



February 10, 2021

The Right Hon. Justin Trudeau, PC, MP
Prime Minister of Canada
Prime Minister's Office
80 Wellington Street
Ottawa, ON K1A 0A3

Re: Open Letter Regarding the Role of Innovation and Technology in the Canadian Aquaculture Industry

Dear Prime Minister:

On December 2, 2020, you and the other 13 world leaders of the High Level Panel (HLP) for a Sustainable Ocean Economy committed to 100 percent sustainable ocean management by 2025. To support this commitment, the High Level Panel commissioned a blue paper on "The Future of Food from the Sea". This paper determined that "the ocean could provide over six times more food than it does today." It further stated that **meeting the ocean's production potential will require the sustainable expansion of both finfish and shellfish aquaculture.**

Given this priority role envisioned for aquaculture, we would like to assure you that the Canadian aquaculture industry is well prepared to support the High Level Panel's goal to sustainably increase marine-based food production. Throughout its history, Canadian aquaculture has followed an orderly transition toward enhanced productive efficiency and greater environmental stewardship through the ongoing implementation of the most recent cutting-edge technologies and innovations.

However, continued investment in innovation by our sector can only take place if there is sound decision making and certainty for future growth of the industry in Canada. Minister Jordan's recent decision to close salmon farms in the Discovery Islands will reduce revenues in the Canadian aquaculture sector by more than 16 percent. This has had an immediate chilling effect on investments in technology and innovation.

Canadian Salmon Aquaculture

Through their focus on clean technology and innovation, Canadian salmon farms have become integrated, technologically sophisticated production systems strategically designed, operated and maintained to ensure sustainability. Today's Canadian salmon farms utilize:

- *Stronger ocean net pens:* Ocean pens are now constructed from steel or high-density polyethylene—and the nets are manufactured from modern polymers. The strength and durability of these innovations have significantly reduced fish escapes in recent years. Machine learning applications combined with underwater drone technology will soon allow ongoing real-time monitoring, cleaning, and repair of nets to further ensure net integrity.
- *High resolution genetic selection.* Analysis of the full Atlantic salmon genome now allows the use of high-resolution genomic tools for the selection of breeding stock with superior growth, quality, and disease resistance.



- *Innovation in vaccines development.* Vaccines have now been developed against many of the common bacterial and viral pathogens, and vaccination processes have been transitioning from manual to fully automated, making vaccinations safer, faster, and more accurate. Vaccination of all juvenile Canadian farmed salmon before transfer to the marine environment significantly reduces the potential of disease transfer to wild stocks. As the world is learning about the advances in mRNA vaccine technology and its role in fast development of COVID treatments, salmon farmers on the west coast have been using a DNA plasmid vaccine for more than 13 years.
- *Stringent disease testing and on-farm health management.* Ongoing disease testing prior to transfer to the marine environment ensures that only disease-free juvenile Canadian farmed salmon enter the ocean. Salmon farmers are also integrating underwater cameras into machine-learning applications that will allow the health status of tens of thousands of individual fish to be monitored on a daily basis, facilitating the detection and treatment of early-stage infections.
- *Environmental monitoring:* Salmon farm companies collect the most extensive data base set of Phytoplankton along with Environmental “real time” data sets. Machine learning and A.I. are now utilizing these data points to conduct predictive ocean trends. This becomes very useful as more data is required to understand the level of climate change and the potential impacts.
- *Automated feeding systems:* Canadian salmon farms already use automated feeding systems and underwater video camera monitoring - and are integrating machine learning software - to ensure that the amount of feed delivered to a pen does not exceed the appetite of the fish. This limits the buildup of waste feed on the ocean floor, supporting a healthy marine ecosystem. These systems also capture lice counts, health, biomass and inventory.
- *Novel feed ingredients:* A significant amount of protein and oil used in salmon feeds now comes from alternative plant and animal sources, utilizing what would be waste from the commercial fishing industry (e.g., skin, bones, organs from processing) and plant-based proteins and oils developed in Canada (e.g. camelina, by-product utilization, insect meal, etc.). Increased usage of alternative sources supports the sustainability of wild fish stocks by reducing reliance on protein and oil sourced from wild-caught fish for the specific purpose of making farmed salmon feed.
- *Sea lice prevention and treatment strategies.* A full suite of innovative non-chemotherapeutic sea lice prevention strategies and treatment options has been developed to keep sea lice levels below the threshold levels specified by Fisheries and Oceans Canada and we are seeing many companies starting to invest in alternate treatment technology such as mechanical delousers.
- *Advanced monitoring of sea floor:* Canadian salmon farmers are currently validating environmental DNA (eDNA) metabarcoding as a powerful new tool to complement existing sea floor monitoring technologies. The eDNA test will be the most sensitive and accurate way to ensure that farms are not permanently impacting marine species living on the sea floor near salmon farms.
- *Wastewater treatment innovations.* Processing facilities are now equipped with innovative wastewater treatment technologies—including UV and chlorine treatment—that support the health of the marine environment and minimize the potential of disease transfer to wild fish stocks.
- *Advanced ship technology:* Aquaculture designs and utilizes some of the world’s most advanced ships to support treatments, live hauling, mooring construction and harvesting. These vessels



are employing and recruiting the highest educated mariners along with supporting the coasts supporting ship builders and maintenance ship yards.

While the industry's high standard of environmental responsibility has already been recognized by multiple independent, global environmental certification systems, Canadian salmon farmers continue to transition toward technologies and innovations that will reduce their impact on the environment even further. New technologies and innovations are being tested at both the hatchery and the grow-out phases of the farmed salmon production cycle. For example:

- *Hybrid production systems:* New land-based recirculating aquaculture systems are being constructed that will allow juvenile farmed salmon to be grown to larger, more robust sizes before transferring them to ocean-based grow-out systems. This 'hybrid' production strategy will significantly lower the length of time that farmed salmon spend in the ocean, further reducing any environmental impacts.
- *Ocean-based semi-closed containment (SCC) systems:* Several SCC systems are currently being piloted in Canada. SCC systems are equipped with technological and/or physical barriers that inhibit other fish species, sea lice, and pathogens from leaving or entering the pen during the ocean grow-out phase. Some designs also have the potential to extract waste particles from the discharge water as that technology becomes commercially available.
- *Fully-closed containment (CC) systems:* Canadian salmon farmers are currently investigating the potential of marine-based CC systems.

Canadian Shellfish Aquaculture

Canadian shellfish aquaculturists are also implementing innovations and new technologies that will improve production efficiencies and enhance environmental sustainability, including:

- *Surface floating bag oyster production systems.* These new systems will:
 - Reduce plastic usage by improving the longevity and retention of production equipment.
 - Improve oyster survival rate.
 - Increase production capacity by allowing higher density oyster culture.
 - Reduce marine mammal interactions.
- *Enhanced cold chain management:* State-of-the-art systems of remote wireless sensors are allowing the Canadian shellfish industry to digitally log temperature data throughout the storage and transportation of shellfish.

Overall, Canadian seafood farmers are world leaders in:

- achieving global science-based standards for traceability, food safety, animal welfare, social responsibility, and environmental performance, exceeding all regulatory requirements;
- reductions in plastics usage in finfish and shellfish cultivation;
- usage of fish meal and fish oil in feed (less than 30% of farmed seafood diets are of marine origin now and from certified sustainable fisheries).

These are Canadian farmed seafood innovations that contribute to fisheries conservation, habitat protection, reduction in GHG emissions, and demonstrate our sector's leadership in growing the Canada's Blue Economy.



Given aquaculture's tremendous capacity and environmental sustainability, the Canadian aquaculture industry is committed to working with you to support the ocean action agenda of the High Level Panel for a Sustainable Ocean Economy and to realize the full potential of Canada's Blue Economy Strategy. As noted earlier, continued investment in innovation by our sector can only take place if there is sound decision making and certainty for future growth of the industry in Canada.

To realize this opportunity, our sector once again asks you to formally identify a federal department to champion our sustainable growth, and for this department to develop a plan and sustainable growth strategy. We ask for your government's support on these key issues that are major blocks for our sector's further development.

Sincerely,

Timothy J. Kennedy
President & CEO
Canadian Aquaculture Industry Alliance

CC:

Hon. Bernadette Jordan, PC, MP, Minister of Fisheries, Oceans and the Canadian Coast Guard
Hon. Chrystia Freeland, PC, MP, Deputy Prime Minister and Minister of Finance
Hon. Dominic LeBlanc, President of the Queen's Privy Council for Canada and Minister of Intergovernmental Affairs
Hon. Jonathan Wilkinson, PC, MP, Minister of Environment and Climate Change Canada
Hon. Mélanie Joly, Minister of Economic Development and Official Languages
Hon. François-Philippe Champagne, PC, MP, Minister of Innovation, Science and Industry
Hon. Marie Claude Bibeau, PC, MP, Minister of Agriculture and Agri-Food
Hon. Carolyn Bennett, PC, MP, Minister of Crown-Indigenous Relations
Hon. Mary Ng, Minister of Small Business, Export Promotion and International Trade
Other Key Federal Ministers and Parliamentary Secretaries engaged with the Blue Economy Strategy
Premiers and Lead Ministers for NL, NS, NB, PEI, QC, ON, BC
Mr. Erin O'Toole, PC, MP, Leader of the Official Opposition
Mr. Richard Bragdon, MP, Critic to the Minister of Fisheries & Oceans
Mr. Pierre Poilievre, MP, Critic to the Minister of Finance
Mr. Jagmeet Singh, Leader of the New Democratic Party