

# **RAS Atlantic Salmon Industry on Vancouver Island**

## **Financial Model & Economic Impact Analysis**



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## Executive Summary

We were tasked by Fraser Basin Council with assessing the impacts of a potential new industry in British Columbia: land-based Atlantic salmon farming using recirculating aquaculture system (RAS) technology. The industry, to be located in the Campbell River region on Vancouver Island, would produce 50,000 tonnes of Atlantic salmon annually. This production is assumed throughout to be incremental to current production of Atlantic salmon in British Columbia.

Conducting an economic impact assessment for a nascent industry is challenging. While there are many years of research data (eg, The Freshwater Institute) and pilot scale demonstration projects (eg, Kuterra), in a study such as this one we would base our model on financial data provided under Confidentially/Non-Disclosure Agreements for like-sized facilities using similar technology. This was not possible in this case. Rather, our financial model is adapted from a planning model developed by an industry expert and modified by us based on reference to similar exercises, research, and interviews with industry experts.

Our financial model estimates the revenues and expenditures arising from a 50,000 tonne industry consisting of multiple 3,000 tonne facilities. This is small based on projects currently planned or under construction, but large relative to existing operations. We believe this is a reasonable scale to choose, balancing potential activity with the here-and-now. We modeled that production as occurring in some unspecified year in the future when the BC Atlantic salmon RAS industry has realized production efficiencies and is performing smoothly at reasonable (ie, not optimistic, not pessimistic) values for key parameters. The intense level of interest, investment, research, and planning surrounding RAS makes it likely that this means of farming Atlantic salmon will take hold. But the timing of implementation, especially given the technical complexity of the activity, is uncertain.

We collected and considered a great deal of information in conducting this assignment. At length, we decided upon a base-case set of assumptions with which to populate our financial model. There not being a definitive data-set, we tested the sensitivity of the results to changes in the values of key parameters.

Our base-case financial model paints a picture of an industry with the following parameters:

- 50,000 tonnes of annual Atlantic salmon production, comprised of individual farms operating at a 3,000 tonne scale.
- A capital cost of \$1.1 billion to set-up the industry including \$83.3 million for land, to set up the industry.
- \$400 million in annual revenue.
- \$208 million in production (variable) expenses, \$28 million in fixed (overhead) expenses, and \$97 million in combined depreciation, interest, and income taxes.
- Annual net income of \$79 million for the farming sector.
- Annual processing, trucking, and sales & marketing charges associated with handling the farmed salmon production totaling \$114 million per year.

While current knowledge and information point to an optimal scale of 3,000 to 5,000 tonnes, and capital costs are taken directly from the planning model, technological development and innovation can only improve efficiencies and reduce costs.

In our view, the Base Case model as calibrated portrays a reasonable vision of a hypothetical future of RAS production of 50,000 tonnes of Atlantic salmon in British Columbia on which to base the estimation of economic impacts.

We fed the results of the base-case financial model into the BC Input-Output Model (BCIOM) to assess the economic impacts — direct, indirect, and induced — associated with this level of industrial activity.

There are three sources of economic impacts generated by the development and operation of RAS Atlantic salmon facilities on Vancouver Island:

1. One-time construction of the RAS facilities.
2. Ongoing operation of the RAS facilities.
3. Ongoing processing of salmon (including trucking, primary and secondary processing, and sales & marketing) produced by the RAS facilities.

The economic impacts associated with the construction phase are summarized as follows (dollar values are in millions). Note that these are one-time impacts that would be spread out over the years required to build the RAS facilities.

Indicator	Direct	Indirect	Induced	Total
Expenditures	\$1,027.5	\$573.6	\$77.0	\$1,678.1
GDP	\$71.8	\$286.0	\$49.6	\$407.5
Jobs	765	2,762	463	3,989
Employment	858	2,974	418	4,250
Household Incomes	\$58.5	\$211.8	\$36.2	\$306.5
Tax Revenues	\$49.4	\$56.0	\$7.7	\$113.2

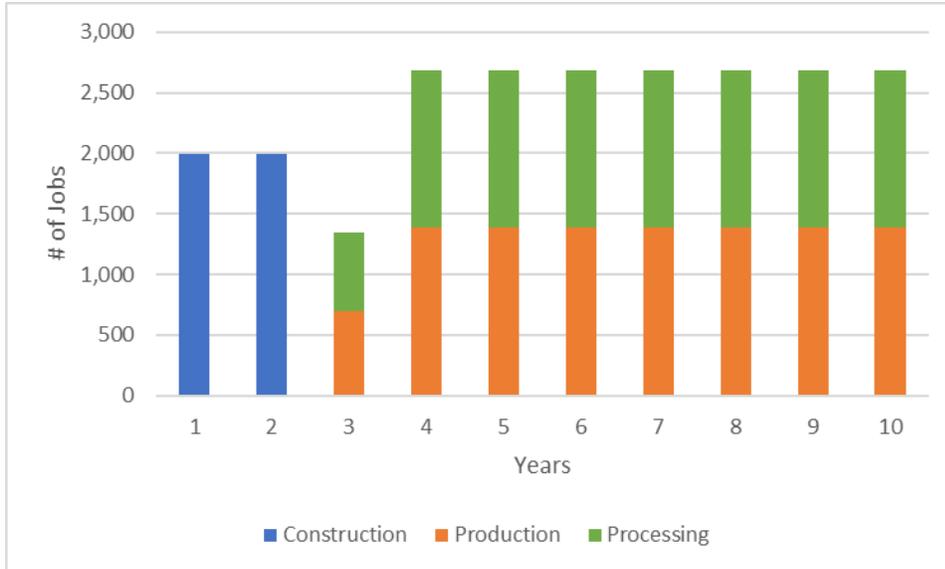
Source: BC Stats & Counterpoint Consulting Inc

The economic impacts arising from farming and processing operations are shown next. These would be annual, ongoing economic impacts.

Indicator	Direct	Indirect	Induced	Total
Expenditures	\$515.7	\$289.5	\$31.9	\$837.1
GDP	\$211.3	\$116.3	\$20.5	\$348.1
Jobs	1,413	1,080	191	2,685
Employment	1,465	1,094	173	2,732
Household Incomes	\$58.7	\$68.6	\$15.0	\$142.3
Tax Revenues	\$40.0	\$26.3	\$3.2	\$69.6

Source: BC Stats & Counterpoint Consulting Inc

The chart below summarizes the job-creation aspect of the RAS aquaculture industry, differentiating between the one-time start-up construction jobs and the ongoing jobs in salmon production and processing.



An unanswered question is whether existing fish processing infrastructure and capacity would be sufficient to handle an additional 50,000 tonnes of production (a question that is beyond the scope of our analysis). If not, then additional economic impacts not quantified in this report (albeit time-limited, not ongoing) would likely be generated by the construction of new processing infrastructure/capacity.

The economic impacts of a potential RAS Atlantic salmon farming industry on Vancouver Island are significant. However, Vancouver Island is only one potential site for land-based salmon aquaculture development in North America; there are many other locales, with a head-start. BC is not used to competing with Florida or Wyoming in the production of salmon. A new competitive reality must be recognized, and a crucial next step in attracting this industry is developing a cohesive plan for making BC competitive, and touting the advantages of locating here.