**Briefing note:** **Salmon Farming Options in British Columbia**

**AVICC Resolutions # R28, LR6 and R30**

Increasing public concern over the potential for negative impacts from open net-pen salmon farming on wild salmon, herring and other species has led to two resolutions before AVICC seeking an end to open net-pen salmon farming (R28, LR6) and one seeking to support the industry (R30). This note is presented by Living Oceans Society, a non-profit organization that has worked on this issue for 20 years.

Land-based, closed containment salmon farming(LBCC) represents an **opportunity for British Columbia to play a leading role in an emerging market.** We are uniquely positioned to expand the aquaculture industry with premium-priced, sustainable product while attracting significant new investment and transitioning out of open net-pen (ONP) aquaculture.

The opportunity is **highly time-sensitive**, however: development of the industry in Europe is proceeding apace and the US is following suit, eroding our most important market for farmed salmon.

As the attached list of global projects shows, **more than 250,000 metric tonnes (mt) of land-based Atlantic salmon projects have been announced to date. Five projects with a combined value of more than $3.5 billion and combined production of 200,000mt are planned for the US east coast.** Canada's total current ocean-based Atlantic salmon production is about 120,000 mt, including about 78,000 mt from west coast farms.

**Kuterra Pilot Project**

The use of Recirculating Aquaculture Systems (RAS) in land-based operations to grow fish to market size was pioneered here in BC at Kuterra.

Conceived as a pilot project, the 300 mt/yr Kuterra facility proved the technology and currently produces about 5 tonnes per week of premium grade, "green" ranked Atlantic salmon.

Kuterra has also proven the financial viability of land-based aquaculture, showing that a facility scaled for 3-5,000 mt (or the size of a current net-pen farm) should generate investment grade returns.

Closed containment FAQ

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| **Why end net-pen salmon farming?** | • **parasitic salmon lice** from farms infect wild salmon and can kill young salmon and spread disease<br>• ~4 metric tonnes of **antibiotics of high importance to human health** dumped into the ocean annually, together with anti-parasite chemicals, other drugs<br>• competition/disease transmission from **escaped** or 'trickle loss' salmon<br>• **whales and other marine mammals-**accidental and targeted deaths<br>• **numerous wild salmon runs are endangered**: sockeye, chinook and coho recommended for listing or listed under Species at Risk Act; some local runs of pink and chum severely depressed<br>• **Bycatch** of herring, cod and other small fish |
| **Science** | • **proving direct impacts on wild fish is nearly impossible**, as they will die or be eaten before being discovered in a diseased state by researchers<br>• independent science implicates lice and the virus PRV in causing **impacts on some wild salmon runs at the population level**—i.e., the death of enough individual fish to negatively affect a salmon run's ability to maintain its numbers<br>• the **precautionary principle** should be invoked where evidence of impacts exists<br>• **science has become adversarial**, with DFO aquaculture research co- |

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| | funded and co-authored by the industry it's supposed to regulate and failing to investigate impacts on wild stocks with rigour and transparency<br>• industry approach has been to discredit independent scientists<br>• plain language summary of science to date by Dr. Lawrence Dill, SFU |
| **Key Benefits of LBCC** | • pretreated water eliminates lice and some pathogens from the farm<br>• no pesticide and much lower drug usage required<br>• more efficient feed conversion means more sustainable operations<br>• water constantly cleaned and recirculated for optimal fish health<br>• all effluent can be used in greenhouse &/or treated prior to release, preventing disease transmission |
| **Economic potential of LBCC** | **By 2027, LBCC could replace current BC production volumes from net-pens** (~78,000 mt), attracting $1.7b in capital investment and generating $600m in sales<br>• Jobs and investment would be located primarily on Vancouver Island, where much of the infrastructure to support the ocean-based industry is located |
| **Global Market Trends** | Demand for farmed Atlantic salmon is strong and growing, with new markets opening for BC product in China and South Korea.<br>While prices fluctuate for net-pen farmed salmon, Kuterra's LBCC facility, using water recirculating technology (called "RAS") has consistently attracted market premiums averaging 59% over the past 3 years, as it has the highest sustainability ranking (Seafood Watch 'green'), consistent quality and more predictable volume than net-pen operations |
| **Salmon farm industry trends** | DNB Markets (a division of DNB Bank ASA) review of aquaculture indicates:<br>• Net-pens facing increasing costs of feed and control of lice and disease<br>• Growth options are limited for net-pens; licensing costs 'skyrocketing'<br>• Substantial progress in RAS technology over past 5-10 years<br>• Production costs for 3-5,000 mt LBCC facility estimated to be close to net-pen production costs<br>Report Conclusion: **"Land-based farming has the largest potential to impact the future of the salmon farming industry."** |
| **Global support for research and sustainability** | **Norway:** strict new controls on the growth of net-pens while offering free "green" licences for facilities working with RAS technology<br>• **UN Food and Agriculture Organization's Blue Growth Initiative and EU Blue Growth Strategy** both focused on rapid, sustainable development of aquaculture. EU has earmarked EUR 1.2B for aquaculture innovation and EUR 46M for research |
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# Planned and Operating RAS Atlantic Salmon Production: status as at 2017

| Company | Country | Planned + Operating Production | Status | | |
|---|---|---|---|---|---|
| | | | Planning | Construction | Operating |
| Atlantic Sapphire | USA (Flor.) | 90,000 | x | x | |
| Whole Oceans/Emergent Holdings | USA (ME) | 50,000 | x | | |
| Nordic aquafarms | USA (ME) | 33,000 | x | | |
| Aquamaof | USA | 20,000 | | | |
| Nekst | Norway | 20,000 | x | | |
| Akvafarm Rjukan AS | Norway | 10,000 | x | | |
| Aquabanq | USA | 10,000 | x | | |
| FishFrom | Scotland | 3,600 | x | | |
| Nordic Aquafarms | Norway | 2,400 | | x | |
| Atlantic Sapphire/ Langsand Laks | Denmark | 2,000 | | x | x |
| Danish Salmon | Denmark | 2,000 | | | x |
| Atlantic Salmon South Africa | South Africa | 1,500 | x | | |
| Jurassic Salmon | Poland | 1,000 | | | x |
| Yantai Salmon Farm | China | 1,000 | | | x |
| Xinjiang E'he Construction and Investment Company | China | 1,000 | | | x |
| SmögenLax Aquaculture AB | Sweden | 1,000 | x | | |
| Swiss Alpine | Switzerland | 600 | | x | x |
| Palom | USA (ME) | 600 | x | | |
| Sustainable Blue | Canada (NS) | 500 | x | | x |
| Kuterra | Canada (BC) | 300 | | | x |
| CanAqua Seafoods | Canada (NS) | 100 | x | | x |
| BDV | France | 100 | | | x |
| **Total Production (mt/year)** | | **250,700** | **244,000** | | **6,700** |