Business and Economy – General overview of the current open pen fish farming industry in Scotland, with concerns (in bold) as they would relate to any renewed application to site an 8000T semi closed containment farm at Lurignish, on Loch Linnhe

- Employment – Salmon Scotland's FTE figure 2,500. Scottish Government FTE figure for 2024 1,362 – an 8% decrease over 2023, despite an increase in production (2023-2024) of 27%. Largely due to consolidation, remote monitoring and mechanisation.
  Industry claims do not reflect job displacement, double accounting.
  Employment often not of "locals" and often on a "2 week on/2 week off" basis, so that income is not spent locally.

- Income generation. Most of the industry profits currently go to foreign companies and their shareholders. Corporation tax goes to the UK government. Seabed leases from the Crown Estate and income tax (from employment) are devolved to the Scottish Government. On the other hand, millions of pounds of taxpayers' money flow to fish farm companies annually for Research and Development – in some years, the grant even exceeds the company's profit.

- Community Benefit. Companies will offer an annual community benefit which is a tiny percentage of their profit. **The spending allocation of the tax (corporation and income) generated is unlikely to directly benefit the community, yet the latter is left to deal with negative environmental/job displacement impacts.**

- Competition for jobs/housing. Other rural business sectors (eg tourism) struggle to compete for staff/housing from a very limited pool and either close or have to limit opening hours. **Many restaurants around Loch Linnhe are already suffering with this issue.**

- Contribution to Scottish Economy. Direct GVA from salmon farming £231.2m (2024).
  In 2021, aquaculture's GVA was £472 million, which was 0.31% of Scotland's total GVA., with salmon farming contributing about 60% of the total aquaculture contribution, i.e. 0.186% of Scotland's total GVA (based on the latest available data from the Scottish Government)

- Wild Salmon fishing contributed £79.9m. GVA to the Scottish economy in 2017 (latest available figure) and employed 4,300 FTE (directly and indirectly through hospitality). **This sector, formerly very active around Loch Linnhe, is increasingly under threat with the dramatic decline of Wild Salmon (on the RED list of endangered species), with some of this decline attributable to the fish farm industry (as well as to climate change and other environmental factors). The siting of a mega fish farm at Lurignish would be directly on the migration route of the few remaining Wild Salmon.**

- Industry inflated figures. Employment potential claims by the industry are often inflated in planning applications – many of the jobs will not be for "locals" (eg transport, foreign owned well boats and feed barges, remote monitoring etc), and many will be part time, low paid jobs. **These figures, whether or not they would be realised, will be very influential in any application to site at Lurignish.**

- Boom/bust risks. The impact of either on a small community where a large proportion of the eggs are in one basket is so much greater than in an urban area. Fish farming, being a global industry, is especially vulnerable to global issues (eg Russia's ban on Scottish Salmon imports in 2014, the current potential threat of USA tariffs, Climate change increasing disease/jelly fish outbreaks).

  Most of the farms, being foreign owned and profit driven have little connection with the communities where they site their farms. If they make a strategic decision to close down an operation, this could have a dramatic effect on the local economy (eg the current threat of closing down/selling the feed factory at Kyleakin with a potential loss of 60 jobs)

  With such a large operation being considered for Lurignish, a bust situation (which could occur for a number of reasons – global pressures/disease/environmental disaster/Climate change) would leave the area with a huge clean up operation and several jobs lost.

<u>Environment and Welfare: is Semi Closed Containment the Solution?</u>

- Current open net issues are sea lice, disease (mostly gill disease), wounds (from mechanisation), waste and chemical pollution, chemical use, escapes, plastic pollution, wild fish and soya as fish feed

- Semi closed containment is being considered by the Scottish Government as the perceived solution to overcome these issues. Norwegian companies have been experimenting with this technology - until recently, only with non-commercial licences - for a number of years, but with very mixed results. Because of the scales required, and the increased densities of fish allowed (in order to make the operations profitable) any disaster, as reported in the press, has been catastrophic.

Sea lice. Most operational evidence shows that SCC's reduce (but do not eliminate) the threat of sea lice. Until recently, it was believed that sea lice only lived above 20-25m. – however recent studies (in submerged cages) have shown that they will adapt to much lower depths in order to find a host. SEPA has identified Loch Linnhe as a key area where fish farms pose a high risk to Wild Salmon due to sea lice outbreaks. **At a recent meeting with researchers at SAMS, it was explained that Lurignish would be especially vulnerable to sea lice being found at depth (they, having completed a 2 year research project on sea lice and flows in Loch Linnhe) because of the potential**

for freshwater collecting at the surface in this area and pushing the lice down to a level below the SCC intakes.

Disease. Amoebic gill disease is a major cause of disease and mortality in fish farms. A recent Norwegian study (December 2024) reported that the increased particle accumulation in an SCC could make it more prone to outbreaks. **Note that neighbouring farms, Shuna and Lismore, have recently been made fallow because of extremely high mortality rates due to AGD.**

Winter ulcers. These cause open wounds on the skin. In SCC's, cold water is brought from depth, but at temperatures lower than 7-8 degrees, the fish are prone to these painful ulcers, which are both a health and welfare issue. These open wounds make the fish vulnerable to disease, which in a closed situation can spread very quickly.

Mechanisation wounds. These would mostly occur while transporting the fish, either from a hatchery as smolts, or to open net as post smolts; or with the increased likelihood of rubbing against the cage sides because of the increased density; or with temporary removal for freshwater de-lousing if required.

Solid Waste and Uneaten Feed pollution. Many SCC providers offer the option of sludge collection, but it would seem that the claims for percentages collected are currently aspirational, rather than actual and the necessary equipment is still under development. In a recent consultation by the Norwegian Trade Industry and Fishing Directorate, it was stated, "***In hatcheries on land, it is estimated that approx. 30% particulate sludge is actually collected, which is significantly lower than the estimate of the filter suppliers who state approx. 70-90% cleaning effect*** *(Turid Synnøve Aas, 2021; Nofima report 23/2021). Collected data for land-based facilities for the area of the State Administrator in Vestland shows a large spread in the extraction of TOC (total organic carbon) both in 2019 and 2020, where the average cleaning was only 28.7% and 34.1% respectively*. ***Further, cleaning of sludge in closed facilities will be less effective than on land due to significantly higher water flow."***
With this limited extraction, the extra nutrient load from a farm approximately 6 times larger than the existing open net farms on Loch Linnhe would be a major concern. Add to this, the release of 100% of the nitrogen and phosphorus into the loch, and the pollutive effect would be significant.

Chemical use. Any chemicals used in an SCC will be flushed out into the loch, just as in an open net situation and SEPA seems to be powerless to impose appropriate restrictions. The Scottish Sea Farms Hatchery in Barcaldine (neighbouring a Special Area of Conservation) recently allowed six times the permitted daily limit of bronopol to

be used. SEPA attempted to suspend permission for SSF to discharge its wastewater (containing the chemicals) into the loch, but is now being subjected to going through an appeal process because SSF has not accepted SEPA's ruling. Anyway, of course, **by the time SEPA gets involved, the damage has already been done.**

Escapes. Climate change is increasing the frequency and intensity of storms on the West Coast. The recent mass escape from the Gorsten farm on Loch Linnhe has demonstrated the vulnerability of these farms. Semi closed pens will be even more vulnerable to damage and mass escape as they are characterised by increased forces on both the structure and moorings from currents, winds and waves. **The same storm caused one side of the road at Lurignish to be closed due to fallen trees and a power cut that lasted three days. Not only would an escape event from an 8000T farm be potentially catastrophic, but there would be significant challenges in ensuring sufficient oxygen transport to site and maintaining an emergency power supply – without which all the fish would very quickly die (as they did in a SCC cage in BC.**

Fish Feed. Fish feed is made with varying ratios of wild fish and soya. Vast quantities of wild fish are hoovered up from poor coastal communities (eg off the West Coast of Africa) and the soya sourced from – worst case – Brazil. Although fish feed companies claim to be lowering the percentage of both used, the demand for fish feed has risen sharply, effectively cancelling out any improvement in the situation. **Mega farms, such as that proposed for Lurignish would require vast quantities of feed.**

Conclusion:

While semi-closed containment (SCC) systems are promoted as a potential solution to the environmental and welfare problems associated with open-net salmon farming, current evidence shows that they only partially address these challenges and may introduce new risks. Issues such as sea-lice adaptation, increased susceptibility to gill disease, welfare impacts from cold-water exposure and crowding, unproven sludge-collection technology, chemical discharge, heightened escape risks, and the ongoing reliance on unsustainable feed sources all raise significant concerns. Given these limitations—and the scale proposed for new farms—SCC technology does not yet offer a reliable or environmentally responsible alternative.