families. Whilst decisions to exit from creeling may not have been solely attributable to negative interactions with salmon farming, those interviewees thought that they were a significant contributory factor.

70. Similarly, around eight jobs were believed to have been lost in mussel farming because of poor water quality attributed to salmon farming. Figure 4 shows a relatively high number of deregistered shellfish sites.



Inshore creel fishing boat. The infrastructure of salmon farms competes for space with other sectors

71. The second form of displacement concerned employment in tourism. Interviewees recounted how tourism-related recreational marine activities such as wildlife tours, diving and kayaking had been negatively affected by salmon farming, not only from physical exclusion, but also through changes to the local marine environment. These had led to reduced species abundance and loss of preferred sites. Beyond the effects of pollutant loadings, acoustic deterrents and shooting were also cited as making it less common for marine tourism providers to observe cetaceans, seals and sharks in inshore waters.

72. The outcome for marine tourism providers has been a forced relocation to more distant and inferior sites, incurring additional costs and less satisfactory visitor experiences, and/or direct constraint on the number of relevant sites, reducing variety and flexibility to cope with weather vagaries. Consequently, the profitability of some firms providing recreational services had undoubtedly diminished. Whilst no actual job losses were recounted in interviewee testimony, referring to previous evidence submitted to Parliamentary Committees and to planning applications, it was perceived that the viability of several providers was threatened by continued expansion of salmon farming, putting perhaps six jobs at risk.

73. Interviewees' perceptions of the effects of salmon farming on wider tourism were more divided. On the one hand, it was acknowledged that tourism on Skye was booming, that the majority of visitors were attracted by features other than the seascape, and that some visitors found salmon farming of interest. Yet, on the other hand, providers of accommodation and catering services reported that, if engaged in discussion, approximately one third of visitors expressed concerns about the visual and environmental impacts of salmon farming.

74. Perhaps the most contentious interaction between salmon farming and other economic activities relates to wild salmon and sea trout. Interviewees recounted how, historically, fishing for wild salmon and sea trout, either as a commercial activity or a private recreational activity featured prominently in the local economy of Skye and Lochalsh. Recreational fishing was particularly popular, generating income for the holders of fishing rights and attracting visitor footfall for accommodation and catering providers, much of it after the main tourist season, thus extending the latter.

75. However, the expansion of salmon farming correlates strongly with rapid declines in wild salmon and sea trout populations and the subsequent decline in the number of operational freshwater fisheries across Skye and Lochalsh. Causal mechanisms for this are subject to some uncertainty but include the positioning of fish farms interfering with migratory routes for wild fish, genetic pollution from interbreeding between wild fish and escapee farmed fish, and increased pest and disease burdens – most notably sea lice.

76. Whilst interviewees were certain that jobs have been lost as a result of actual closures and reduced catches from remaining freshwater fisheries, they acknowledged that such effects have occurred over an extended period and are difficult to quantify and attribute solely to salmon farming. Nonetheless, given the number of fisheries affected, they probably amount to the low tens.

Around eight jobs were believed to have been lost in mussel farming because of poor water quality attributed to salmon farming.

77. The third form of displacement relates to the wider labour market. Interviewees noted that the economy of Skye and Lochalsh is growing, yet housing stock levels are low, therefore many businesses across different sectors find it difficult to recruit staff. This is evidenced in the large number (over 1,000)[33] of vacancies that exist in the area. As salmon farming grows, this inevitably increases competition with other sectors and makes it harder for some to recruit and retain staff over others. While interviewees accepted that such competition for labour is unavoidable in a market economy, concerns were expressed that salmon farming benefitted from certain privileges, for example, preferred access to grant aid, and more favourable regulatory controls on negative externalities. These were seen to give advantages when competing in the labour market. In impact assessments therefore, account should be taken of the effects of salmon farming on competition for labour with other sectors.

78. Finally, on displacement, Skye and Lochalsh is typically characterised as a fragile economy with relatively high socio-economic challenges faced by the population. The expansion of salmon farming is often justified on the basis of being particularly valuable to the area, given these characteristics. However, whilst some parts of Skye do score relatively poorly on the Scottish Government's Multiple Index of Deprivation (SMID), this is driven primarily by geographical remoteness impeding access to public services and a lack of affordable housing, rather than income and employment problems *per se*.[34] Indeed, interviewees repeatedly cited housing as a significant local problem given population and visitor growth over the past decade or so. However, they asserted that the presence of salmon farming exacerbated rather than alleviated the situation, due to corporate owners outbidding other sectors and private buyers to acquire accommodation for salmon workers.

3.3.3 Divestment risks

79. In headline reporting, the growth trajectory of salmon farming is typically presented as smooth and upward, allowing ever more employees to benefit from secure, well-paid careers. However, interviewees made the point that the salmon sector is a commodity market subject to fierce international competition and forces beyond the control of employing companies, including cyclical low global prices and disease and jellyfish bloom outbreaks. They argued that salmon farming exposes the local economy to the risks of these volatilities, with consequent impacts for jobs and incomes.

[33] Survey evidence for this exists here Thousands of job vacancies in Skye left unfilled due to housing shortage | Scottish Housing News

[34] See https://nhshighland.publichealth.scot.nhs.uk/wp-content/uploads/2019/08/SkyeAndLochalsh-DeprivationAndRuralServiceNeed.pdf

80. As evidence, numerous examples were found in press coverage, stretching from the early 1990s to recent years, of start-ups going bankrupt and companies divesting due to financial difficulties, leading to layoffs and pauses in recruitment. One example is the decision by Grieg Seafoods to close its 5 farms on Skye in 2019, due to financial problems and high mortality blamed on jellyfish blooms. As recently as March 2025, the BBC reported that Mowi was reviewing the future of its feed mill at Kyleakin, putting the 60-70 jobs there at risk.[35] Impact assessments therefore need to take account of the risk environment of the sector and the vulnerabilities to divestments/job losses, and the profile of employment over time relative to some counterfactual.

81. Interviewees also made the point that the foreign ownership and corporate structures of most salmon farming companies in Skye and Lochalsh exacerbate these risks of divestments. Multinational enterprises (MNEs) operate sites from a strategic perspective, driven by efficiency maximisation and profit targets. Less productive sites risk closure when economic conditions become difficult, and interviewees argued that MNEs were less likely to show commitment or loyalty to their workforce in Skye and Lochalsh than locally owned enterprises might do. Moreover, although MNEs may be able to offer alternative employment on other sites, that does not help the local economy of Skye and Lochalsh. Hence, economic appraisals need to account for how ownership structures and exposure to global markets may affect the volatility in employment and other local impacts.

3.4 Headline Figures Relating to Benefit Sharing

82. Proponents of salmon farming argue that beyond employment headcounts, wider community benefits are generated from the presence of salmon farming, and its associated supply chain, in local areas. First, multiplier effects of wages recirculating through local economies. These effects were discussed in the preceding section specifically in relation to employment, but they also offer potential boosts to economic activities more generally. Nationally, Biggar Economics (2020) estimated that salmon farming contributed c.£250m direct to Scottish GVA, or £310m with inclusion of indirect and multiplier effects. Of this, staff pay represented c.£77m, across 1800 jobs, and yielded c.£10m in income tax revenue plus a further £14m in national insurance. Corporation tax of £43m was also estimated.

[35] Skye feed mill could be sold by Mowi as part of strategic review - BBC News

83. Second, salmon farming companies can make infrastructure investments, such as road upgrades, to improve their own productivity/efficiency, but from which the wider community may also benefit. Again, such investments can save public costs and induce additional local activities (although not all infrastructure will necessarily be shared e.g. some jetties and slipways may be exclusively for the use of salmon farm staff).

84. Third, salmon farming companies can engage in direct community contributions, via voluntary financial or in-kind donations. The Scottish Salmon Producers' Organisation, via its community engagement charter, claims to have contributed c. £1m to local communities across Scotland, through a mix of financial and in-kind support. For example, providing minibuses to transport people to community youth events, paying for childrens' playparks, and sponsoring sporting events.[36]

85. Finally, taxes paid by employees and firms contribute to government budgets for public expenditure, at least some of which finds its way back to local communities. The presence of salmon farming is also argued to promote population retention in rural areas, to sustain public services such as schools, and provide a workforce for other sectors.[37]

86. In terms of measuring these benefits in Skye and Lochalsh, specific data are not readily accessible. For GVA for example, we were not able to identify a specific breakdown for the area. However, as Skye and Lochalsh hosts c.10% of Scottish salmon farms, this would imply, pro rata, a direct GVA contribution of c.£20m to c. £30m for the area.[38] In terms of infrastructure improvements, the study did not identify any official records for Skye and Lochalsh, but reference was made in interviews to harbour/pier improvements (e.g. Staffin harbour regeneration) part-funded by salmon farming companies.

87. Finally, in terms of voluntary contributions, examples we identified included Mowi's support of charitable causes through its 'salmon wagon' venture – a foodservice truck which operates at selected festivals in the Highlands and Islands, and from which all profits are donated to charities nominated by the event organisers. It has reportedly raised £22k for local charities across the Highlands and Islands.[39]

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[36] Follow-up inquiry into salmon farming in Scotland and Supporting Local Communities | Salmon Scotland

[37] e.g. Imani and Westbrook (2017)

[38] This is also broadly consistent with estimates derived by multiplying salmon farm employment by the per capita GVA figures reported here Supporting documents - Scotland's Marine Economic Statistics 2022 - gov.scot. Some imprecision is unavoidable given differences in dates and granularity of data.

[39] https://mowisalmonwagon.co.uk/

88. In interviews, stakeholders acknowledged the existence of these various benefits to the local area. However, concerns were also expressed that their magnitude was exaggerated in headline figures. The next section explains these points in detail.

3.5 Critical Scrutiny of Headline Figures Relating to Community Benefits

89. As with scrutiny of employment figures, this section draws from the UK Treasury guidance on best practice in economic appraisal. In relation to the theme of community benefits, we refer, in particular, to Green Book guidance on acknowledging counterfactuals, and the need to recognise the contributions of other sectors to the local community. We also respond to the advice that economic impacts should be calculated net of negative externalities, which include, for example, degradation of natural capital and/or other non-provisioning ecosystem services, as a result of construction and operation of salmon farms.

90. In interviews, stakeholders pointed out that salmon farming was not unique in representing an economic activity which generated multiplier revenues for Skye and Lochlash. All businesses are part of supply-chains and all employees (and self-employed workers) resident in the local area have disposable incomes to spend as they choose. This means that a proportion of earnings from any sector may recirculate through a local economy. To illustrate, a study by the Moffat Centre (2020) estimated that the tourism sector generated a GVA of c.£140m on Skye alone[40], a figure more than five times the GVA for salmon farming in Skye and Lochalsh estimated above.

91. Economic impact assessments should therefore acknowledge the actual and potential counterfactual contribution of other sectors. In particular, that other activities also have multiplier effects and that these might be bigger in the absence of displacement caused by salmon farming.

[40] https://www.pressandjournal.co.uk/fp/news/highlands-islands/2343962/year-long-economic-study-finds-skye-visitors-boosted-economy-by-211-million-pre-lockdown/ - although different studies employ different GVA calculation methodologies and comparisons should be made with caution

92. In terms of investments in infrastructure, interviewees also argued that businesses other than salmon farms may also make such investments that offer spill-over benefits to other local businesses and residents. Moreover, public funding towards salmon-related infrastructure could have been invested in alternative infrastructure, such as visitor car parks and footpaths, affordable housing, telecommunications, or other forms of business, such as food processing, transport and tourism experiences.

93. In terms of voluntary contributions towards the community, interviewees noted that enterprises outside salmon farming can and do engage in this activity. Examples found by this study include Muirhall Energy and Isle of Skye Renewables Cooperative (ISRC), the latter claiming to have donated £45k to community projects in 2024.[41] Again, therefore, assessments of community benefits need to take account of the counterfactual. Interviewees also perceived that existing levels of community contribution by salmon farming companies were relatively modest, given the scale of their revenues and profits. Therefore, in impact assessments, it is important that the magnitude of voluntary contributions is taken in context.[42]

94. More generally however, interviewees made the point that voluntary corporate contributions, whether financial or in-kind, are an insecure means of supporting community development activities, as it can be withdrawn as well as offered. This was argued to be a regressive model for community development, as it is corporations that decide which activities are supported, not the community. Therefore, it bypasses local democratic processes and accountability. For some interviewees, the voluntary contributions of salmon farming companies were viewed more as strategic PR rather than genuine altruism, designed to enhance corporate images, not least in the face of critical reporting of salmon farming's impact on the marine ecosystem (discussed below).

95. Regardless of salmon-farming companies' motivations for voluntary contributions, interviewees expressed a preference for monetary donations to council or community bodies, and that these should involve some element of compulsion or at least some official guidance for the expected magnitude of contributions. Such conditionality already exists for renewable energy developments (of which Muirhall Energy and ISRC are examples), and for local communities rather than sponsors to choose how to allocate funding.

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[41] https://www.skye.coop/community-fund/

[42] On a national scale, the SSPO's claims of c.£1m of voluntary contributions to local communities would equate to approximately 0.3% of the sector's estimated GVA of c.£330m.

96. With respect to taxes, interviewees noted that all businesses, employees and self-employed workers across Skye and Lochalsh pay taxes. Hence, again, headline figures need to be viewed relative to what would otherwise be the case without salmon farming rather than be stated (as currently) as if no tax revenue would be raised in other ways.

97. Also related to taxes, some interviewees made the point that the majority of salmon farming operations in Skye and Lochalsh are partially or wholly owned by companies that are part of larger groups head-quartered overseas. This may influence UK tax liabilities, but almost certainly diminishes the retention of profits locally due to, for example, internal transfers within parent companies and/or dividend payments to investors, although quantification of such leakage is difficult from published company accounts Stakeholders also cited the grant aid available to companies as at least partially offsetting tax paid, as does public expenditure on regulatory oversight, highlighting (again) the need to consider net rather than gross figures.

Image: HM Treasury building, Whitehall. The UK Government's economic and finance ministry

98. Published[43] company accounts offer some insights into tax contributions paid by Scottish salmon farming firms. For example, Table 1 shows that Mowi Scotland, Bakkafrost Scotland and Scottish Salmon Farms each pay several £m per year on average. However, the amount varies somewhat between years to reflect fluctuations in profitability but also when deferred liabilities from earlier years fall due. Table 1 also confirms that each company is routinely claiming government grants as well R&D tax credits, which in some years exceed their tax contributions.

Table 1: Tax-related figures from published company accounts of main salmon farm businesses *Source:* Derived from Get information about a company - GOV.UK Some figures not disclosed for some companies in some years. Figures in parenthesises are negative. In some cases, grant figures are averaged over project lifespan rather than attributed to year of receipt e.g. Mowi received £2m in 2023 and £5m in 2024 from the UK Seafood Fund for infrastructure investments.[44]

		2023	2022	2021	2020	2019
Mowi Scotland	Tax paid	£10.0m	£1.3m	£17.5m	£5.6m	£17.6m
	R&D credit	£4.5m	£6.6m	£3.3m	£3.0m	£6.3m
	Grants	£0.2m	£0.3m	£0.0m	£0.1m	£0.1m
Bakkafrost Scotland	Tax paid	£11.9m	(£4.3m)	(£0.1m)	(£2.9m)	£3.7m
	R&D credit	£4.3m	£2.8m	£3.3m	£5.5m	-
	Grants	£0.0m	£0.0m	£0.2m	£0.3m	-
Scottish Salmon Farms	Tax paid	£8.2m	(£2.8m)	£5.8m	£4.9m	£4.6m
	R&D credit	£0.9m	£0.3m	-	-	-
	Grants	£0.3m	£0.3m	-	-	-

[43] Accessed via Get information about a company - GOV.UK. Published accounts also reveal a degree of volatility across years in employee numbers.

[44] UK Seafood Fund - GOV.UK See also Marine Fund Scotland: grants awarded - gov.scot NB. Significant funding relating to salmon farming is also made available to research institutions.

99. Separately, it should also be noted that taxes paid by Scottish salmon farming businesses flow to either London and/or Edinburgh where decisions on budget allocations are taken centrally. For example, corporation tax revenues from salmon farming flow to the UK Government and are subsumed within whatever budget settlement is agreed with the Scottish Government - a point which echoes Professor John Kay's analogous observations about weak tax linkages between Scotland and the Scotch Whisky industry.[45] The Scottish Government supplements this with more limited revenues controlled domestically. For example, through income tax on salmon farm staff, non-domestic rates and seabed leases let by Crown Estate Scotland, receipts from which are subsumed centrally before funding allocations are made to myriad Scottish policy areas and to Scottish Local Authorities who have some further discretion on expenditure choices.

100. Consequently, communities where tax revenues are generated from salmon farming have no direct say in how those revenues are used and there is no guarantee that any expenditure benefits areas with salmon farms. In principle, greater local democratic accountability could be offered through decentralisation and/or hypothecation of tax revenues, but this would require a shift in central government policy. For example, non-domestic rates have long been controlled centrally and, notwithstanding initiatives such as the Coastal Communities Fund,[46] locally raised revenues are not ring-fenced for local purposes.

101. Regardless of how public revenues from salmon farming are subsequently allocated, if additional revenues were to be sought from salmon farming businesses different potential mechanisms could be considered. First, as per Kay's suggested whisky bottle levy, and indeed Grigg's favoured single license approach,[47] a new Scottish tax could be levied on salmon produced in Scotland. This would have the advantage of being transparently direct but would require new legislation and new administrative procedures.

[45] Whisky tax 'could benefit Scots' - BBC News

[46] Coastal Communites Fund - gov.scot The separate Scottish Marine Environmental Enhancement Fund (SMEEF) disburses voluntary private rather than public funding, with modest contributions to-date coming solely from the renewable energy sector, Home - Scottish Marine Environmental Enhancement Fund

[47] A Review of the Aquaculture Regulatory Process in Scotland

102. Instead, second, salmon farming's longstanding[48] exemption from non-domestic rates (NDR) could be removed (a recent analogy being removal of Scottish sporting estates' exemption). This would have the advantage of using an existing mechanism, albeit one not currently applied off-shore.

103. The basis for the original NDR exemption is unclear but the appropriateness of it applying to a sector now dominated by profitable corporate interests could be questioned, particularly given current pressure on public budgets. Calculating ratable values and extending existing procedures would require some effort, as would unpicking legislation to avoid unintended consequences. For example, with respect to other forms of aquaculture also currently exempted (e.g. shellfish)[49] and to other reliefs from NDR. Imposition of NDR on top of levies paid to Crown Estate Scotland (CES) for seabed leases would inevitably increase the cumulative cost burden for the industry and potentially involve additional administrative costs.[50]

104. Hence, third, seabed lease levies could instead simply be increased. This would have the advantage of using an existing mechanism already applied to salmon farms and being transparently direct (i.e. calculated as a percentage of turnover). Aggregate aquaculture revenues to CES in 2024 are reported as £11.4m, within which salmon farming is presumed to overwhelmingly dominate but is not shown separately.[51] However, the basis for levies has recently been reviewed and further increases may be difficult to secure, particularly given the status of CES as a public corporation.

[48] The exemption was inserted into the Valuation and Rating (Scotland) Act 1956 by section 32 of the Local Government, Planning and Land Act 1980, and the provision was brought into effect for the rate period beginning 1 April 1981 Local Government, Planning and Land Act 1980

[49] Implications for off-shore windfarms' exemption from NDR would also need to be considered. The Valuation and Rating (Exempted Classes) (Scotland) Order 2006

[50] It is also possible that seabed lease rental charges would drop to reflect NDR charges, thereby reducing any net additional revenue gained.

[51] Rents and charges | Crown Estate Scotland Seabed leases for aquaculture raised £11.4m in 2023/24, up from £6.3m in 2022/23. CES Annual Report 2023-24 Web.pdf

105. Deploying any of these three mechanisms could generate additional revenues that might or might not then be ring-fenced for communities hosting salmon farms. Ring-fencing would align with community benefit funding as advocated in the Grigg's report, which also favoured a single rather than multiple revenue-raising mechanisms. The salmon industry has itself suggested ring-fencing a proportion (c.£10m) of rental income to CES for coastal community benefit.[52]

106. Historical press coverage indicates that salmon farming in Scotland was initially expected by many stakeholders to be relatively small-scale and locally owned, thereby posing minimal environmental threats and offering the possibility of high local multipliers. Over time, exploitation of economies of scale and consolidation into primarily foreign ownership has increased the environmental pressures whilst retaining a smaller share of profits locally.

107. Previous sections have already discussed how management practices for farmed salmon create some environmental externalities that negatively impact upon other sectors, notably inshore fishing and recreational use. However, these impacts also extend to community well-being and residents' sense of the place they live in. For example, nutrient (eutrophication) and chemical loadings, disease, and predator controls[53] reduce the abundance of iconic species. Similarly, the visual presence of fish farms and of plastic pollution alter marine and coastal vistas.[54]

108. It was also emphasized that such long-term chronic effects can be exacerbated by more acute pollution incidents (e.g. chemical spillages). Our review of press archives identified the case of the pollution incident at Bakkafrost's site in Portree Bay[55] (barge sinking) as an example, involving high quantities of toxic and explosive gases being spread to Reraig as part of the salvage operation. Another example of a chemical release incident on Loch Hourn, in April 2025, was also cited by several interviewees.[56]

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[52] https://www.salmonscotland.co.uk/news/salmon-farmers-welcome-scottish-government-deliberation-on-coastal-community

[53] Whilst shooting of seals is no longer permitted, other deterrent measures are.

[54] The economic cost of these and other, less visible ecological effects is not directly reflected by market prices or employment levels but could, in principle, be estimated through non-market valuation techniques.

[55] The Story of the Bakkafrost Barge Sinking - Bylines Scotland

[56] Pollution of West Highland loch under investigation

3.6 Governance issues

109. Governance is not referenced directly in UK Treasury guidance; however, it is important to include in a critical scrutiny of economic claims. If the potential for the positive economic impacts of salmon farming are to be maximized and the risks of disbenefits to be minimized, a transparent, robust regulatory framework is required to underpin the processes by which salmon farm licenses are approved and their operations monitored. Consistent strategies are also needed at regional and national policy level.

110. Governance of salmon farming within Scotland has evolved over the past five decades. Historical press coverage reveals considerable early freedom to commence operations but also frustrations amongst proponents at the lack of positive local and central government support and strategic planning.

111. Over time, explicit government encouragement increased, but decision making was somewhat opaque, raising concerns amongst salmon farmers about the cost of seabed rentals but also concerns amongst environmental bodies and communities at the lack of local accountability. The latter led to pressure, initially resisted, to bring salmon farming into local government planning processes.

112. However, in interviews, stakeholders expressed strong reservations about current planning processes, citing multiple instances of strong community opposition to applications for new farms and expansion of existing farms being over-ridden. The perception was that central government's pursuit of growth in salmon production and exports was prioritized over other policy objectives relating to environmental protection and community resilience. Interviewees suggested that this was inconsistent with existing planning guidance that seeks co-existence between different activities, implying that existing procedures were not being followed fully.

113. Such prioritization may, of course, reflect genuine political choices and trade-offs made by well-informed officials and Ministers confronted with multiple objectives and constraints.[57] It may, however, reflect a degree of naivety or unfamiliarity with respect to appraisal best practice, amplified by salmon producers' lobbying strength (stakeholders perceived the industry as having privileged Parliamentary access).[58]

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[57] Not all jurisdictions come to the same prioritisations. We note that open cage salmon farming has been banned by US and Canadian authorities along the entire west coast of north America

[58] https://www.thenational.scot/news/24822033.salmon-scotland-ceo-tavish-scott-accused-breaching-lobbying-rules/

114. Beyond misgivings about central government policy, interviewees also raised several specific concerns about the processes for official scrutiny and decision-making in planning applications for salmon farms. First, concerns were expressed that responding to planning applications was disproportionately burdensome for communities. This related both to the initial effort required, as well as the need to prepare responses repeatedly and afresh when rejected applications are modified slightly and re-submitted. Whereas applicants are generally able to call upon specialist staff and resources, communities typically have to self-fund and self-organise to coordinate responses across disparate groups. The outcome is consultation fatigue, which ultimately favours the applicants.

115. Second, interviewee testimony and our document scrutiny indicates there is often no attempt by officials to verify the accuracy of economic impact claims made in planning applications for salmon farms. This finding holds both for claims made in new applications, as well as in evaluations of past developments. Surprisingly, the lack of verification effort appears to be the case even for impacts that are relatively straightforward to account for, such as gross job creation. This is clearly contrary to the basic guidance of the UK Treasury Green and Magenta Books.[59]

116. To illustrate authorities' apparent inability and/or unwillingness to check the veracity of claims in planning applications, and the weaknesses of the approval process leading to outcomes that tend to favour the applicants, the example of Organic Sea Harvest's application for sites at Balmaqueen and Flodigarry can be referenced.[60] The official decision on the company's initial application was a rejection, on grounds of detriment to visual amenity. In terms of economic impact, the assessor was unable to make a definitive judgement, based on the information provided in the application:

"…it is difficult to reach a definitive conclusion about the net economic benefits of the proposal. On balance, I consider that it is more likely to have a positive as opposed to a negative benefit, but I am not able to reach any conclusions about the scale or significance of any such benefit."

[59] Although the same lack of institutional curiosity is similarly apparent in other parts of the agri-food sector e.g. applications for capital grants are judged partly on promises of job creation but follow-up evaluations frequently founder on a lack of on-going and robust monitoring data.

[60] https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=Q3WCUEIH09K00 https://wam.highland.gov.uk/wam/files/D615292EE7D507ECF17917CC6CCA61B2/pdf/20_00097_FUL-Committee_Report-2287072.pdf

117. However, in a second application submitted on appeal (which was approved on the visual amenity grounds), a more positive interpretation was made about the economic impacts the development would bring:

"…the proposal would deliver economic benefit of at least local importance…..
In addition …. the proposal would assist with local economic development and diversification"

118. Given that no additional quantitative data appeared to have been submitted in the second application, this example highlights the weaknesses of the data sources used, how officials engage with those data, and the subjective inconsistencies that can ensue in the decision-making process. Another example is the successful appeal against initial rejection of an application by Marine Harvest for the Sconser Quarry site, which asserts:

"The economic and social benefits of the proposal are not in dispute"[61]

119. Such a bold claim neglects opposing perspectives articulated by other stakeholders opposed but is presumably accepted on the basis that salmon farms are observed to create jobs but jobs displaced elsewhere are not as visible. Hence, despite decades of experience of salmon farming across Scotland, it seems that claims and counter-claims in planning applications are accepted or ignored on an opaquely subjective basis, without attempts to verify previous industry claims, nor quantify displacement issues.

120. Interviewees' concerns about governance related not just to salmon farm application processes, but also to procedures for monitoring and regulating salmon farming operations after site construction. In relation to the latter, interviewees thought that governance was fragmented across too many bodies with a lack of clarity of respective roles and responsibilities.

[61] https://wam.highland.gov.uk/wam/files/90DFB958775CA3693F4AA1E62EB1B869/pdf/17_02707_FUL-DPEA_DECISION_NOTICE-1675631.pdf https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=OR7Z2HIH0CV00

121. Several interviewees referenced the authorities' response to a recent pollution incident on Loch Hourn (April 2025), as an example. They voiced concerns about SEPA's apparent refusal to initially confirm the nature of the problem, followed by delay and confusion between different local and national public bodies and a lack of coordination between them.[62] Similar concerns have been expressed in various recent reports – including by the salmon industry itself.

122. Interviewees also voiced concerns about poorly designed and under-resourced inspection regimes for salmon farms. These were seen to allow instances of environmental damage and non-compliance with license requirements to go under-detected. Reliance on self-reporting by salmon farms was seen to exacerbate these risks.

A salmon farm undergoing net cleaning maintenance (credit © 2025 Salmon Media Hub)

[62] For example, this response to an FOI request implies an unexpected lack of analysis and information sharing regarding the location of fish farms relative to actual and proposed Marine Protection Areas. https://www.gov.scot/publications/foi-202500446654/

123. Interviewees also pointed out the complexities of the salmon farming supply chain which made detection and accountability procedures harder to apply. Routine use by companies of transient sub-contractors (e.g. well boats registered outside of the UK and frequently transferred between different owners), and administrative backlogs were cited as examples here. Weak monitoring procedures will under-estimate negative effects, thereby contributing to exaggerated net benefit figures.

124. Finally, interviewees thought that there was a lack of any strategic overview to account for the cumulative effect of salmon farms at a local or regional scale. Equally, there has been no attempt to identify a strategically optimal distribution of farms to meet stated policy objectives.

125. For example, beyond avoiding East and North coast sites, national ambitions for overall production have not been disaggregated to specific parts of Scotland, let alone to specific locations most in need of employment, or where production might be maximized, or where environmental damage would be limited.[63]

126. Rather, applications are reacted to and considered on an individual basis. This lack of an overall strategy has previously been noted in various recent Scottish Parliamentary Committee reports as problematic, leading to lower aggregate benefits than might otherwise be achieved if a more joined-up approach with more detailed locational criteria were deployed. The same point is made in the international literature which highlights the desirability of greater clarity and transparency in the consideration of trade-offs between different policy objectives and how these are experienced by different groups in society.

[63] Some interviewees also suggested that reliance on imported feed from (e.g.) Africa was also in conflict with commitments made by the Scottish Government with respect to sustainable international development. Animal welfare concerns, both for farmed salmon but also cleaner fish, also apply.

4. Discussion and Conclusions

127. This exploratory scoping study set out to assess the feasibility of estimating under-reported negative economic impacts of salmon farming, using Skye and Lochalsh as a test case. Specifically, it aimed to (i) identify and, where possible, quantify localised economic disbenefits; and (ii) critically examine the data limitations, measurement issues, and methodological needs that future economic impact assessments should address.

128. Through a synthesis of international academic and grey literature, parliamentary committee reports, press coverage, planning documentation, and insights from stakeholder interviews, the study found consistent concerns across three interlinked domains: employment, community benefits, and governance.

129. In each, the framing of economic benefits by proponents of salmon farming was found to neglect important considerations including displacement of other activities, distributional effects, and counterfactual possibilities. The need to consider such effects in economic appraisals and evaluations is stressed by official guidance, notably the UK Government's Green and Magenta Books, and failure to do so leads to exaggerated estimates of net benefits.

4.1 Employment Findings

130. Whilst salmon farming does provide employment, both directly but also indirectly along the supply-chain, ex post comparison of actual job creation from new farms with ex ante job creation predictions does not appear to happen.

131. Equally, little consideration appears to be given to the potential volatility of employment in an industry exposed to international markets and disease risks, nor to long-run pressures from climate change.

132. More immediately, jobs created are presented in gross rather than net terms, ignoring the possibility that salmon farms displace other activities that compete for the same marine and coastal space or indeed other resources (notably labour). Such displacement is reported anecdotally, including for in-shore fishing, freshwater fisheries and some tourism activities.

133. However, whereas salmon production is routinely surveyed as a discrete activity, other sectors suffering potential displacement are not, making it difficult to use official statistics to detect employment changes with the same granularity as reported for salmon farming.[64] Moreover, given other influences upon business viability, attributing employment changes in other sectors solely to salmon farming is not necessarily appropriate.

134. Stakeholder testimonies can offer powerful narratives about displacement but are difficult to collate quantitatively. For example, they range across different time periods and locations, and care has to be taken to avoid double-counting of the same displacement event whilst other events may go unremarked upon due to the challenge of canvassing all stakeholders (particularly those who have already left an area due to displacement). Consequently, whilst confirming the existence of displacement effects, it is difficult to judge the comprehensiveness of the 'low tens' of job losses identified by interviewees in the scoping study.

4.2 Community Benefits

135. The distribution of employment benefits across different members of a rural community is uneven. In some cases, jobs may be filled by non-residents. More generally, households most in need of enhanced employment choices (including those suffering displacement because of salmon farming) are not necessarily able to access salmon-related jobs.

136. Beyond employment, salmon farming can offer additional community benefits. These include population retention, infrastructure improvements and philanthropic support. However, such benefits are not unique to salmon production since other businesses can and do offer them too.

137. Equally, stakeholder perceptions of voluntary support from salmon firms are not uniformly positive. In particular, funding levels are viewed as inadequate and the democratic basis for how funds are calculated and allocated is perceived to be weak. Greater local ownership and/or compulsion to provide financial support to communities would be preferred by interviewees.

[64] This lack of data granularity also applies to changes along the supply-chain.

138. Similarly, tax receipts from salmon production are viewed as surprisingly low relative to the apparent profitability of the sector and are at least partially offset by public expenditure on the salmon industry through grant-aid, R&D and regulatory oversight.

139. Separately, some negative externalities affect community well-being and sense of place but do not manifest directly as changes in incomes or employment. Estimation of the economic value of such changes is even more challenging, but could be attempted using non-market valuation techniques.

4.3 Governance Arrangements

140. Although not part of an economic appraisal per se, governance matters since it affects the context within which salmon farming operates and it does influence the bounds within which appraisals are conducted. For example, if salmon farming is viewed by the Scottish Government as a strategic way of stimulating economic activity and employment in rural areas it is not clear why areas or people most in need of regeneration have not been targeted more proactively. Equally, it is not clear how growth in salmon production is being reconciled with other Scottish Government policy commitments relating to environmental sustainability.

141. Similarly, at an operational level, there appears to be confusion about the roles and responsibilities of different regulatory bodies. This contributes to data gaps with respect to environmental externalities and actual employment creation, but also to a perception amongst stakeholders of a lack of local democratic accountability.

142. Governance imperfections also contribute to the harmful lack of mutual trust between different interest groups. This has resulted in increasingly polarised positions and an unwillingness of at least some stakeholders to voice criticism of salmon farming, a position that stifles the type of open debate and dialogue needed to resolve the multiple tensions identified.

5. Recommendations and framework

143. The scoping study confirms that current reporting under-estimates negative effects and hence exaggerates the net benefits of salmon farming. We suggest that adherence to published guidance for economic appraisal and evaluation would go some way towards correcting this. In the first instance, this would require a commitment by the Scottish Government to gather more comprehensive and granular data, including less reliance upon self-reporting by the salmon industry.

144. Table 2 summarises the steps involved in following such guidance, noting each step's purpose and data requirements. Meeting the latter implies a need for better official ex post verification and evaluation of salmon license application claims but more generally some attempt to balance routine granular surveys of salmon farming with equivalent repeated surveys of other discrete marine and coastal activities. Hence the Scottish Government and other relevant bodies should be encouraged to improve data collection and provision.

145. Whilst such additional routine survey work may help to better estimate net benefits in future, estimation of current and past net benefits is unavoidably reliant upon stakeholder testimonies. If this approach is to be pursued, the sample size of interviewees would need to be expanded beyond that achieved in this scoping study and some attempt made to include a greater proportion of individuals with first-hand experience of displacement.

146. Separately, echoing recommendations made by various Scottish Parliamentary Committees and by Professor Russel Griggs in his role as author of the independent review of Scottish aquaculture regulatory process, greater clarity would be welcome on how salmon farming and its cumulative effects fit within the overall strategy for rural economies, communities and environments. Without this, it is difficult to understand how economic, environmental, and social objectives are being prioritised and traded-off.

Table 2: Framework to guide economic appraisal and evaluation of salmon farming in local areas in Scotland

Assessment activity	Purpose	Example considerations	Data issues
Define scope	To set geographical, supply chain and temporal boundaries for what is to be assessed.	What will be included in/excluded from the assessment? Which events/developments, over time, will be included/excluded?	Many datasets are not broken-down beyond national level. How data is gathered/categorized can change over time.
Define counterfactuals	To set basis for assessing what would have happened without the presence of salmon farming in the local area.	What other sectors or economic activities will be examined? Is simple before-and-after comparison valid or does changing context require a dynamic baseline?	Unobservable counterfactuals require reliance upon varying assumptions about the timing, duration and magnitude of positive and negative effects.
Identify cost and benefit categories	To catalogue/account for full range of types of impact from salmon farming, both positive and negative. To allow estimation of *net* impacts of salmon farming.	Which categories are relevant? (Examples: GVA, tax receipts, employment, skills, investments, voluntary donations.) Which impact effects should be accounted for? (Examples: multiplier effects, displacement effects, negative externalities.)	Different sectors are affected in different ways. Some effects are not immediate, and/or are contested and conflated with other causes, making it difficult to attribute spill-over/externality effects to specific sources. Costing some externalities requires recourse to non-market valuation techniques.
Quantify costs and benefits (where possible)	To define measures that promote reliable, robust quantitative estimates of impact (but also qualitative description of other effects)	Which measures are applied to define cost and benefit categories, and how are these defined? (E.g. GVA, employment, tax receipts). Which impacts should be assessed qualitatively, in the absence of quantified measures?	Annual survey of salmon farming is not matched by similar granular data collection for other sectors, including along supply-chain. Anecdotal recollections are powerful, but care is needed in sample coverage and to avoid double-counting.
Ongoing monitoring	To verify *ex ante* claims and assessments against observed outcomes.	Are forecast impacts realized in practice (e.g. GVA, jobs created)? Have there been unforeseen benefits or costs?	Currently, there is no existing *ex post* mechanism for gathering farm-specific information to compare to *ex ante* claims.
Governance and policy reflections	To reflect critically on the extent to which official processes help to maximise economic benefits of salmon farming, while minimizing costs.	How does salmon farming policy align with different local, regional and national strategic policy aims? How well do planning approval and appeal processes work? How well do monitoring and control processes work?	Articulation of the relative prioritization of different policy aims and trade-offs between them is complex. e.g. attracting inward investment to stimulate jobs and exports but subject to environmental commitments.

147. Similarly, whilst the salmon industry creates significant output value (c.£1.1bn in 2023, much of it exported), this is not subject to direct production or export taxes. Public revenue is instead generated from the industry through other mechanisms, including corporation tax on profit. However, centralisation of revenue raising mechanisms means that public expenditure does not necessarily flow back to communities hosting salmon production. Moreover, foreign ownership of production increases the potential for pre and/or post-tax profits to leak away from local areas. Further research into the extent to which public revenues and private profits are (and could be) retained locally would be helpful, alongside collation of the different forms of public expenditure relating to the industry itself.

148. If additional public revenues were to be sought from salmon farming, consideration could be given to direct taxation of production, removal of the current exemption from non-domestic rates, and/or imposing higher seabed lease levies. Such changes would require careful design and implementation, but ring-fencing of at least some additional revenue would align with others' recommendations for mandatory community benefit payments.

149. Finally, the process of undertaking the study underscored a pressing need to rebuild trust between stakeholders, regulators, and the salmon farming industry. A shared evidence base, built on transparency and openness could help in this regard.

Appendix A: Literature reviewed

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Appendix B: Discussion Guide

Discussion Guide: Economic Impacts of Aquaculture in Scotland – Stakeholder Interview
Duration: Aim for 30 minutes
Format: Semi-structured, by telephone
Target audience: Selected stakeholders in Skye and Lochalsh with experience of negative economic impacts of Scottish aquaculture (particularly salmon farming)

1. Introduction (2-3 minutes)

- Thank participant for their time.
- Briefly explain the purpose of the research:
- *"We're conducting a study on the economic impacts of aquaculture in Skye and Lochalsh, particularly salmon farming. By sharing your perspectives and experiences, you will help us capture nuanced insights into how the sector has shaped the local economy, positively and/or negatively."*
- Emphasise confidentiality and anonymity.
- Ask for permission to take notes / record (if applicable).
- Invite them to speak freely and share any experiences or insights.

2. Background and Role (2–3 minutes)

- Can you briefly describe who you are and what you do?
- What kind of involvement or exposure have you had to aquaculture in Skye and Lochalsh? Salmon farming specifically?

3. Perceived Economic Benefits (7–8 minutes)

- In your view, is there evidence of economic benefits of aquaculture in Skye & Lochalsh?
  - Prompts (i.e. multiplier effects):
    - Local employment (direct/indirect, quality of jobs)
    - Local economic development
    - Contribution to national economy/export revenues
    - Infrastructure investment

- If not, why not?
  - Prompts (i.e. multiplier dampeners, GVA leakage):
    - Composition and origin of aquaculture workforce
    - Non-local ownership, GVA leakage (enclave economies)
    - Location of rest of supply-chain
    - Expansion without jobs (economies of scale, new technology)

4. Perceived Economic Costs or Harms (7–8 minutes)

- What economic downsides do you associate with aquaculture?
  - Prompts:
    - Displacement or loss of other livelihoods (e.g. fisheries, tourism)
    - Land/water access issues or community dispossession
    - Dependency or volatility in local economies
    - Environmental degradation with economic consequences

- Do you think some groups are more negatively affected than others? Who benefits, and who bears the costs?
  - Prompts:
    - Livelihood trajectories/transition matrices
    - Land/water access issues or community dispossession

- What quantitative evidence is there for such negative effects?
- What could be done to improve the evidence base?

5. Trade-offs, Alternatives, and Governance (7–8 minutes)

- Do you think current governance or planning arrangements are effective in managing economic trade-offs?
    - Prompts:
        - ‘Promissory’ narratives of projected growth, job creation, or inward investment narratives; neglected counterfactual possibilities
        - Lack of data/transparency and increasing polarisation

- In your view, are there other ways coastal or marine resources could have been developed to support local economies?
    - Prompts:
        - Stricter controls on ownership/local retention of GVA
        - Alternative industries (e.g. tourism, shellfish, renewables)
        - Community-led models (e.g. Blue Community vs. Blue Economy)

6. Final Reflections (2–3 minutes)

- Are there any important economic issues related to aquaculture in Skye and Lochalsh (or Scotland more widely) that we haven’t covered?
- Do you have any suggestions for other people or groups we should speak with?

Thank participant again and confirm next steps (e.g. how the findings will be used and whether they'd like to receive a summary.

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