

Economic and Financial Impacts of the Draft Transition Plan for BC Salmon Farms



RIAS INC.
November 2024

Prepared for



BC SALMON
FARMERS



Citation: RIAS Inc., 2024. Economic and Financial Impacts of the Draft Transition Plan for BC Salmon Farms. Prepared for the BC Salmon Farmers Association, Campbell River, British Columbia. 22 pages

Cover Photo: Albert (Fonz) Frank, Member of the Ahousaht First Nation, Clayoquot Sound. 25-year employee of Cermaq Canada

EXECUTIVE SUMMARY

The following is an analysis of the economic and financial impacts of a ban on marine net-pen salmon farming as proposed in the Government of Canada's Draft Salmon Aquaculture Transition Plan for British Columbia, September 2024.

Going directly to a ban by 2029 will result in significant long-term negative socio-economic impacts in British Columbia and Canada. It will reverse and harm once positive Indigenous economic development and reconciliation efforts and severely impact employment in areas with a history of underemployment. An unjustified ban and push to unproven technology on salmon farming in B.C. will reduce Canadian agri-food production by 400 million healthy meals per year, eliminate B.C.'s top agri-food export, destroy 4,560 jobs, and cost Canadian taxpayers at least \$9 billion.

The anticipated impacts of the ban are as follows:

1. Loss of \$1.17 billion in annual economic activity, \$435 million in GDP, and 4,560 fewer well-paid full-time jobs with a combined annual payroll of approximately \$259 million.
2. Loss of \$437 million in spending with over 1,400 vendors across B.C.
3. Elimination of a further 50,000 tonnes of farmed salmon production.
4. Reverse meaningful Indigenous reconciliation, self-determination and rights and title for impacted First Nations.
5. Devastation to several rural, B.C. coastal communities—the removal of this critical industry for Vancouver Island, with an average salary that is 30 percent higher than the median employment income, takes away meaningful career opportunities and the ability for rural, coastal, and Indigenous communities to attract and retain their youth.
6. Impose unnecessary costs on Canadian taxpayers of at least \$9 billion to compensate for the industry's closure and to subsidize unproven closed containment tech companies.
7. It ignores the existing responsible plans of B.C. salmon farmers and First Nations to minimize further interactions between farmed and wild salmon – which would deliver the same policy outcome as the ban without the devastating consequences for coastal and Indigenous communities.
8. Contradicts the government's own policies, resulting in the complete loss of investor confidence in Canada to invest in new innovations and technologies.

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BACKGROUND

Salmon farming in B.C. began over 40 years ago and has become deeply embedded in coastal Indigenous and non-Indigenous communities and local economies. By 2019, the sector employed some 7,500 people directly and indirectly, engaging with over 2,400 suppliers, contributing \$1.9 billion to the economy annually, and produced about 90,000 tonnes of salmon.

Today, 100 percent of BC's farmed salmon is raised in agreement with Rights Holder First Nations. The sector directly and indirectly employs over 1,000 Indigenous people and provides about \$134 million in total annual economic benefits to First Nations peoples.

The B.C. salmon farming sector has already weathered closures of production sites in the Broughton Archipelago, Sunshine Coast region and the Liḡwítḡaxw (Laich-will-tach) territory known as the Discovery Islands that has reduced annual production capacity from over 90,000 tonnes to less than 50,000 tonnes, a 45% reduction over a 6-year period. This has led to annual losses of over \$770 million in economic output, \$286 million in GDP, 3,000 jobs and \$170 million in income for families.

On June 19, 2024, the Government of Canada announced a decision on the future of marine net-pen salmon farming in B.C. The decision committed to implementing a ban on current marine net-pen salmon aquaculture in B.C. coastal waters by June 30, 2029. It required that any new salmon aquaculture licences be either land-based closed containment or marine-based closed containment.

B.C. salmon farming companies, their suppliers, and the First Nations in whose territories they operate have stated that the proposed ban on current fish-growing operations and technology requires implementing new technologies which do not exist on a practical or commercial scale. Mandating unproven technologies to be adopted by 2029 will end investment by B.C. salmon farming companies in R&D, as well as in operations and production. Companies across B.C.'s integrated salmon farming value chain will close, and thousands of jobs will be lost. Communities on Vancouver Island will suffer most, including Campbell River, Courtenay, Port Hardy, Sayward, Port McNeill, Port Alberni, Tofino/Ucluelet, but also mainland coastal communities like Klemtu and others.



This report examines the following:

- Economic and financial impacts of the government’s proposed transition plan on the salmon farming sector, including suppliers and First Nations.
- Financial cost and timelines to comply with a closed containment mandate as proposed in the draft transition plan.
- Potential gains from a “responsible transition plan” put forward by the sector that would eliminate harmful interactions between farmed and wild salmon and achieve the overall transition objective of reducing risks to wild salmon stocks.

ECONOMIC AND FINANCIAL LOSSES UNDER TRANSITION

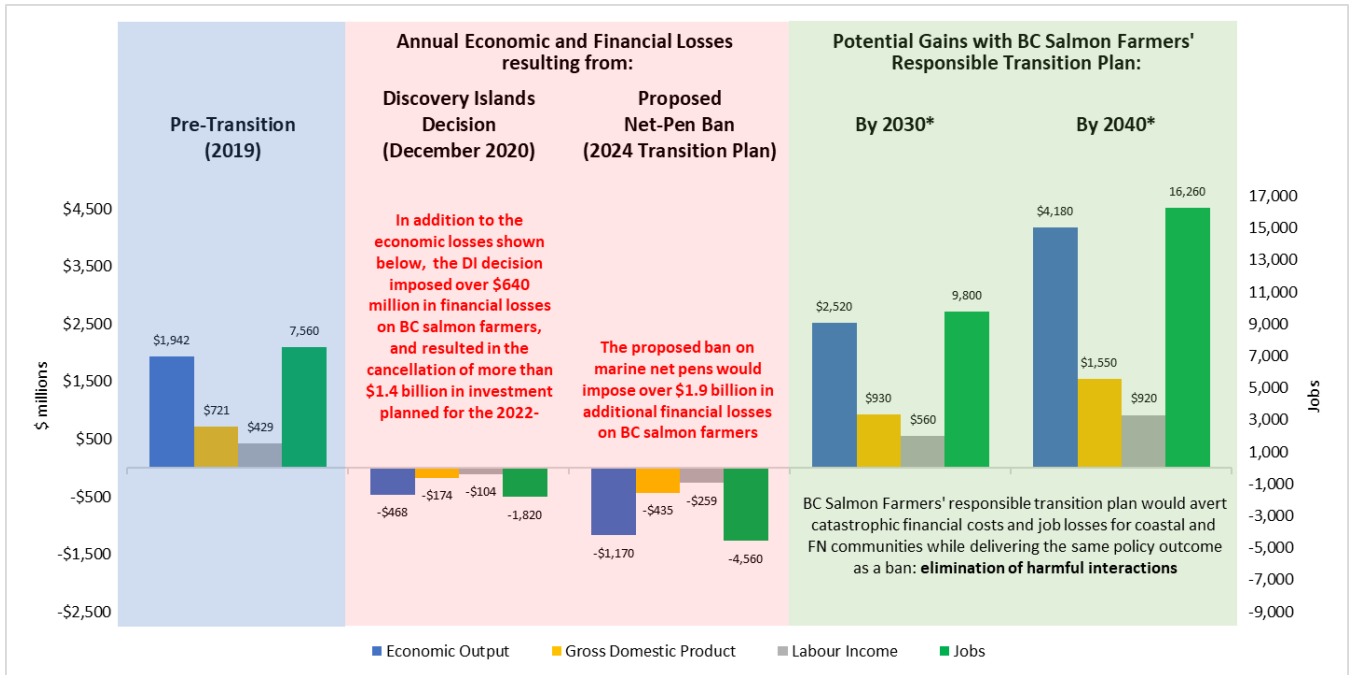


Figure 1. BC Salmon Farming Impacts, Canada-wide
* Growth scenarios are based on company projections of potential recovery of production under the responsible transition plan.

ECONOMIC BENEFITS AND SIGNIFICANT INVESTMENT PLANS PRE-TRANSITION

In the Fall of 2020, the BCSFA issued its “We Are Ready” report that showed the importance of the salmon farming sector as an economic driver in remote coastal communities in B.C.

As shown in Figure 1 above, across Canada, B.C., salmon farming generated a total of \$1.9 billion in economic activity, \$721 million in GDP, and 7,560 jobs for Canadian workers earning wages totalling \$429 million in 2019. Within B.C., the economic benefits amounted to over \$1.6 billion in total economic output, \$577 million in total GDP, and employment for 6,370 workers.

The “We Are Ready” report also detailed significant investments that B.C. salmon farmers were planning to make in new production technologies over the next 30 years: immediate investments (shovel-ready, 2021) of \$113 million, an additional \$684 million in investments in the medium term (2022-2030), and potential for even more long-term investments (2031-2050) of \$618 million. In total, this amounted to more than \$1.4 billion in planned investments, primarily on Vancouver Island.

IMPACTS OF THE DISCOVERY ISLANDS DECISION:

In December 2020, with no warning to the industry and despite clear advice to the contrary from DFO officials and scientists, former DFO Minister Jordan decided to close salmon farms in Liḡwíłdaxw territory (“Discovery Islands”) area near Campbell River.

The federal court overturned the decision, finding it breached procedural fairness and was not transparent or intelligible. Then, on February 17, 2023, former DFO Minister Murray decided again not to license salmon farms in Liḡwíłdaxw territory despite the support of Wei Wai Kum, We Wai Kai, and Klahoose Nations for the farms in their territories. This single decision meant the loss of 21,000 tonnes of sustainably farm-raised salmon from Canada.

The impacts of this decision have been devastating for affected workers, companies and communities:

In total, annual losses to the B.C. economy amounted to a reduction of almost \$390 million in economic output across the province, \$139 million less GDP, a loss in salaries and benefits for B.C. workers of almost \$87 million per year, and 1,535 fewer B.C. jobs across a range of sectors in the province. This has occurred mainly in remote coastal communities of B.C. where there are very few alternative employment opportunities or income sources for families.

As shown in Figure 1 above, the overall losses across Canada amounted to \$468 million in lost economic output, \$174



million in lost GDP, \$104 million less in wages and over 1,820 fewer jobs.

It is estimated that the financial losses imposed on B.C. salmon farmers by the closure of farms in Liḡwítḡax territory have amounted to more than \$640 million. Financial losses for devastated suppliers to the sector will add considerably to this amount.

The closure of the Liḡwítḡax territory farms stalled all plans to invest over \$1.4 billion in new technology, which has had a dramatic and long-term effect on the economic benefits of salmon farming and the role that salmon farming could play in the future of Canada’s Blue Economy and in B.C.’s economic recovery.

CASE STUDY: BROWNS BAY PACKING

[Browns Bay Packing Company](#), located north of Campbell River, continues the family legacy of the Millerd family that has been processing BC salmon since 1913. Browns Bay Packing was established in 1989 and, in its continual spirit of innovation, became a major farmed salmon processor while continuing to handle limited amounts of wild salmon. Maintaining processing infrastructure has also allowed the company to assist more than 11 First Nations with their Food, Social and Ceremonial, as well as commercial fisheries.

When the Discovery Island decision was made in 2019, Browns Bay Packing was forced to cancel its next evolution: a state-of-the-art seafood processing facility in Campbell River in partnership with local First Nations. This facility would use year-round farmed salmon production to stabilize operations and support multiple seasonal commercial indigenous fisheries that did not have dedicated processing capacity.

In 2024, as BC salmon farm production dropped off, Browns Bay was forced to lay off more than 70 long-term full-time employees, many of them from local First Nations communities. These employees are paid at a scale that reflects the “living wage” for the urban city of Vancouver, a high wage for Vancouver Island. Being forced to seasonal processing may provide just enough hours for a reduced staff to qualify for unemployment insurance.

During this year’s commercial wild salmon season, Browns Bay was shut down for the first time in decades and unable to assist local First Nations with their food fisheries. In 2025, Browns Bay will make the difficult decision of whether to cease its 35 years of operations in the Campbell River region and a 130-year legacy in the BC Seafood sector.



IMPACTS OF THE PROPOSED BAN ON NET-PEN SALMON FARMING:

On June 19, 2024, the Government of Canada announced a decision on the future of marine net-pen salmon farming in B.C. The decision committed to implementing a ban on marine net-pen salmon aquaculture in B.C. coastal waters by June 30, 2029, and required that any new salmon aquaculture licences utilize closed containment technology.

In September 2024, DFO released the Government of Canada's Draft Salmon Aquaculture Transition Plan for British Columbia that *"provides a basis for engagement with coastal communities, stakeholders, and First Nations on the transition to closed containment and other innovative aquaculture technology adoption, while collaboratively fostering the development of the aquaculture sector — creating jobs and safeguarding the environment for future generations."*

B.C. salmon farmers, their suppliers, and First Nations in whose territories they operate have told the federal government that a ban on marine net pens within five years means that the industry could not continue to operate in BC.

The result would be eliminating the remaining 50,000 tonnes of farm-raised salmon production, creating significant socio-economic ripple effects across B.C. and the rest of Canada.

- ❑ Based on 2024 data, annual economic losses would amount to a further \$1.17 billion in annual economic activity across Canada, \$435 million in GDP, more than 4,560 jobs and a resulting reduction in family incomes of \$259 million annually.
- ❑ Within B.C., economic activity would fall by approximately \$973 million per year, annual GDP would be reduced by \$348 million, family incomes would be \$216 million lower, and there would be more than 3,840 fewer good-paying jobs in the province, mainly in remote Indigenous and coastal communities of B.C. where there are very few alternative employment opportunities.
- ❑ The closure of the industry in B.C. will also have a significant impact on salmon farming operations in Atlantic Canada. Many of those companies rely on production on both coasts to fund development and fill market gaps.
- ❑ Closing salmon farm operations on Canada's West Coast send a clear signal to international investors and investment firms, located in places like Norway, Chile, China and Japan, that Canada is no longer a safe place for their funds.



DEVASTATING IMPACTS ON FIRST NATIONS

Closures will represent a lost opportunity for meaningful Indigenous reconciliation and self-determination. B.C. salmon farmers have worked closely with Indigenous communities for decades and have negotiated mutually beneficial partnership agreements that support sustainable economies, Indigenous-owned businesses and improved living standards in the communities of First Nations partners.

These agreements also express a commitment to respect First Nations rights, including the right to exercise jurisdiction over the land, resources and waters within their territories. First Nations have included environmental oversight in all these agreements as well as supports for local wild salmon revitalization efforts.

In May 2024, the Coalition of First Nations for Finfish Stewardship (FNFFS) provided updated information on the current economic benefits of salmon farming within their communities:

Table 1. Current Economic Benefits of Salmon Farming for First Nations (annual)

	Within First Nation Communities	Outside First Nation Communities	Total
Output	\$46.8	\$86.8	\$133.6
GDP	\$26.8	\$49.8	\$76.6
Jobs	376	698	1,073
Wages	\$21.0	\$38.9	\$59.9

These annual economic benefits would be lost with a ban on marine net pens by 2029.

CASE STUDY: CERMAQ CANADA PROTOCOL WITH THE AHOUSAHT FIRST NATION

The business relationship with [Cermaq Canada](#) has had a long-term positive social and economic impact on the [Ahousaht Nation](#), located in Clayoquot Sound on the west coast of Vancouver Island, and on its citizens and community. A form of protocol agreement has been in place in Ahousaht Territory since 2006. It has been reviewed, modernized, and updated several times since, with the most recent agreement updated in 2021/2022.

Respect and recognition of Ahousaht governance, Territory, and position as a Rightsholder is central to the Protocol. The agreement addresses operational plans, environmental stewardship, wild salmon protection and enhancement, economic development opportunities, employment, and emerging business opportunities.

The latest protocol further focuses on wild salmon, area-based management, food fish procurement, innovation, and broader environmental monitoring in recognition of changing ocean conditions, climate change, strict environmental standards, and compliance criteria. Cermaq is committed to aligning the required resources for culturally appropriate recruitment, advancement, skill development, and retention of Ahousaht employees (including neighbouring nations).

The protocol also specifies economic development, social well-being and benefits sharing. Economic benefits that would be lost with the ban include:

- opportunities for equity investment;
- the creation of a health and wellness facility;
- food security, including the provision of salmon and commercial fishing capacity;
- climate/wellness action in the form of electrification of a new alcohol/drug-free village site;
- local supply chain business acquisition by the Nation and;
- Diversification into aquaculture of alternate species.

Over the thirty-year generational cycle, the economic benefits of this protocol are estimated at \$543 million to the Ahousaht Nation, all dependent on the finfish operations remaining in the territory.



Hasheukumiss, Richard George, President Maaqutusiis Hahoulthee Stewardship Society and Ahousaht Haw'il provides a tour of their Health and Wellness Centre in development. June 2024



LOST OPPORTUNITIES:

First Nations would also face lost future opportunities for economic growth and diversification within their communities based on potential growth. The estimated cumulative economic losses for First Nations over the next 10-year period could amount to:

- ❑ \$560 million in lost economic activity, 4,500 fewer jobs and \$250 million in lost wages annually within First Nations over the next 10 years; and,

Loss of further benefits generated outside of First Nation communities, amounting to \$1 billion in lost economic activity, 8,380 lost person-years of employment and \$470 million in lost wages over the next 10-year period.

FINANCIAL LOSSES

First Nations will also face financial losses, such as the value of stranded assets and the cost of adapting their current business models and developing new business ventures to replace salmon farming, if

even possible. These losses have not been estimated but would likely amount to well more than \$1 billion over the next 10 years.

SOCIAL COST IN FIRST NATIONS COMMUNITIES

What cannot be calculated is the total human and financial cost of increased social issues in Indigenous communities due to the loss of salmon farming jobs, opportunities, and revenue to First Nations. Remote First Nations communities have identified that this impact will see increased suicides,

overdoses, overdose deaths, domestic violence, and overall poverty for their communities. This will create additional strain on local social and healthcare programs and facilities.

CASCADING SOCIO-ECONOMIC IMPACTS ACROSS B.C.

The above estimates are just a snapshot of the economic and financial consequences of the proposed ban on net pens by 2029. There would be significant, cascading socio-economic impacts as outlined below:

- ❑ Closed farms in Canada have resulted in reduced 'homegrown' products on grocery store shelves and a massive jump in imports of Atlantic salmon farmed in other countries. A recent study of the impact of the Liḡwítax^w territory farm closures estimated "profound consequences for both the environment and market dynamics," including price increases for farm-
- raised salmon of over \$30 per kilogram, heightened carbon emissions due to increased foreign imports, and job losses within rural and Indigenous communities(1).
- ❑ Ripple effects across B.C.: Businesses operating in fish processing, feed manufacturing, high-tech equipment supply, and net supply have expressed grave concerns about the government's "phase-out" option for salmon farming in B.C. Phase-out of salmon farming would reduce purchases from over 1,000 local vendors in B.C. by a total of \$437 million per year:

Table 2. Reduced Annual Spending on Local Vendors, by Region in B.C.

Region	Reduced spending on local vendors per year (\$ millions)	Number of local vendors affected	Estimated number of jobs at risk
Courtenay / Comox / Cumberland	-\$12.3	76	50
Campbell River / Sayward / Discovery Islands	-\$120.0	498	488
Port Hardy / Port McNeil	-\$22.5	107	92
Port Alberni / Tofino / Ucluelet	-\$29.6	117	120
West Coast NVI	-\$9.3	35	38
Central VI	-\$8.6	95	35
South VI	-\$9.0	108	37
Sunshine Coast / Metro Vancouver	-\$210.1	348	854
Other regions in B.C.	-\$15.7	78	64
Total	-\$437.1	1,462	1,778



- ❑ Due to the predominately coastal/rural nature of the value chain for B.C. salmon farming, affected suppliers have very limited opportunities to pivot their operations to other sectors or markets. For many suppliers, the loss of salmon farming business will force them to cease operations. Recent applications to federal court in B.C. by suppliers over the government's *Liḡwítḡax*[™] territory licensing decision support this grim reality.
- ❑ Devastating impacts on small coastal communities: B.C. salmon farmers and their suppliers have built a strong employee base within their coastal communities. Fish farming jobs pay approximately 30% more than the median employment income in B.C., and employment in the industry is full-time and year-round, not part-time or seasonal. Alternative employment opportunities are non-existent in many of these remote coastal communities.
- ❑ Loss of investment and spending on innovation and advanced technology solutions: Despite the chilling effect of the *Liḡwítḡax*[™] territory decision on most of the sector's investment plans, ongoing innovation and technology solutions have remained part of B.C. salmon farmer's operations. A ban on the remaining marine net pens in B.C. will spell the end of these investments as well. In 2023, this amounted to at least \$12.8 million in ongoing operating expenditures and \$38.9 million in capital expenditures on innovations such as chemical-free delousing technologies, improved containment structures, semi-closed cage technology, hybrid power systems for aquaculture vessels, and advanced technology solutions for environmental monitoring, fish tracking, feeding systems, sea lice monitoring and biomass estimation.
- ❑ Ripple effects across Canada: phasing out the sector in B.C. will affect businesses across Canada, for example, over 50,000 tonnes of feed ingredients are required by B.C. salmon farmers each year, a major portion of which are imported from Canadian Prairie grain farmers. Further, any phase-out option will further damage Canada's reputation as a stable, business-friendly country with a strong and predictable regulatory regime and will cause international investors and domestic companies to reassess the risks of doing business in Canada. These impacts will be felt beyond B.C. and outside of the aquaculture sector.

Table 3 below breaks down the overall economic impacts of a potential phase-out of B.C. salmon farming by region.

Table 3. Estimated Total Economic Impacts of the proposed ban by region in B.C. and Canada

Region	Output (millions)	GDP (millions)	Labour Income	Jobs (FTEs)
Courtenay/ Comox/ Cumberland	\$63.4	\$22.0	\$15.2	241
Campbell River/ Sayward/ Discovery Islands	\$321.3	\$113.8	\$73.3	1,251
Port Hardy/ Port McNeil	\$54.5	\$19.4	\$12.3	214
Port Alberni/ Tofino/ Ucluelet	\$134.7	\$46.9	\$32.1	513
West Coast NVI	\$61.2	\$21.1	\$14.8	231
Central VI	\$36.2	\$12.6	\$8.6	138
South VI	\$16.1	\$5.8	\$3.5	64
Sunshine Coast / Metro Vancouver	\$225.3	\$84.8	\$43.2	946
Other regions in B.C.	\$33.0	\$11.8	\$7.3	130
Total Within B.C.	\$945.6	\$338.4	\$210.3	3,729
Impacts within other provinces	\$224.5	\$96.1	\$48.5	831
Canada Total	\$1,170.1	\$434.5	\$258.8	4,560

Notes: Total economic impacts = direct, indirect and induced impacts calculated using input-output multipliers for BC salmon farming according to the following definitions:

- Direct impacts are changes that occur in all “front-end” salmon farming operations, which include not only on-farm grow-out activities but also broodstock farms, hatcheries, smolt farms and primary processing of farm-raised salmon.
- Indirect impacts arise from changes in activity for suppliers to the front-end businesses.
- Induced impacts arise from the spending of direct and indirect labour income on goods and services in the economy.



CASE STUDY: CHILEAN AND NORWEGIAN EXPORTS OF FARMED SALMON TO CANADA

Fresh salmon continues to be the top seafood choice of Canadians. During 2024 reductions in BC farmed salmon have resulted in imports of worth approximately \$20 Million CDN per month into Canada at the expense of local jobs and climate goals

In November 2024, Silvana Gattini, trade commissioner for state export promotions agency ProChile speaking in Chile noted: "... the reduction in the supply of Canadian salmon represents an opportunity for the Chilean product, which could occupy part of that space in the market by reinforcing its sustainability and traceability credentials, elements of high value for Canadian consumers."

According to Chile's National Customs Service, between January and September 2024, 6,838 tonnes of salmonids raised in open net pens worth US\$84 million (\$117M CDN) were exported from southern Chile to Canada, an increase of 34% in volume and 31% in value compared to the same period in 2023, when 5,075 tonnes were exported for US\$64m (\$89M CDN).

Statistics from the Norwegian Seafood Council show that compared to the same period last year, the amount of farmed salmon exported by Norway to Canada jumped by 35%, or around Can \$11.2 million, to Can \$42.8m in the first half of 2024.

The Canadian Aquaculture Industry Alliance estimates that the climate impacts of air freight imports of salmon from northern Europe and the southern regions of South America equals the carbon footprint of adding about 84,000 cars to Canadian roads.

Sources:

[Canada 'importing more salmon and exporting jobs' Fish Farm Expert July 5, 2024](#)

[BC fish farms shutdown 'will massively increase carbon footprint of salmon' FishFarm Expert November 15, 2024](#)



COSTS AND TIMELINE TO IMPLEMENT FEDERALLY MANDATED CLOSED CONTAINMENT

In August 2024, RIAS Inc. prepared a study of the “Cost Implications of Closed Containment Technology for Salmon Farming in BC.” The study provided updated cost estimates of potential closed containment technologies based on assessments undertaken by B.C. fish farming companies in recent years and the work of the Salmonid Alternative Production Technologies Technical Working Group (TWG) established by DFO in 2019(2). The results of the RIAS Inc. study are summarized below.

The capital expenditure estimates for floating closed containment technologies are rough approximations based on information provided to RIAS Inc. by BCSFA members. Since DFO has not yet fully defined “marine-based closed containment,” it is impossible for companies to determine exactly which technologies would be acceptable to the Federal government at this time.

CAPITAL COST ESTIMATES

Table 4. Updated Capex Estimates for Alternative Production Systems

Technology	Existing Capex cost estimates	Updated Capex estimates based on BCSFA members’ review of current technologies	Total Capex required to replace 50,000 tonnes of marine net pen production
Land-based RAS	\$7 to \$40 per kg of output (3) \$20 to \$25 per kg output (4)	Reasonable estimates of Capex cannot be developed since no land-based closed containment technology has reliably produced market-sized Atlantic salmon at a commercial scale anywhere in the world.	Up to \$2 billion, but technology is not a viable option to produce 50,000 tonnes of farmed salmon in BC.
Floating Closed Containment	\$5 to \$15 per kg (3)	Based on a review of existing technologies, Capex costs range from \$4.61 per kg for a new semi-closed containment system with barriers and feed barge to \$28.20 per kg for a level 3 marine closed containment facility.	\$1.4 billion for level 3 marine-based closed containment.

OPERATING COSTS

Table 5. Updated Operating Cost Estimates for Alternative Production Systems

Technology	Operating cost estimates per kg of production	Updated operating cost estimates based on BCSFA members' review of current technologies	Increase in operating costs vs. current marine net-pen systems
Land-based RAS	\$5 to \$6 per kg of output (3)	Reliable estimates of operating costs for land-based RAS are not available. No land-based closed containment technology has reliably produced market-sized Atlantic salmon at a commercial scale anywhere in the world.	Not estimated.
Floating Closed Containment	Estimated \$4.5 to \$5.5 per kg of output(3) \$4.5 to \$12.5 (2)	Operating costs are expected to exceed \$12.5/kg due to increased permitting, licensing and regulatory costs, increased energy requirements, and higher labour costs.	Current marine-based net-pen operating costs in BC are estimated to be more than \$9/kg in 2024. Marine-based closed containment would likely increase BC's operating costs by more than 35%.

INCREASED REGULATORY COSTS

The site permitting, licensing and regulatory framework required to develop and implement alternative production systems and technologies is largely non-existent (e.g., offshore) or long, unclear and convoluted and requires approvals at multiple government levels. The 2024

RIAS Inc. study identified a long list of federal and provincial regulatory issues that will have to be addressed before new technologies can be implemented, and that will significantly affect the timing and drive up costs of innovation.

OTHER COSTS

Salmon farming companies have been investigating the feasibility of electrification of their facilities by connecting them to the B.C. Hydro electrical grid. In addition to fulfilling their commitment to reducing GHGs, electrification will be necessary due to the

increased power requirements for marine-based closed containment systems over current marine net-pen systems. The time and resources required for electrification will be considerable, as demonstrated by recent research by B.C. salmon farming companies:

- ❑ One company has determined that on-grid electrification by 2029 is only feasible for one of their three production areas, and the cost of connecting that area to grid power will be more than \$7.8 million and take at least 4.5 years to permit, design and construct. Further, limits to available power in the area mean that only 40% of their production facilities can draw power from the BCH grid, leaving the remaining 60% of their production facilities to rely on alternate energy sources such as diesel.
- ❑ Another company determined that the cost to connect to the BCH grid to electrify only 7 of their sites would be \$65 million (one Semi-Closed Containment System site, one support facility and five conventional farms). The total electrical power for the project would be 4 MW, up to a maximum of 7 MW, and an upgrade to the BCH line would be an additional expense to the company. If all farms were converted to marine-based closed containment, there would not be enough power available within the entire region, even with an upgraded line.
- ❑ Investigations to date into electrifying other existing production sites indicate that, in some cases, insufficient power is currently available on the BCH distribution lines. In one instance, the cost of upgrading a BCH line was estimated to be \$35 million in 2022. Additional capital costs of the powerline to the facility have not been estimated and would depend on POI and routing.
- ❑ One company estimated that replacing their entire conventional production with marine-based closed containment technology would require a peak power load of 32.55 MW, which would account for 14% of the maximum power generation of the entire Campbell River generation system.
- ❑ If all of BC's farmed salmon production was converted to marine-based closed, that would consume 87.5 Mw of power/ year, which would equate to almost 60% of BC Hydro's most recent forecast of surplus power for Vancouver Island by 2036. This level of consumption does not include the added load of RAS systems for post-smolt or larger grow-out.
- ❑ Based on the assessments conducted to date by fish farming companies, it is expected that the potential costs for electrification to convert current conventional marine net-pen production systems to marine-based closed containment could range from \$180 million to over \$500 million and would take decades to achieve.



COMPOUNDING BC'S PRODUCTION COST DISADVANTAGE

Canada is already one of the highest-cost jurisdictions in the world for farm-raised salmon production. We estimate that production costs for farm-raised salmon in Canada are more than 19.1% higher than the average production costs across other salmon farming jurisdictions (Norway,

Scotland, Faroes and Chile) in 2024. The costs of converting all B.C. production to marine-based closed containment would result in B.C. having an even larger cost disadvantage compared to every other farm-raised salmon jurisdiction in the world.

COSTS > MARKET PRICES

Considering that the capital costs of marine-based closed containment are estimated to be a minimum of \$1.4 billion (Table 4), with additional electrification costs of \$180-\$500+ million and increased operating costs of more than 35% (Table

5), the total cost for B.C. farm-raised salmon produced in marine-based closed containment would be more than current market prices, making it unfeasible and unaffordable.



TIME REQUIRED TO DEVELOP, TEST AND IMPLEMENT CLOSED CONTAINMENT TECHNOLOGIES

B.C. salmon farming companies and technology suppliers have warned that replacing current production levels with closed containment would take more than 10 years. Some of the realities of implementing new, unproven technologies include:

- ❑ Typically, it takes years to process new sites and license amendments. The application process is complex and detailed, and the volume of applications (a minimum of 63 within the next 18 months to meet the approval process timelines to ensure investment) could not be handled by either the Pacific Region of DFO or Front Counter BC.
- ❑ Also, any amendments to marine sites must go through Front Counter BC and will be subject to their published service standards (response time) and human resources capacity. The province is also responsible for the infrastructure needed to support the transition, e.g. hydro, connectivity, marine licenses of occupation changes, marine staging areas, etc.
- ❑ For example, companies would need to do a minimum of a year of water quality and biophysical work, including engineering plans and modelling, to populate each application. The DFO Pacific region currently does not have the capacity to deliver this outcome. Process for timelines and expert review in the approval process of amendments – new skills and capacity will be required federally at DFO and Transport Canada and provincially.
- ❑ Numerous regulatory changes will be required to support alternate infrastructure for various closed containment technologies.
- ❑ Limitations on the number of units international suppliers can produce annually. This would be even more restrictive if developed locally. These are highly technical and complex systems that can not be assembled quickly or by just anyone – thus, supplier capacity is a major bottleneck.

TOTAL PRICE TAG FOR CANADIANS

TOTAL COSTS TO TAXPAYERS

The total cost of compensation for closing the current salmon farming ecosystem plus the subsidies to incentivize a rebuilding of the sector in B.C. using unproven technology would likely exceed \$9 billion.

Below, we estimate the following:

- ❑ Opportunity costs for Canada in terms of lost future economic activity, jobs and family incomes.
- ❑ Potential costs to compensate existing salmon farmers, suppliers and First Nations for shutting down the B.C. salmon farming sector.
- ❑ Potential costs to subsidize rebuilding the salmon farming eco-system in B.C.
- ❑ with new closed containment technology entrants.
- ❑ Loss of capacity and infrastructure to support the Blue Economy vision for the West Coast of Canada.
- ❑ Loss of food security as it will be extremely costly and slow to rebuild a West Coast aquaculture industry.

OPPORTUNITY COSTS

Figure 1 shows the economic gains that B.C. salmon farmers state could achieve by 2030 and 2040 under a responsible plan for transition that does not entail a ban on marine net pens. These gains would be lost if the current draft Transition Plan is implemented:

- ❑ \$2 billion less in economic activity, \$750 million less in GDP, 7,830 fewer jobs, and \$440 less income for Canadian workers per year by 2030.
- ❑ By 2040, \$3.3 billion less in economic activity, \$1.2 billion less in GDP, 13,000 fewer jobs and \$740 less income for Canadian workers.

COMPENSATION COSTS

The potential costs to Canadian taxpayers for the government to compensate existing salmon farmers, suppliers, downstream affected industries in local communities, and First Nations for shutting down the B.C. salmon farming sector could amount to:

- ❑ Financial losses on B.C. salmon farming companies of more than \$1.9 billion in stranded assets and closure costs. Future lost profits over the long term (2030 to 2050) could amount to another \$1.2 billion (PV^{5%}).

- ❑ Suppliers would suffer significant additional financial losses from reduced business and closure in some cases. Future lost profits for suppliers within B.C. due to a ban on marine net-pen salmon farming could amount to \$1.9 billion (PV^{5%}). This does not include the financial costs of business closures for some suppliers.
- ❑ The downstream business (retail) within B.C. could see a future profit reduction of \$170 million (PV^{5%}).
- ❑ First Nations financial losses would likely amount to well more than \$1 billion over the next 10 years.
- ❑ Total compensation costs could amount to at least \$6.1 billion.

SUBSIDIZATION COSTS

The proposed ban on marine net pens will shutter the entire salmon farming ecosystem in B.C. New entrants, which would predominantly be technology companies (note: these are tech companies, not salmon farming companies) with non-permeable containment technology that at this stage is unproven on a commercial scale, would have to rebuild the salmon farming ecosystem in B.C. that had been built up over 40 years.

This would include hatcheries and processing plants and equipment, on-land waste disposal (land, buildings, equipment), electricity supply (in remote areas), barges, boats, transportation and warehousing, marketing and sales.

The potential costs to attract such investment to rebuild the salmon farming ecosystem in B.C. by entrants into the market would be considerable.

At a minimum, we estimate that in addition to the cost of the technology (\$28,200+ per tonne of production for level 3 containment), the cost to rebuild the remaining salmon farming assets would be at least \$25,000/tonne, plus electrification costs of \$180 million to over \$500 million, for a total of \$2.8 to \$3.2 billion for 60,000 tonnes of production capacity. This does not include the cost of failures.



OPTION TO ACHIEVE THE SAME OUTCOMES

B.C. salmon farming companies, suppliers, and First Nations within whose territory's salmon farming operates have communicated to the federal government that transition cannot be a “ban” on marine net-pen salmon aquaculture in five years. If it is, then there is no future for salmon farming in B.C.

A ban on marine net pens means that most of the innovative technologies being developed and tested by salmon farming companies and other tech suppliers cannot be deployed in B.C. But these innovations can deliver the same outcome as a “ban”, by further reducing potential interactions between farm-raised salmon and wild salmon over time.

This begs the question: if the same outcome can be achieved using achievable innovative technologies, what is the justification for banning marine net-pen aquaculture in B.C. coastal waters by June 30, 2029?

Major investments in innovation are being made by salmon farmers worldwide, but not in B.C. due to the dramatic production cuts caused by the federal government and the resulting economic impacts that have put the future of salmon farming companies in B.C. at risk. Salmon farmers are developing and testing world-leading innovations and deploying those innovations once they have been proven to be sound from a risk, cost, and sustainability perspective.

It will take much longer than the five-year time frame set out in the government’s

June 2024 transition decision to adopt the right combination of technologies suitable to specific site conditions and characteristics in B.C. In the absence of near-term stability measures by the government, including movement away from the term “ban” and DFO-initiated regulatory decisions that could result in further loss of production volume, the ability to invest and innovate in B.C. salmon farming will disappear.

However, if the federal transition plan is what is stated on page 1 of the Government of Canada’s Draft Salmon Aquaculture Transition Plan for British Columbia: “*transition to closed containment and other innovative aquaculture technology adoption,*” then the industry and First Nations believe there is a chance for a realistic and achievable path forward “toward a future sustainable, innovative and thriving aquaculture sector for B.C.”

To achieve this, B.C. salmon farmers, in partnership with First Nations in whose territories the sector operates, have presented detailed plans to further eliminate potentially harmful interactions between farm-raised and wild salmon in B.C.

Figure 1 (page 2) demonstrates the economic gains that could be achieved under the responsible transition plans that B.C. salmon farmers and First Nations have presented to the Government of Canada. By 2030, the salmon farming sector expects to generate over \$2.5 billion in output, \$930 million in GDP, and

9,800 jobs, paying \$560 million in wages annually. By 2040, the annual economic benefits could reach \$4.2 billion in output, \$1.55 billion in GDP, over 16,260 jobs and \$920 million in wages for Canadian workers.

CONCLUSIONS

The findings demonstrate that the Government of Canada's proposal to ban marine net pen salmon farming in B.C. and replace 60,000 tonnes of production with unproven closed-containment technology within 5 years is unrealistic.

The costs to develop, test, implement and operate various closed containment technologies will exceed market prices on a per-kilogram basis by a wide margin. The time required to build new production systems and infrastructure and to secure regulatory approvals will be much longer than 5 years.

All existing salmon farming operations will wind down by 2029, resulting in diminishing revenues over the next 5 years that will not support R&D investment in B.C. The supporting supply chain infrastructure for the salmon farming sector will also shutter by 2029.

The cost for the government to compensate existing companies, suppliers and First Nations for their losses and to subsidize new entrants is estimated to be more than \$9 billion.

The federal government intends to amend the Pacific Aquaculture Regulations to implement the proposed ban. Such a regulatory change must meet the rules and requirements established by the government's Cabinet Directive on Regulation, which "*ensures that regulations promote innovation and economic growth, while protecting the health, safety, security, social and economic well-being of Canadians, and the environment.*".

Our assessment shows that a regulatory ban on marine net-pen salmon farming in B.C. would inhibit innovation and growth, significantly reduce the social and economic well-being of Canadians, and have no effect whatsoever on the environment compared to the alternative approach proposed by salmon farmers and First Nations.

The salmon farming sector and First Nations have presented to the Government of Canada a more realistic, no-cost-to-taxpayers alternative that would achieve the same policy outcome as a ban (by eliminating potentially harmful interactions between farmed and wild salmon) without imposing devastating impacts on the sector, First Nations, and coastal communities in B.C.

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