
THE BRITISH COLUMBIA FARMED SALMON INDUSTRY

Regional Economic Impacts

Prepared for:

BC Salmon Farmers Association
Agriculture and Agri-Food
Canada

BC Ministry of Agriculture,
Fisheries, and Food

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Executive Summary

Introduction

From its modest beginning in 1980, the salmon farming industry in British Columbia has experienced remarkable growth. The sales value of farmed salmon production increased from less than \$1 million in 1980 to \$140 million in 1993 (Exhibit S.1).

Farmed salmon is the province's leading agricultural export, and generates significant amounts of foreign exchange (Exhibit S.1). About 85% of industry output is exported to the US and Japan each year. The average salmon farming site generates over \$1 million in foreign exchange earnings.

Almost all the 1,100 full-time direct jobs created in this industry in the last decade have been in rural areas outside the Vancouver and Victoria areas. This job creation has benefited smaller coastal communities which have experienced declines in resource industry employment. The industry has also launched many start-up service and supply enterprises. The average salmon farming site generates 12 hatchery, growout, processing, and other direct jobs, and a further 12 jobs in support and service industries.

British Columbia is endowed with excellent salmon growing conditions. Unlike resource constrained industries such as forestry or commercial fishing, the salmon farming industry can produce as much product as the market demands. The industry has significant growth potential.

Some of this potential can only be achieved through the cooperation and aid of regulatory agencies. However, to date, there has not been a comprehensive profile of the industry, or its economic impacts at the community and regional level. This type of information is essential, from the perspectives of both the private and public sectors, for charting a course for continued growth and development.

Provincial, regional, and local governments, the British Columbia Salmon Farmers Association (BCSFA), industry participants, and international organisations are among the users who will benefit from this economic impact study. The results will significantly enhance the efforts of these agencies and organisations in examining issues relating to industry development, policies and programs, land use planning, research priorities, and planning of infrastructure support.

Exhibit S.1: Growth of the British Columbia Salmon Farming Industry

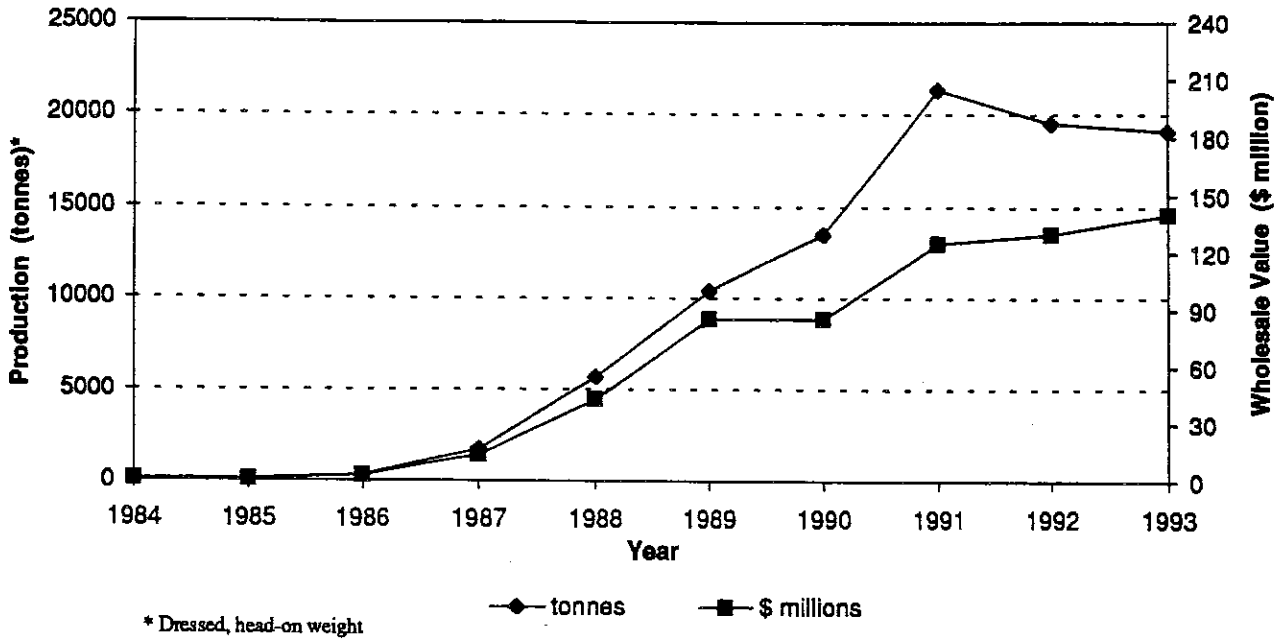
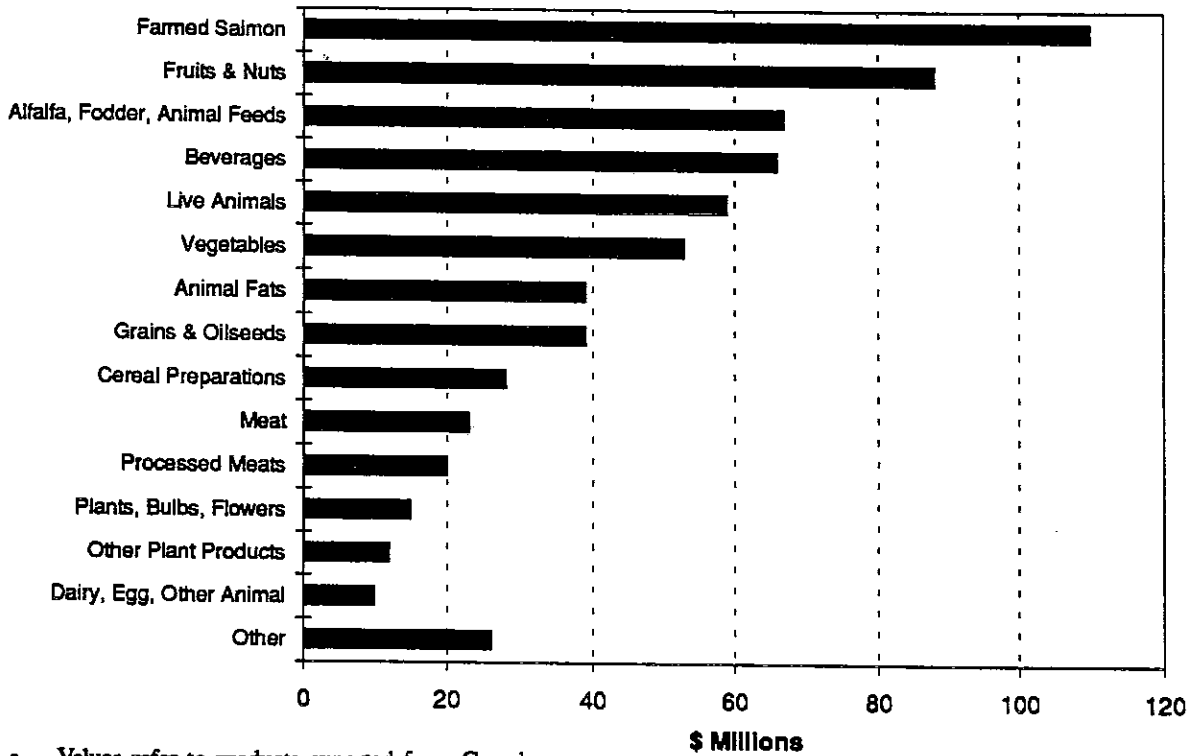


Exhibit S.2: Value of Exports of Agricultural Products from British Columbia 1993^a



^a Values refer to products exported from Canada
 Source: Statistics Unit, MAFF

Industry Development

The largest producers of farmed salmon in the world are Norway (an early leader), Chile, and Scotland. Farmed salmon is now a very significant component of world salmon production, comprising 330,000 tonnes, or 30% of total salmon production in 1992.

British Columbia has long been recognised as having excellent growing conditions for farmed salmon, as evidenced by foreign investment in the industry and by growth in the industry itself. British Columbia provides about 19,000 tonnes, or 6% of world farmed salmon production.

The BC industry has shifted to growing predominantly Atlantic salmon, rather than the Pacific chinook and coho salmon species. Initially, most BC producers were located along the Sunshine Coast, but today, salmon farms are located over broad areas of the South Coast.

<i><u>Regional District</u></i>	<i><u>1993 Active Sites</u></i>	<i><u>1993 Production (tonnes)</u></i>
Mount Waddington	25	4,800
Comox-Strathcona	22	6,000
Alberni-Clayoquot	15	4,100
Sunshine Coast/Powell River	<u>26</u>	<u>4,200</u>
	88	19,100

After a difficult restructuring period which began in 1989, the consolidated industry has emerged to be more globally competitive, stable, and sophisticated, and is poised to expand.

Industry Activities

The actual rearing of salmon at growout sites or "farms" is only one aspect of the salmon farming industry. The industry involves several integrated activities: hatchery (freshwater sites), growout (saltwater sites), marine transport of fish to a processing plant, processing, and selling.

Unlike the wild salmon fishery, the salmon farming companies usually retain ownership of their fish until they are sold to a wholesaler/distributor. Most farmed salmon is sold through fish brokers, many of whom are located in Seattle or Vancouver.

Another difference with the wild salmon industry is that, akin to other livestock industries such as beef and poultry, the salmon farming industry can expand production to the limit of market demand.

Exhibit S.3: Overview of B.C. Salmon Farming Companies 1993

OPERATIONS	
No. of Companies	17
No. of Active Sites	
Mt. Waddington	25
Comox-Strathcona	22
Alberni-Clayoquot	15
Sunshine Coast	22
Powell River	4
	<u>88</u>
Production (tonnes) ^a	
Atlantic	10,800
Chinook	7,300
Coho	1,000
	<u>19,100</u>
Employment PYs ^{b,c}	
Hatchery Sites	87
Growout Sites	522
Processing Plants	132
Transport	29
Selling/General/Admin.	89
	<u>859</u>
No. of Companies by Production Level ^a	
< 500 tonnes	6
500 - 999 tonnes	4
1000 - 1999 tonnes	3
2000 + tonnes	4
	<u>17</u>

FINANCIAL	
Operating Revenues	\$ millions
Product Sales	\$140.1
Other	8.2
	<u>\$148.3</u>
Expenses	
Selling	\$4.2
Wages, Salaries, Benefits ^c	27.3
Feed	47.7
Smolt Purchases	9.4
Marine Transport/Processing	10.9
Other Transport	5.1
Insurance	4.8
Repairs/Maintenance	4.9
Supplies	4.3
Utilities/Fuel	2.3
Office/Admin.	4.7
Services and Other	7.0
	<u>\$132.6</u>
Income before Interest, Depreciation & Taxes	\$15.7
Net Fixed Assets ^d	\$62.6

MARKETS	
Local B.C.	7%
Rest of Canada	8%
U.S.	76%
Japan	9%
	<u>100%</u>

a Dressed, head-on weight

b Full-year equivalents

c Direct company employment and wages only (i.e., excludes employment and wages associated with purchased smolts, contract processing and contract trucking, etc.)

d Fixed assets net of accumulated depreciation as at December 31, 1993

Not all of the hatchery, growout, marine transport, processing, and selling functions are performed by salmon farming companies. In some cases, third party companies supply smolts, custom process the fish, sell the finished products on a commission basis, and so on. These third party companies comprise an important part of the industry.

Industry Profile

The cornerstone of this study is a detailed survey of salmon farming companies that addresses 1993 production, revenues, employment, and operating and capital expenditures. The analysis has been bolstered by a survey of key suppliers. Exhibit S.3 gives a profile of salmon farming companies.

Survey results indicate that the 17 companies in the industry produced 19,100 tonnes of dressed, head-on product worth an estimated \$140 million in 1993. Over half of the production is comprised of Atlantic salmon. Other revenues of \$8 million flow from services such as contract smolt production, fish processing, and hauling.

Employment of the 17 salmon companies was 859 person-year equivalents (PYs) with associated wages, salaries, and benefits of \$27 million. None of the 17 salmon farming companies had a unionised workforce in 1993. About 60% of company employment is associated with growout sites (Exhibit S.4).

Feed is the largest expense in salmon farming, followed by wages, salaries, and benefits. Feed costs comprise about one-third of industry sales revenue.

The four largest companies accounted for 57% of total production in 1993, with each producing over 2,000 tonnes. Industry concentration is much greater today than in the late 1980s, when more than fifty companies were in operation. Another industry trend is greater vertical integration. Many companies have integrated the various aspects of production (hatchery production, growout, marine transport, processing, and marketing).

The Industry's Contribution to the Regional Economy

The industry produces farmed salmon destined primarily for export markets. Accordingly most of the associated income and employment represent an injection of "new" money and jobs into the provincial economy. Farmed salmon is the province's leading agricultural export.

The total impacts of the salmon farming industry, however, extend beyond direct industry effects. An important feature of the industry is its linkages to regional supply firms.

Exhibit S.4: Direct Employment in the B.C. Salmon Farming Industry 1993

	Activity	Direct Industry Employment (PYs)		
		In-house ^b	Contract ^c	Total
Farmed Salmon Industry	Hatchery	87	+ 39	= 126 jobs
	Growout	522	+ 0	= 522 jobs
	Marine Transport	29	+ 34	= 65 jobs
	Processing	132	+ 134	= 266 jobs
	Selling	12	+ 19	= 31 jobs
	Administration	77	+ 0	= 77 jobs
TOTAL INDUSTRY		859	+ 226	= 1,085^d jobs

a Person-year equivalent.

b Employees of the 17 salmon farming companies.

c Employment from contracted third party hatchery, marine transport, processing and selling operations.

d Includes 12 out-of-province employees.

The industry has spurred small business development in many coastal communities, and has further contributed to the economic diversification of these areas. Industry purchases of containers, services, etc., and subsequent expenditures by these suppliers, generate indirect impacts. As well, the respending of earned wage income in consumer industries generates induced impacts in retail stores, gasoline service stations, and the like.

The 1993 direct and total (direct, indirect, and induced) provincial impacts supported by the salmon farming industry are estimated to be:

	<i><u>Direct</u></i>	<i><u>Total</u></i>
Employment (PYs)	1,073	2,070
Wages, Salaries, and Benefits (\$ millions)	\$33.8	\$62.7
Income or GDP ((\$ million)	\$52.2	\$118.0

Total provincial impacts are about double the impacts of each direct impact measure. That is, for each direct job in the industry, there is another job generated in the supply or retail industry. Government revenue generated by the industry amounted to \$11 million, mainly in the form of personal income taxes and UIC/ CPP premiums.

The salmon farming industry in British Columbia has generated considerable employment in coastal communities at a time when employment in resource-dependent areas has been declining. About 90% of direct employment accrues to areas outside the urban centres of Greater Vancouver and Greater Victoria.

	<i><u>Industry Jobs (PYs)</u></i>		<i><u>Share of Total Jobs in Community</u></i>
	<i><u>Direct</u></i>	<i><u>Total*</u></i>	
<i>Non-Urban</i>			
Campbell River	278	399	4%
Sechelt	87	118	4%
Powell River	85	113	2%
Port Alberni	80	104	1%
Tofino	66	90	14%
Comox/Courtenay	62	100	1%
Port Hardy	47	61	2%
Nanaimo	25	39	<1%
Ucluelet	24	31	3%
Port McNeil	17	24	2%
Other Non-Urban	<u>215</u>	<u>280</u>	<u><1%</u>
	986	1359	1%
Vancouver and Victoria	87	570	<1%

* Direct industry, indirect supplier, and induced retail.

The bulk of salmon farming jobs are situated in small, coastal communities. In contrast, close to 40% of commercial fishing jobs and 60% of fish processing jobs accrue to residents of the Lower Mainland. Most salmon farming jobs are full-time, whereas many fishing jobs are seasonal.

One result is that the 814 direct salmon farming jobs on Vancouver Island excluding the Victoria region, provide approximately the same amount of employment in full-time equivalents as the 1,400 commercial salmon fishing vessels based on the Island (excluding Victoria).

Industry Outlook and Constraints

The outlook for the BC salmon farming industry is promising. With excellent growing conditions and increasing consumer demand for healthy food products, the industry seems well-positioned to expand its existing markets and to develop new ones.

Nevertheless, there are several potential constraints to industry expansion and viability. Some of these constraints, such as market conditions, fluctuations in exchange rates, and environmental factors, are external to the industry.

But some of the major constraints of the industry, primarily those related to land tenure and other regulatory dimensions appear to be internal in nature. Recent industry confidence and optimism about its future, as evidenced by on-going investment in supporting infrastructure, has been tempered by lack of access to new sites.

As a result of this study, a comprehensive profile and regional impact analysis of the salmon farming industry is available for the first time. It is hoped that the study will lead to greater appreciation of this important industry, and assist in the analysis of resource allocation issues in coastal British Columbia.

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Appendix A: Economic Profiles of Salmon Farming Regions of British Columbia

Appendix B: Industry Questionnaires

1.0 Introduction

The salmon farming industry in British Columbia has grown rapidly since its beginnings 15 years ago. Industry sales grew from less than \$1 million in 1980 to \$140 million in 1993. The industry has now achieved an important role in the provincial economy, and provides significant year-round employment in coastal communities.

After a difficult restructuring period which began in 1989, the consolidated industry has emerged to be more globally competitive, stable and sophisticated, and is poised to expand.

The continued growth of the industry is constrained by both market and institutional factors. Many of the pressing issues facing the industry are local issues such as land use, yet there is a chronic lack of industry information at the regional and community level.

For example, during recent deliberations, the Commission on Resources and the Environment (CORE), requested region- and community-specific information on the economic significance of various sectors, including aquaculture.

This information would help ensure a balanced assessment of industry development impacts compared to other land use concerns. Unfortunately, very little information on the economic impacts of salmon farming was available.

An economic profile is also needed to document the contribution of the industry to the provincial economy. In this way, the size, importance, and impacts of the industry would be better appreciated.

Accordingly, this independent study has been commissioned to examine the economic impacts of the British Columbia industry.

Study Objectives

The study has three broad objectives:

- to develop an operational and financial profile of the industry;
- to estimate industry income and employment impacts, both at the provincial and sub-provincial level; and
- to document industry constraints to growth.

The information collected in the study is anticipated to meet the needs of a variety of end users: governments, regional planning authorities, international organizations, and the industry itself.

Study Approach

The cornerstone of the study is a detailed survey of salmon farming companies. The survey addressed production, revenues, employment, and operating and capital expenditures of each operation. In addition, a survey of key suppliers has also been conducted.

A total of 14 of the 17 active salmon farming companies (as of December 31, 1993) in the industry responded to the survey. The 14 respondents account for over 90% of industry sales.

The 18 suppliers who responded to the supplier survey represent a broad cross section, including: feed companies; custom processors; marine transport companies; cage, net, and equipment suppliers; and providers of specialized services.

This primary survey data, as well as secondary information from available studies, have been amalgamated to develop a profile and economic impact analysis of the total industry for 1993.

Report Outline

The next four sections comprise the main body of the report.

<i>Section</i>	<i>Focus</i>
2	Industry Development and Regulation
3	Key Industry Functions
4	Industry Profile
5	Regional Economic Impacts
6	Industry Outlook and Constraints

The text is supported by a set of summary tables in Appendix A. The farmed salmon and supplier company questionnaires are given in Appendix B.

2.0 Industry Development and Regulation

The world salmon farming industry has been growing steadily during the past two decades. By 1992, farmed salmon represented 330,000 tonnes, or 30% of total world salmon production. Much of the industry growth has been fuelled by consumer demand for more healthy and convenient foods.

Norway, with its many deep fjords, was an early leader in the farming of Atlantic salmon. Norway is still the world's largest producer of farmed salmon, accounting for nearly half of the world farmed salmon production.

However, Norway's share of the world market has been declining due to the spread of salmon farming first to Scotland and other parts of Northern Europe, and then to North and South America. Chile and Scotland are now the other large farmed salmon producers.

	<i>1992 World Share</i>
Norway	44%
Chile	15%
Scotland	11%
Canada - British Columbia	6%
- New Brunswick	3%
Japan	8%
Other	<u>13%</u>
	100%

British Columbia provides about 19,000 tonnes, or 6% of world farmed salmon production.

2.1 Industry Development in BC

BC salmon farmers produce both Atlantic and Pacific species of salmon. Pacific salmon is also farmed on the west coast of the US, in Chile, in New Zealand, and in Japan. Atlantic salmon is farmed in Europe, both coasts of Canada and the US, in Chile, and in Tasmania.

In the Pacific Northwest, British Columbia is the largest producer of farmed salmon. BC also has the greatest development potential from a biophysical standpoint.

Washington State produced close to 5,000 tonnes of farmed salmon in 1992, almost all of which was Atlantic salmon. Salmon farming in the state is concentrated in Puget Sound. Expansion potential for the industry is very limited because of user conflicts.

In Alaska, development of salmon farming has been prevented by a state-imposed moratorium on salmon farming. Oregon lacks a sheltered coastline and has little potential for salmon farming.

BC has generally good growing conditions for farmed salmon. Through the early 1980s, salmon farming grew rapidly to become the largest subsector of the BC aquaculture industry. In 1991, salmon farming accounted for 80% and 51% of the value of the aquaculture industry in the province and Canada, respectively.

Exhibit 2.1: Growth of the British Columbia Salmon Farming Industry

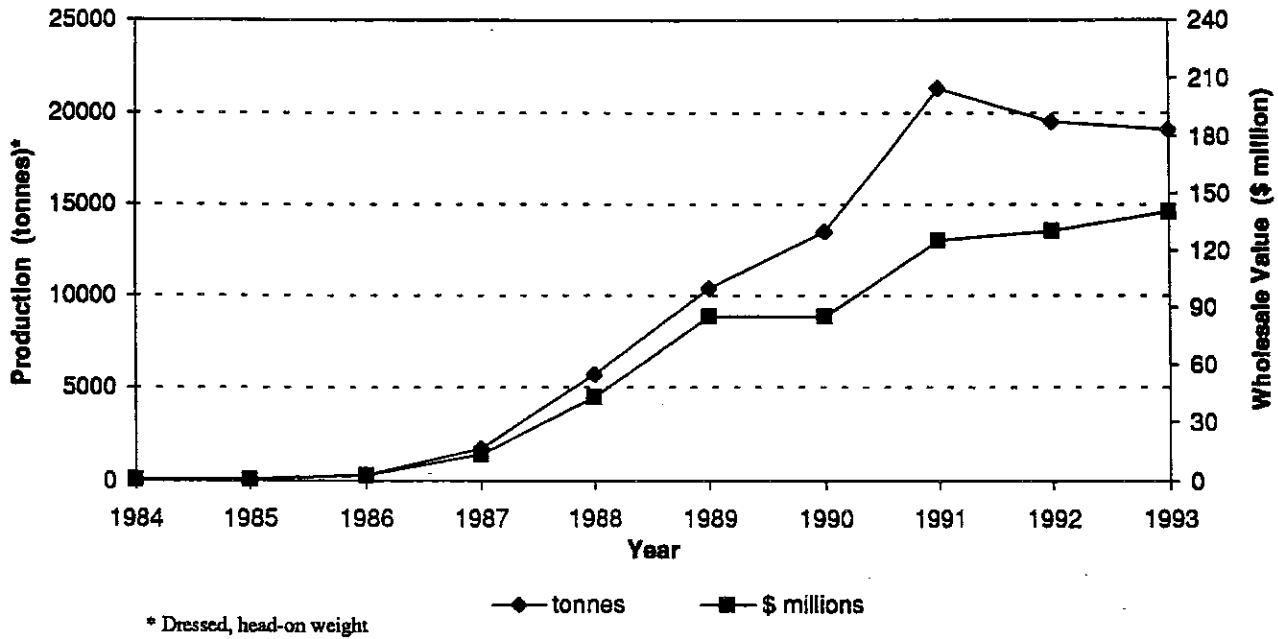
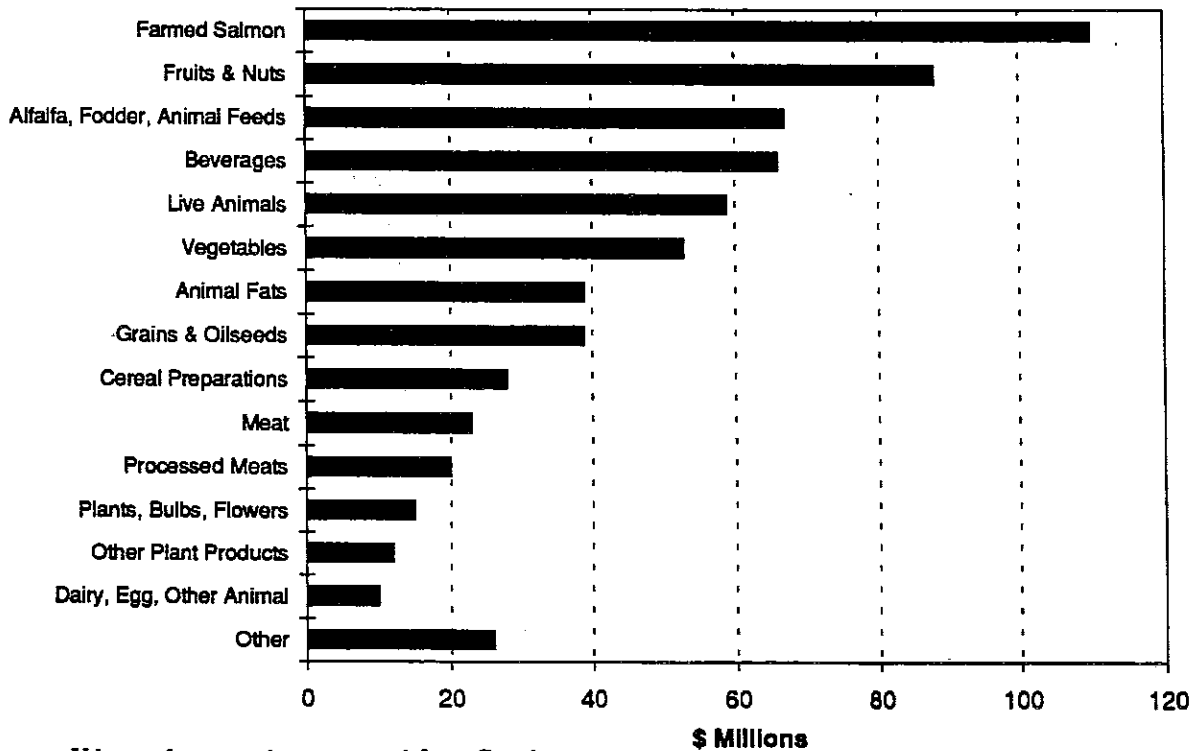


Exhibit 2.2: Value of Exports of Agricultural Products from British Columbia 1993^a



^a Values refer to products exported from Canada

Source: Statistics Unit, MAFF

Early attempts at farming salmon in BC focussed on coho (*Oncorhynchus kisutch*) and chinook (*O. tshawytscha*). Efforts to farm coho have been scaled back in recent years, and Atlantic salmon (*Salmo salar*) now represents the majority of production.

Nevertheless, there is potential for greater chinook and coho production as the industry develops its own broodstock. Initially, the industry relied on DFO broodstock from Salmon Enhancement Program (SEP) facilities which, in many cases, proved not to be ideal for farming.

Most BC producers were initially located along the Sunshine Coast, but recurring algae blooms resulted in many producers moving farther north along the coast and to Vancouver Island (see map of Southwestern BC, Exhibit A.1, Appendix A).

At first, salmon production in BC was seasonal. Customers would typically buy farmed salmon in the winter months but rely on wild salmon in season. Production is now more constant throughout the year since many buyers have become year-round customers. Consistent high quality and freshness, in addition to availability and predictability of supply throughout the year, are the major draws.

The majority of BC farmed salmon production is exported, primarily to the United States, but also to Japan. Close proximity to the US has been a major advantage, since fresh salmon can be delivered to most markets within 48 hours of harvesting. BC's main competitors in this market are producers from New Brunswick, Chile, and the US.

By the late 1980s, the dramatic increases in salmon supply from both wild and farmed sources had led to declines in prices and a worldwide rationalization of the industry.

Between 1988 and 1993, the number of farmed salmon producers in BC more than halved, although industry output has increased steadily (Exhibit 2.1).

The remaining companies have been quick to adopt new technology that has been developed in Norway and Scotland. The rationalization of the industry has resulted in scale economies in production and processing.

Today, the BC salmon farming industry is a vibrant, technologically sophisticated industry, and has achieved the stature of the province's leading agricultural exporter (Exhibit 2.2).

2.2 Regulations

Jurisdiction

Both the provincial and federal governments have jurisdictional responsibilities for salmon aquaculture. The lead agencies are the provincial Ministry of Agriculture, Fisheries, and Food, and the federal Department of Fisheries and Oceans.

In 1988, a Memorandum of Understanding (MOU) signed by Canada and British Columbia established the areas of responsibility regarding aquaculture and aquaculture development.

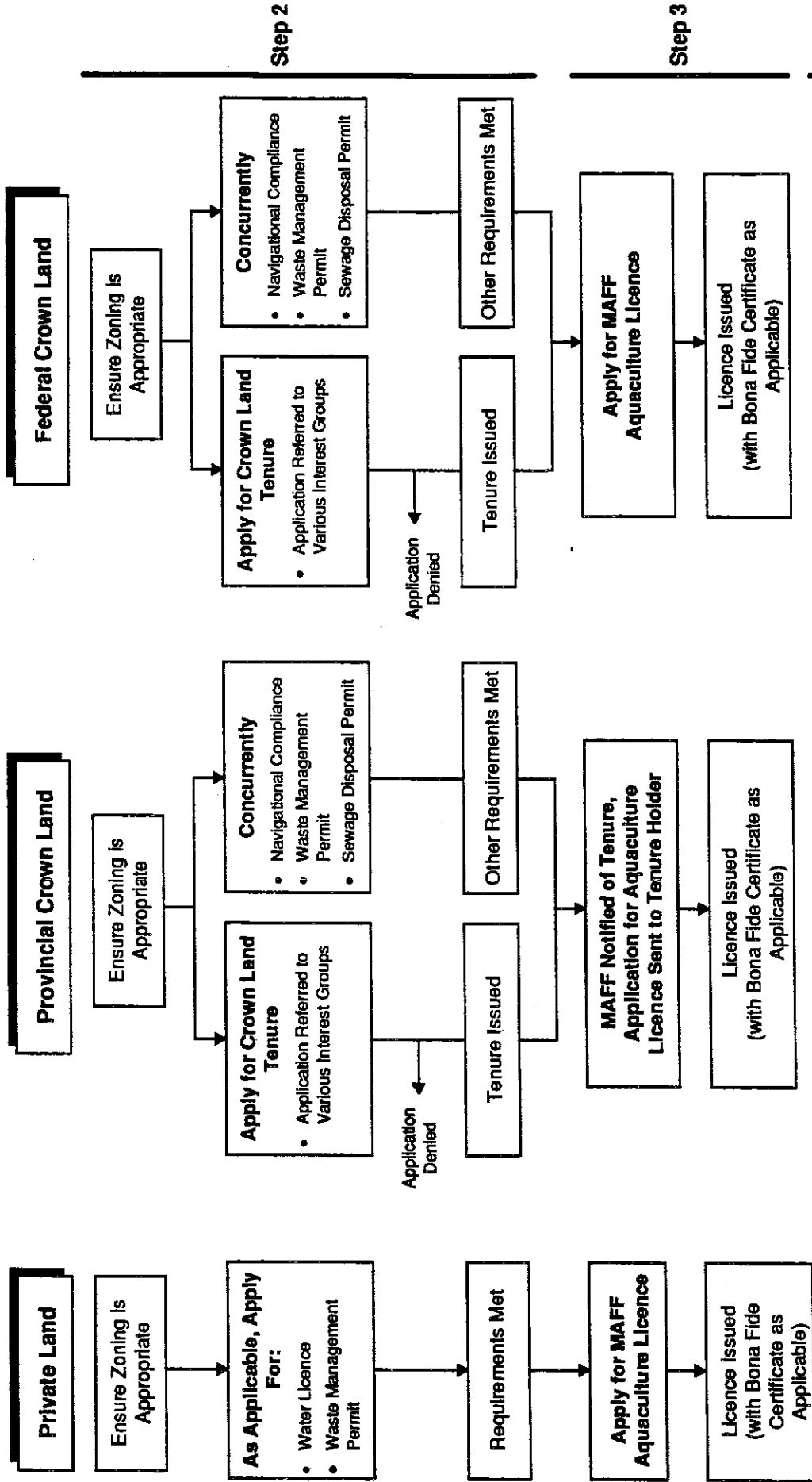
The Province has authority over development and management of the industry, licensing of aquaculture activities, and jurisdiction over provincial resources, such as provincial Crown Land.

Exhibit 2.3: Licence and Permit Structure for Aquaculture in B.C.

- Company Registration
- Business Licence
- Business Plan (Optional)

Step 1

Proposed Operation On



As Required: Transplant Committee Approval &/or DFO Import Permit

The federal government's role is generally limited to protecting wild stocks and fish habitat, regulating collection of wild broodstock (e.g., eggs, spawn, juvenile and adult salmon), and regulating inspection and marketing considerations.

Licensing Requirements

To operate a hatchery or salmon farm, two types of provincial approval are required: a Crown Land Tenure to locate the farm; and an Aquaculture License to operate.

The BC Ministry of Environment, Lands and Parks (MELP) has responsibility for granting land tenure for provincial Crown land. If the operation is to be located on federal land, in public harbour or ports, a Federal Waterlot Lease or License must be obtained. If the operation is on private land with its own groundwater source, only an Aquaculture License is required.

Two main types of provincial land tenure are available:¹ a short-term (normally ten years) License of Occupation, which allows development during a Lease application; and a thirty-year (maximum) Crown Lease which allows for exclusive use of the land.

During the approval process, MELP refers the application to various government agencies and interest groups for comment (see license and permit structure in Exhibit 2.3).

At present, there are 131 Leases and Licenses of Occupation for salmon farm sites occupying a total of 1,033 hectares. The rental price of a Crown Land Tenure depends on the MELP aquaculture pricing

¹ Also available is an Investigative Permit, valid for up to one year, to study site feasibility.

zone (A to E) in which the tenure is located, and the type of tenure. Rental prices range from \$324/ha/yr to \$563/ha/yr, although discounts apply in the early years of tenure.

MELP is also responsible for regulating the size and location of aquaculture facilities. An Aquaculture Development Plan and Guide is required as part of the application for Crown Land and an Aquaculture License. Biologists at MAFF then review the plan to ensure the salmon farm is compatible with the biophysical capability of the site.

MAFF has administrative responsibility for licensing of salmon farms. The main requirements are compliance with the Development Plan and with provincial Aquaculture Regulations under the *Fisheries Act*.

Other provincial permits that may be required include a Waste Management Permit and a Sewage Disposal Permit. Navigation compliance may be required from the federal Department of Transport. Aquaculture operations must also comply with municipal or regional district zoning regulations.

The Province has a general guideline not to issue commercial licenses in areas with provincial parks and ecological reserves. Recently, the provincial government has included First Nations in the referral process for aquaculture siting.

Federal and Provincial Transplant Regulations require authorization from a Transplant Committee and/or an Import Permit from the federal Department of Fisheries and Oceans, if fish are to be moved across watershed boundaries or imported from out of the province.

When the industry went through its major expansion in the mid-1980s, many resource conflicts developed. A moratorium on new

site licenses was imposed in October 1987, and lasted until March 1987, when a major inquiry was completed (Gillespie, 1987). Thereafter, Coastal Resource Identification Studies (CRIS) were initiated to reduce conflicts over salmon farming.

A significant change to result from the CORE process for Vancouver Island is that the CRIS process will likely be replaced by regional and sub-regional coastal zone planning that incorporates "highest and best use" as a fundamental principle.

Inspection and Other

The salmon farming industry is subject to all federal and provincial fish inspection regulations, where appropriate, in the same manner as the wild fishery. Similarly, federal food and drug, and consumer packaging and labelling regulations also apply.

The use of chemicals in salmon farming follows regulations in place in other sectors of the agriculture industry. However, since salmon farming is relatively new, it has drawn close scrutiny. The Department of Fisheries and Oceans, in conjunction with the Department of National Health and Welfare, has requirements to ensure that consumer safety standards for agri-food production are met.

3.0 Key Industry Functions

Salmon farming involves the husbandry or raising of salmon in a controlled farm environment, and is complex from both a technical and business perspective. In contrast to the wild fishery, the production cycle in salmon farming is closed. Farmed salmon are reared from the egg stage to a product ready for market at weights ranging from one to seven kilograms.

Akin to other livestock industries such as beef and poultry, the salmon farming industry can expand production to the limit of market demand. The industry is not resource-constrained as is the wild salmon fishery.

Another difference with the wild salmon fishery is that salmon farming companies usually retain ownership of their fish until they are sold to a wholesaler/distributor. As a result, the salmon farming industry involves several distinct activities (Exhibit 3.1):

- hatchery phase;
- growout phase;
- harvesting and marine transport;
- processing; and
- selling.

These activities or industry functions are described below.

3.1 Hatchery Phase

Salmon are anadromous species; they spend part of their life in freshwater and part in saltwater. The hatchery or freshwater phase

can last anywhere from about six months to two or three years.

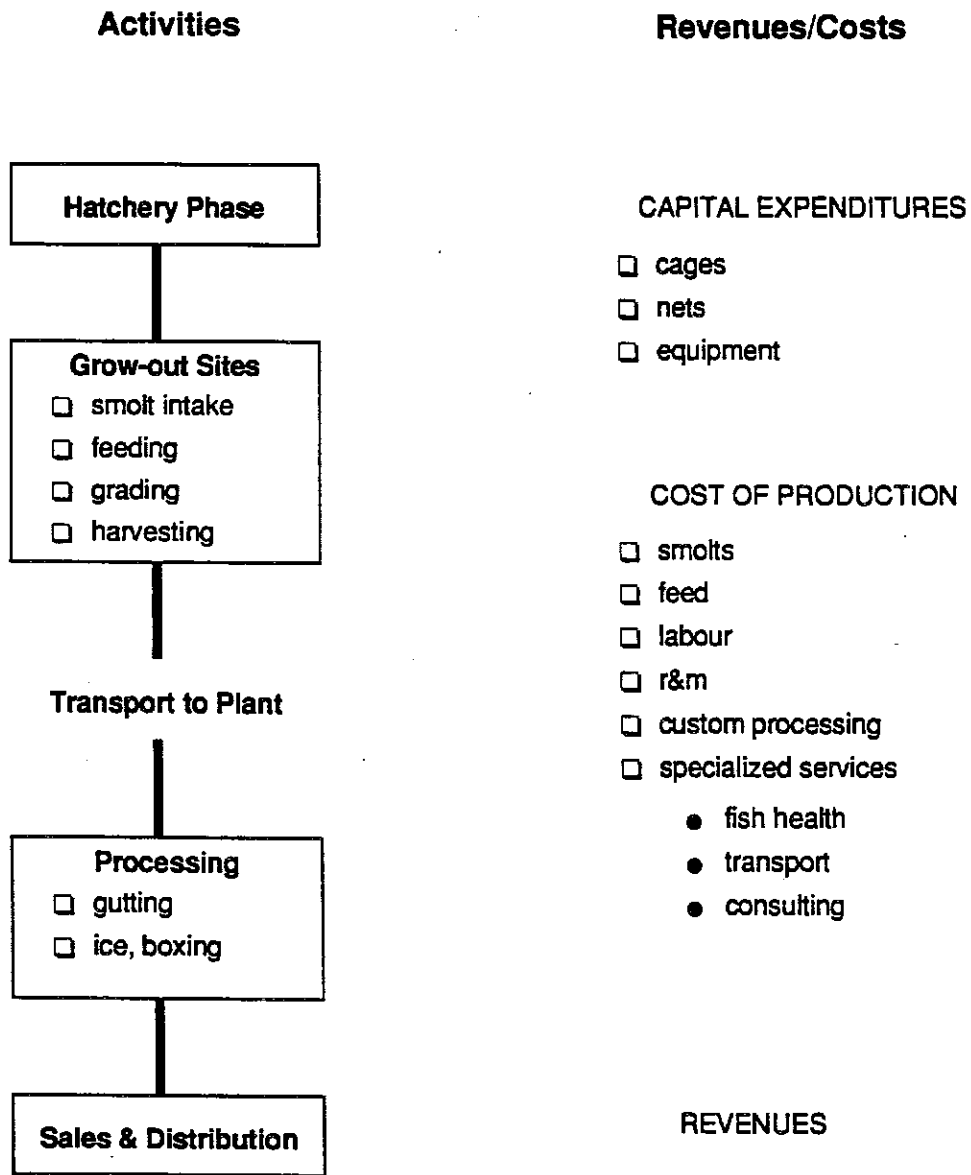
Eggs are stripped from private female broodstock and fertilized with male milt. Fertilized eggs are incubated in trays in a controlled temperature and light environment until they hatch. The juvenile salmon begin to feed on commercial feeds and are then moved to circular tanks or raceways.

When they reach the smolting stage (i.e., they are physiologically ready for saltwater), juvenile salmon are transferred to seapens by various methods of transport, including trucks, boats, and helicopters.

Both Pacific and Atlantic salmon are presently farmed in BC. Atlantic salmon have a longer freshwater phase (up to a year more) than Pacific salmon. As a result, Atlantic salmon smolts tend to cost more than chinook smolts.

However, the freshwater phase of chinook salmon is now typically extended over a longer period.

Commercial salmon farms normally try to obtain the best performing genetic stocks that are most suited to their production objectives and growing conditions. Usually the main genetic characteristics sought are high growth rates, good disease resistance, and low rates of premature development. The industry, unlike most livestock industries, does not yet have well developed brood lines.



3.2 Growout Phase

Initially, the growout sites of salmon farms were located in sheltered bays with deep water and with minimal current. Technological advances now permit cage systems to be located in more exposed areas that are better suited to rearing salmon.

Both Atlantic and Pacific salmon are grown out in the same types of sea cages, which are usually constructed from galvanized steel. These steel cages are designed to support nets and equipment, withstand strong currents and adverse storm conditions, and last for several years.

A typical growout site has several netpens supported by anchored cages arranged in a rectangular shape. In addition, predator nets surround the inner nets. Many salmon farm sites also have floating barges with housing for staff and storage for feed and supplies.

Experience has shown the benefits of deeper nets which allow the salmon to choose the most desirable water depth with respect to temperature, water quality, and light intensity. Increased net cage sizes have also proven to be advantageous in BC.

Atlantic salmon stocks have been imported from Ireland, Scotland, the US, Eastern Canada, and Norway. Since Atlantic salmon are more docile than Pacific salmon, the stocking densities can be higher, reducing the capital costs for netpens and equipment.

Atlantic salmon tend to have fewer losses from disease and injuries during the saltwater phase of their life cycle. However, they are more difficult to raise to the smolting stage and are more vulnerable to plankton blooms.

The industry has reached the stage where it can produce a desirable market-size fish (i.e., greater than 2.5 kg) in 12 to 18 months in seawater. This also means that it is becoming possible to produce market size fish throughout the year, for example, by varying smolt entry times.

With the introduction of Atlantic salmon and yearling chinook, and generally improved rearing practices, the industry has also been able to produce fish in larger size categories. Larger fish are preferred by buyers because of higher yields in converting whole fish to fillets and steaks.

Salmon farming is labour intensive, and fish farms require constant care. A typical farm site producing 200 to 300 tonnes of salmon per year requires five or six people on a full-time basis.

Commercial fish feeds formulated to meet the dietary requirements of salmon are supplied by feed companies. The main ingredients in fish feeds are fish meal and fish oil, which are supplemented with vitamin and minerals.

Feeding typically occurs at least once a day. Both hand feeding and mechanized feeding systems are common. Feedback (feed recovery) systems now optimize feed use.

A number of other activities are essential in intensive fish farming. Fish are typically graded by size during the cycle. Various inventory methods are employed, including the use of underwater video cameras. Services such as fish health and diagnostics, net washing, and transport are often contracted to specialized suppliers.

The disposal of fish mortalities was an early industry problem that has been largely over-

come. A project associated with the UBC Agricultural Research Farm at Oyster River on Vancouver Island processes fish mortalities into fertilizer which is used on the farm. Other salmon farms process fish mortalities into fertilizers for commercial sale.

3.3 Harvesting and Marine Transport

Harvesting of fish involves the use of seine nets and/or pumps. Fish are either stunned and bled on site and then placed on ice or gel packs in totes, or they are transported live to processing plants in customized live haul transport boats.

The harvesting of fish has become very efficient in a short time. Some farms harvest fish through the night so that fish are ready to be processed in a plant in the morning and trucked to market the same day.

3.4 Processing

Almost all farmed salmon are processed to some extent before they are sold. Farmed salmon are predominantly sold in a fresh gutted, head-on form, in a 60 lb (27 kg) styrofoam box containing ice or gel packs to preserve freshness. All farmed salmon are graded based on texture, colour, and other factors, according to grading standards developed by the industry.

Depending on the location of farms and processing plants, the gutting and boxing functions may be conducted in different locations. Repacking of fish is common at distribution centres in Vancouver and Seattle.

Value-added processing into steaks, fillets, and other product forms (e.g., smoking in sauces) is usually done at wholesale centres,

but more and more of this activity is beginning to occur within the province.

3.5 Sales and Distribution

Farmed salmon are marketed through a variety of means. Some of the larger companies have their own sales teams with North American coverage.

A substantial amount of product is also sold through fish brokers, many of whom are located in either Seattle or Vancouver. These locations are, in effect, major clearing houses for farmed salmon, as they are with wild salmon and other seafood.

Most of the overseas sales are through foreign brokers. Sales to Japan are usually conducted through Seattle.

Not all of the above hatchery, growout, marine transport, processing, and sales functions are performed by salmon farming companies. In some cases, third party companies supply smolts, custom process the fish, sell the finished products on a commission basis, and so on. In other words, the industry involves more than just the salmon farming companies involved in the growout function.

4.0 Industry Profile

In this section, the nature and extent of the salmon farming industry is outlined using several indicators — output, revenues, employment, expenditures, and industry structure. The profile is useful to understand better the dimensions and importance of the industry.

The industry snapshot of Exhibit 4.1 refers to all 17 salmon farming companies in the province, and is derived from a detailed survey. The profile provides the basis for the economic impact analysis of Section 5.

4.1 Size of Industry

Number of Companies and Sites

The industry presently comprises 17 companies, half of which have head offices in the Lower Mainland. This total excludes one or two very small companies with minimal production.

There are economies of scale in salmon farming. Many farms have multiple sites to reduce the risk of losses from diseases, storms, and other natural disasters.

The survey results indicate that there were 88 “active” salmon farming sites in 1993. Active sites are those with fish in the water, and not necessarily those producing harvestable product.

Output and Revenues

In 1993 the industry produced 19,100 tonnes of product (dressed, head-on weight) worth an estimated wholesale value of \$140.1 million.

The wholesale value is the sales value of the finished product (mainly boxed, iced, gutted, head-on, fresh fish), FOB shipping point of Vancouver or Seattle. The value includes paid selling commissions.

The majority of the \$8.1 million in other company operating revenues is comprised of services such as contract smolt production, fish processing, and hauling. Crop insurance claims are also included. Operating revenues exclude interest revenues, and non-recurring items.

The species mix in 1993 was:

	<i>Tonnes</i>	
Atlantic	10,800	57%
Chinook	7,300	38%
Coho	<u>1,000</u>	5%
	19,100	

The survey results confirm the shift towards greater Atlantic salmon production.

The average price of product sold was \$7.34 per kg or \$3.33 per lb (all sizes and all species). Prices increased in 1993, in part due to the weaker Canadian dollar (see Markets, below).

Regional Distribution

Salmon farms are situated in four main areas — Mount Waddington Regional District (25 sites), Comox-Strathcona Regional District (22 sites), Alberni-Clayoquot Regional District (15 sites) and the lower coast area, comprising Sunshine Coast and Powell River Regional Districts (26 sites).

Exhibit 4.1: Overview of B.C. Salmon Farming Companies 1993

OPERATIONS	
No. of Companies	17
No. of Active Sites	
Mt. Waddington	25
Comox-Strathcona	22
Alberni-Clayoquot	15
Sunshine Coast	22
Powell River	4
	<u>88</u>
Production (tonnes) ^a	
Atlantic	10,800
Chinook	7,300
Coho	1,000
	<u>19,100</u>
Employment PYs ^{b,c}	
Hatchery Sites	87
Growout Sites	522
Processing Plants	132
Transport	29
Selling/General/Admin.	89
	<u>859</u>
No. of Companies by Production Level ^a	
< 500 tonnes	6
500 - 999 tonnes	4
1000 - 1999 tonnes	3
2000 + tonnes	4
	<u>17</u>

FINANCIAL	
Operating Revenues	\$ millions
Product Sales	\$140.1
Other	8.2
	<u>\$148.3</u>
Expenses	
Selling	\$4.2
Wages, Salaries, Benefits ^c	27.3
Feed	47.7
Smolt Purchases	9.4
Marine Transport/Processing	10.9
Other Transport	5.1
Insurance	4.8
Repairs/Maintenance	4.9
Supplies	4.3
Utilities/Fuel	2.3
Office/Admin.	4.7
Services and Other	7.0
	<u>\$132.6</u>
Income before Interest, Depreciation & Taxes	\$15.7
Net Fixed Assets ^d	\$62.6

MARKETS	
Local B.C.	7%
Rest of Canada	8%
U.S.	76%
Japan	9%
	<u>100%</u>

a Dressed, head-on weight

b Full-year equivalents

c Direct company employment and wages only (i.e., excludes employment and wages associated with purchased smolts, contract processing and contract trucking, etc.)

d Fixed assets net of accumulated depreciation as at December 31, 1993

	<i>Production (tonnes)</i>	<i>Value (\$ million)</i>
Mt. Waddington	4,800	\$36.9
Comox-Strathcona	6,000	\$42.6
Alberni-Clayoquot	4,100	\$30.8
Sunshine/Powell	<u>4,200</u>	<u>\$29.8</u>
	19,100	\$140.1

As previously indicated, most of the salmon farms were initially located in the Sunshine Coast area. The majority of companies that operated in the Sunshine Coast/Powell River area in 1993 have since relocated to Vancouver Island or withdrawn from the industry. (The 1994 production from the Sunshine Coast/Powell River region would be much less than the 4200 tonnes of production in 1993.)

Markets

Approximately three quarters of industry sales are to the United States, particularly western states such as California.

	<i>% of Sales</i>
Local BC	7%
Rest of Canada	8%
US	76%
Japan	<u>9%</u>
	100%

The bulk of the 1,000 tonnes in coho production is exported to Japan. Sales to Japan may be somewhat higher than indicated since some salmon farming companies know only the first point of sale.

Employment

Total employment of the 17 salmon farming companies was 859 person-year equivalents (PYs) in 1993. The 859 PYs corresponds to approximately 950 positions. There are many part-time employees in processing plants.

The mix of employment by function is:

	<i>PYs</i>	
Hatchery sites	87	10%
Growout sites	522	61%
Marine transport	29	3%
Processing	132	16%
Selling, general, admin	<u>89</u>	10%
	859	

Companies have been reducing their office overhead in an effort to be competitive. One result has been a decline of selling, general, and administrative employment to 10% of total employment.

The employment figures given refer to salmon farming company employment only, and exclude employment in contract hatcheries, processing plants etc. (e.g., Browns Bay Packing). The share of each industry function performed "in-house" versus "contract" is discussed later in this section.

Investment

Industry fixed assets, net of accumulated depreciation, at year-end 1993 were an estimated \$62.6 million. The figure excludes the value of farm inventory and accounts receivable.

Capital expenditures in 1993 were an estimated \$6.8 million (original cost basis).

Some of these assets have been purchased "used" because, with the rationalization of the industry, much equipment has become available in liquidation proceedings.

Annual capital expenditures were much higher than this during the rapid expansion phase of the industry in the late 1980s. Industry purchases of equipment were an estimated \$30 million in 1989 (The Coopers & Lybrand Consulting Group, 1990).

Aboriginal Participation

Aboriginal participation in salmon farming is presently not significant. There are no active salmon farms owned and operated by aboriginal interests in British Columbia.

We estimate that 50 to 60 aboriginals are employed on salmon farms, or about 6% of the 859 total company employment.

Aboriginal participation in the industry is split about equally between growout sites, and processing and other activities. Aboriginal participation in salmon farming is also highest in the more remote locations, such as Tofino, which have a relatively greater percentage of aboriginals in their population.

4.2 Industry Expenditures

Salmon farming companies have strong and extensive linkages to the local business community. Non-wage purchases of goods and services amounted to \$105 million in the industry in 1993. This figure excludes depreciation and other amortized costs, as well as interest expenses.

The selling, smolt, and processing expenses shown in Exhibit 4.1 represent contract services only. Expenses related to selling, smolts, and processing with those firms in-

tegrated with these activities are, for the most part, included in other expense categories (e.g., labour).

Selling Commissions

Selling commissions are normally around 5% of product sales for head-on, gutted fish, and up to 10% for value-added sales, such as fillets.

Sea Prime in Vancouver sold a substantial proportion of the industry's 1993 brokered production.

Wages, Salaries, Benefits

The wage, salaries, and benefits bill for the 859 person-years of company employment was \$27.3 million, an average of \$29,600 for production employees and \$51,300 for selling, general, and administration employees.

Benefits included in the employers' share of Unemployment Insurance (UI), Canada Pension Plan (CPP), and Workers Compensation Board (WCB) premiums, medical/dental, and statutory holidays comprise about an additional 15% above the gross wages and salaries base and are included in the total above.

Feed

Feed is the largest expense in salmon farming. The prices of salmon feeds sold by the two major feed companies (EWOS and Moore-Clark, based in the Lower Mainland) are in excess of \$1,000 per tonne. On a dressed fish basis, these costs average \$2.50/kg, or about a third of product sales.

In most cases, the prices paid for feed include delivery charges and, with medicated feeds, the cost of medication.

Smolt Purchases

Smolt expenses vary depending on the species and on the age of smolt. Smolt costs for Atlantic salmon can exceed \$3/smolt. Expressed on a dressed fish basis, smolt costs typically range between \$0.70 and \$1.20/kg.

Average chinook smolt costs are lower than those of Atlantic salmon smolts. However, the costs of the preferred yearling chinook smolts are similar to those of Atlantic salmon smolts. United Hatcheries in Fanny Bay is a major Atlantic salmon smolt provider.

Contract Harvesting and Processing

The contract processing expenses shown also include marine transport. Live hauling charges are in the \$0.20/kg to \$0.35/kg range. Transmar Shipping of Langley, AquaSea Industries of Comox, and Sealand Marine Freight of Garden Bay live-haul farmed salmon.

Gutting expenses are about \$0.45/kg. Boxing charges, including the cost of the box, are an additional \$0.35/kg (box costs are included in supplies in Exhibit 4.1). Depending on whether the boxing function is separated from gutting, some freight forwarding expenses may be incurred.

For example, Browns Bay Packing and Okisollo in Campbell River, and Walcan Seafoods on Quadra Island are some of the companies that custom process farmed salmon.

Trucking

Trucking expenses include both freight forwarding and transport to customers, and trucking of supplies. Kelly Transport and

smaller local trucking companies move much of the finished product to Vancouver.

Insurance

These expenses include crop, plant and equipment, and liability insurance. Crop insurance ranges between 2.5% and 5.0% of fish inventory values.

Other

Other expenses are incurred for repairs/maintenance, supplies (mainly containers), utilities/fuel, office rent and other administrative costs (e.g., legal), and services such as veterinary.

A myriad of other companies service the industry. For example, AquaPak in Surrey and Noboco in Campbell River provide styrofoam containers, Micrologix International in Victoria and Syndel Laboratories of Vancouver provide pharmaceuticals, and Camcor Diving of Tofino provides pen repair services.

The large companies reported that they buy goods and services from more than 100 separate suppliers.

4.3 Industry Structure

None of the 17 salmon farming companies had a unionized work force in 1993. Some other key aspects of industry structure include concentration, integration, product differentiation, and foreign investment. These areas are discussed briefly.

Exhibit 4.2: Salmon Farming Functions by Company in British Columbia 1993

	Company Functions				
	Hatchery	Growout	Marine Transport	Processing	Selling
Company Name					
1. Anchor		X			
2. BC Packers	X	X			X
3. Blue Tornado		X			
4. Creative Salmon		X			
5. Hardy/Scanmar	X	X	X	X	X
6. Intercan	X	X	X		
7. NorAm Aquaculture	X	X	X	X	
8. Pacific Aqua	X	X	X		
9. Pacific National Group	X	X	X	X	X
10. Paradise Bay Seafarms		X			X
11. Phillips Arm		X			
12. Read Island Industries		X			
13. Saga Sea Farms		X		X	
14. Saltstream Engineering	X	X	X	X	
15. Sonora Sea Farm		X			
16. Stolt Sea Farms	X	X			X
17. Sunderland Salmon Farms		X			
No. of Companies with Activity	8	17	6	5	5

Source: Survey of BC salmon farming companies

Concentration

The four largest companies together account for 57% of total production, with each producing over 2,000 tonnes in 1993.

<i>Production Level</i>	<i>No. of Companies</i>
<500 tonnes	6
500 - 999 tonnes	4
1,000 - 1,999 tonnes	3
2,000+ tonnes	<u>4</u>
	17

In the late 1980s, there were more than 50 companies in operation. The 17 companies active today are much larger on average and more financially sound. The increased concentration is consistent with world trends.

Vertical Integration

Vertical integration is a strategy pursued by many salmon farms to reduce costs, and to provide more control over the entire production cycle.

As a result, many companies have integrated various aspects of production, such as smolt production, marine transport, processing, and marketing. Other companies have instead chosen to contract out specialized services.

Of the 17 companies comprising the industry (Exhibit 4.2):

- 8 companies operate their own hatcheries;
- 6 companies provide marine transport of their fish to processing facilities;
- 5 companies operate their own processing plants, and;

- 5 companies sell some of their production, rather than use a broker exclusively.

The other companies contract with third parties for these functions.

Exhibit 4.2 does not identify vertical linkages between affiliated companies, e.g., a fish brokerage company which has an ownership stake in a (separate) salmon farming company.

Based on the industry survey, we estimate the following shares of industry activity conducted in-house versus contract.

	<i>In-House</i>	<i>Contract</i>
Smolt supply	63%	37%
Growout	100%	—
Marine transport	43%	57%
Processing (gutting)	41%	59%
Selling	39%	61%

Some salmon farming companies sell smolts or custom process salmon for other salmon farming companies. These have been classified as "contract" activities.

Product Differentiation

The BCSFA introduced grading standards in 1988. The grades (premium, standard, and utility) are patterned after that of the Norwegian industry.

Farmed salmon are differentiated from most wild salmon by their freshness. The standard packaging for farmed salmon, a 60 lb random weight box containing ice or gel pack, can keep salmon fresh for up to two weeks.

Many of the companies have wholesale brands which appear on packaging.

Foreign Investment

Salmon farming in BC has attracted considerable foreign investment. Much of the early expansion of the industry was fuelled by foreign investment from Norway.

The Norwegian presence in the industry has lessened over time and has been replaced by Canadian and US capital. The BC government's Venture Capital Corporation Program alone is responsible for channelling over \$20 million in capital to the salmon farming industry.

Cross-ownership and other vertical links between salmon farming companies exist. Partly as a result of this, production from some farms flow through the same marketing channels.

Some links to the conventional fishery also exist. BC Packers Ltd., the province's largest fishing company, is a major producer of farmed Atlantic salmon.

The two major salmon feed companies are part of multinational groups headquartered in Europe. These two companies have operations in most salmon farming regions in the world. They also supply the Washington State industry with fish feed. Both have direct or indirect ownership of salmon farms in BC.

Stolt Seafarms, the Weston Group (owners of BC Packers), and International Aquafood have direct investment or marketing arrangements with farms in Chile, New Brunswick, and the US. Indeed, companies such as Stolt Seafarms are engaged in various types of aquaculture in many parts of the world and are pursuing global strategies.

Productivity

Both labour productivity and capital utilization have been increasing in the industry. Production of farmed salmon per person year in the growout phase was 37 tonnes in 1993, which we estimate represents an increase of over 50% since 1990.

The increase in labour productivity is due to more efficient processes in labour intensive activities such as feeding, net washing, and harvesting, and to higher yields which are a function of the transition to Atlantic salmon, and better growth rates and higher survival rates with chinook salmon.

Production per person year in 1993 in processing was 134 tonnes. Productivity in processing has been increasing with greater capacity utilization.

For every dollar of net fixed assets invested, the industry had \$2.23 in sales in 1993, compared to less than \$1 in 1988 (according to financial statements of four publicly traded companies in 1988).

The BC Salmon Farmers Association

The BC Salmon Farmers Association (BCSFA) is an industry-funded producers' association that was formed in 1984 to provide the developing industry with an equitable means of allocating surplus chinook and coho eggs from the federal government's Salmon Enhancement Program to prospective salmon farmers.

In 1987, the BCSFA expanded its services to include communications, marketing, and research, and public relations. The BCSFA membership now includes all but a few small salmon farms operating in the province, and includes key suppliers on an associate basis.

Marketing activities are conducted through the BC Farmed Salmon Institute, and ongoing research is carried out by the Cooperative Assessment of Salmonid Health Program, both subsidiaries of the BCSFA. The BCSFA in turn is an active member of the Canadian Aquaculture Producers' Council and the International Farmed Salmon Association.

There also exists a newly-formed regional aquaculture association, the Clayoquot Sound Aquaculture Association.

5.0 Regional Economic Impacts

The financial profile of the salmon farming industry in Section 4.0, in conjunction with economic multiplier analysis, is used in this section to estimate the regional and provincial economic impacts of the industry. The survey of salmon farming companies provided the locations where industry employees live, and the regional distribution of industry expenditures.

However, before presenting the economic impact analysis, we first introduce some relevant terms and concepts. This should help provide better understanding and comprehension of the results.

5.1 The Nature of Economic Impacts

Economic impacts address the potential economy-wide impacts of a particular industry, activity, or policy. Economic impacts arise from money expenditures.

Economic impacts arise directly from income and employment to industry operators and workers. In addition, spinoff effects occur through linkages to the suppliers of goods and services to the industry (e.g., feed suppliers) and through the respending of wage income on consumer goods and services.

The total economic impact of the salmon farming industry is the sum of direct industry, indirect supplier, and induced consumer spending impacts.

The total magnitude of impacts depends both on the absolute amount of expenditures, as well as the multiplied effects of these expenditures on the rest of the region.

The multiplied effects depend on the economic structure of the region, particularly the import content of goods and services purchased.

Imports, as well as taxes and savings, represent a "leakage" from the regional economy (i.e., money spent on imports is not available for respending within the region). Generally, the smaller a community, the greater the leakage, since many goods and services are not available locally and must be "imported."

Larger regions have a larger multiplier effect since a greater share of industry and consumer purchases are made within the region. For example, the total economic impact of a salmon farm located in the Campbell River area will be less for the local economy than for the Vancouver Island economy.

Three main economic impact indicators are used:

- Employment — measured in person-year equivalents to facilitate comparisons among economic sectors.
- Wages, salaries, benefits — the gross remuneration paid to labour, including benefits.
- Income or value-added — the gross payment to labour and capital, the wages, salaries, benefits above plus business income (interest, depreciation, plus pre-tax profits). Income is sometimes called Gross Domestic Product or GDP.

Exhibit 5.1: Regional Summary of BC Salmon Farm Company Expenditures 1993

	British Columbia								Outside BC	Total
	Mount Waddington	Comox-Strathcona	Alberni-Clayoquot	South Island	Sunshine/Powell R.	Lower Mainland	Total BC			
Operating Expenditures (\$ millions)										
Selling	-	-	-	-	-	2.1	2.1	2.1	4.2	
Wages, Salaries, Benefits	2.2	9.9	4.7	1.1	6.5	2.7	27.1	0.2	27.3	
Feed	-	0.3	-	-	-	47.4	47.7	-	47.7	
Smolt Purchases	0.5	8.4	0.5	-	-	-	9.4	-	9.4	
Marine Transport/Contract Processing	0.7	6.1	1.3	-	0.5	2.3	10.9	-	10.9	
Trucking	0.1	1.5	0.8	0.1	0.4	1.9	4.8	0.3	5.1	
Insurance	0.1	0.1	-	-	-	1.6	1.8	3.0	4.8	
Repairs/Maintenance	0.6	1.8	1.0	0.3	0.7	0.5	4.9	-	4.9	
Supplies	-	1.9	-	-	-	2.4	4.3	-	4.3	
Utilities/Fuel	0.4	0.9	0.6	-	0.4	-	2.3	-	2.3	
Office/Administration	0.1	0.9	0.4	0.1	-	2.3	3.8	0.9	4.7	
Services & Other	0.4	1.3	1.2	1.3	0.5	1.8	6.5	0.5	7.0	
Total	<u>5.1</u>	<u>33.1</u>	<u>10.5</u>	<u>2.9</u>	<u>9.0</u>	<u>65.0</u>	<u>125.6</u>	<u>7.0</u>	<u>132.6</u>	
Operating Surplus^a (\$ millions)	0.9	5.6	0.2	1.7	0.6	2.3	11.3	4.3	15.6	
Total Revenues (\$ millions)	6.0	38.7	10.7	4.6	9.6	67.3	136.9	11.3	148.2	

a Difference between revenues and operating expenditures (allocated to regions on the basis of 1993 capital expenditures and the head office location of the company).

Economic impacts are useful in addressing the linkages between particular sectors and regions, and represent a tangible measure of gross economic activity.

5.2 Provincial Impacts

The salmon farming industry produces a product destined mainly for export markets and accordingly, most of the associated income and employment represents an injection of “new” money and jobs into the economy. The average salmon farming site generates over \$1 million in foreign exchange earnings.

Impacts on provincial income and employment flow from in-province expenditures made by salmon farming companies. Exhibit 5.1 displays the regional distribution of company expenditures in 1993.

Regional Sourcing

The vast majority of company expenditures, an estimated \$137 million or 92% of total industry revenues of \$148 million, are made in BC.

Out-of-province expenditures are concentrated in three categories — selling commissions, insurance, and operating surplus. Much of the industry output is sold through Seattle brokers, and insurance often is arranged with offshore agents.

An undetermined share of industry operating profits flow from the province in cases where the BC company is owned by an out-of-province-based parent.

Direct Impacts

The direct industry effects are those associated with industry hatchery, growout, marine transport, processing, and selling and admin-

istrative operations. We attribute direct effects to salmon farming company operations as well as third party contractor activities in these areas. For example, the employment generated through custom processing of farmed salmon is considered a direct employment effect.

The direct industry employment then was 1085 PYs in 1993 — 859 by salmon farming companies and 226 by third party companies (Exhibit 5.2). The contractor employment is estimated on the basis of the share of total industry activity performed in-house versus contract (Section 4.3), and the results of the supplier survey conducted for this study.

In a similar manner, wages, salaries, and benefits and GDP or value-added have been estimated.

Direct industry impacts on the province in 1993 then were:

- 1,073 person-years of provincial employment;
- \$33.8 million in provincial wages, salaries and benefits; and
- \$52.2 million in provincial GDP.

The 1,073 PYs is less than the 1,085 PYs in the total industry because three of the in-house administrative jobs and nine of the broker selling jobs are outside of the province.

Total Impacts

The total impacts of the salmon farming industry extend beyond direct industry effects. Industry purchases on fish feed, containers, specialized services, etc., and subsequent round expenditures by these suppliers generate indirect impacts. As well, the respending of earned wage income in consumer industries generates induced impacts.

Exhibit 5.2: Economic Impacts of the Salmon Farming Industry in British Columbia 1993

	Direct Industry Employment PY's		
	In-House ^b	Contract ^c	Total
Function			
Hatchery	87	39	126
Growout	522	0	522
Marine Transport	29	34	63
Processing	132	134	266
Selling	12	19	31
Administration	77	0	77
Total	<u>859</u>	<u>226</u>	<u>1,085^a</u>

	Provincial Economic Impacts	
	Direct	Total ^d
\$ Millions		
Wages, Salaries, Benefits	33.8	62.7
GDP or Value-Added	52.2	118.0
Employment PY's	1,073 ^a	2,070

- a 3 of the in-house administrative jobs and 9 of the broker (contract) selling jobs are out-of-province.
- b Salmon farming company employment.
- c Employment from industry functions performed by contracted third parties.
- d Includes sum of direct, indirect suppliers and induced consumer spending impacts.

Exhibit 5.2 summarizes the direct and total economic impacts of the salmon farming industry. (The difference arises from indirect and induced impacts.)

- 2,070 PYs of total provincial employment;
- \$62.7 million of total provincial wages, salaries, and benefits; and
- \$118.0 million of total provincial GDP.

A significant share of the benefits of salmon farming company in-province expenditures flow to out-of-province interests as the feed industry uses fish meal from Chile, the pharmaceutical suppliers use ingredients from the US, the net suppliers use raw material from Japan, etc.

As the industry progresses, more of the supplies to the industry are expected to be manufactured from BC materials.

Note that the employment estimates above exclude any employment associated with industry-related personnel in government and educational institutions (e.g., Malaspina College, Simon Fraser University).

Government Revenues

Total remittances to government from direct industry activity in 1993 amount to an estimated \$10.6 million — \$6.9 million to the federal government, \$3.5 million to the provincial government, and \$0.2 million to municipal governments.

The UIC/ CPP figure of \$3.5 million includes both the employee and employer share of premiums. Corporate income tax is minimal as the industry most likely would have tax loss carryforwards.

	<i>\$ million</i>
Municipal Property Taxes	0.2
Federal	
Personal Income Tax	3.4
UIC/ CPP	3.5
Provincial	
Personal Income Tax	1.8
Corporate Capital Tax	0.2
WCB	1.1
Crown Land Rentals/ Aquaculture Licenses	0.4

5.3 Regional Impacts

Most of the provincial impacts accrue to regions outside the population centres of the Lower Mainland and Victoria (Exhibit 5.3).

Direct Community Impacts

Of the 1,073 direct industry jobs in BC, 986 or 92% of those employed reside in communities other than Greater Vancouver and Victoria.

	<i>Industry Jobs (PYs)</i>		<i>Share of Regional Jobs</i>
	<i>Direct</i>	<i>Total*</i>	
Non-Urban			
Campbell River	278	399	4%
Sechelt	87	118	4%
Powell River	85	113	2%
Port Alberni	80	104	1%
Tofino	66	90	14%
Comox/Court'y	62	100	1%
Port Hardy	47	61	2%
Nanaimo	25	39	<1%
Ucluelet	24	31	3%
Port McNeil	17	24	2%
Other non-urban	215	280	≤1%
	986	1359	1%
Vancouver and Victoria	87	570	<1%

* Direct, indirect, and induced

Regional District/ Community ^c	Industry Impacts					Total Regional Employment 1991 Census
	Direct Impacts ^a			Total Impacts ^d		
	Local Jobs PYs ^b	Wages, Salaries, Benefits \$ millions	Local Exp. \$ millions	Local Jobs PYs ^b	Wages, Salaries, Benefits \$ millions	
Mount Waddington						
Port Hardy	47	1.5	0.8	61	1.9	2,760
Port McNeil	17	0.5	0.8	24	0.7	1,405
Other	21	0.6	0.7	28	0.8	2,540
All	85	2.6	2.3	113	3.4	6,705
Comox-Strathcona						
Campbell River	278	8.7	7.0	399	12.2	9,995
Comox-Courtenay	62	1.9	2.5	100	3.0	8,655
Other	106	3.0	1.6	137	3.9	19,010
All	446	13.6	11.1	636	19.1	37,660
Alberni-Clayoquot						
Tofino	66	1.6	2.5	90	2.3	645
Ucluelet	24	0.7	0.5	31	0.9	895
Port Alberni	80	2.4	1.2	104	3.1	7,555
Other	22	0.7	0.5	29	0.9	4,335
All	192	5.4	4.7	254	7.2	13,430
South Island						
Nanaimo	25	0.7	1.0	39	1.1	26,250
Victoria	4	0.1	0.6	11	0.3	143,310
Other	7	0.2	0.2	10	0.3	41,980
All	36	1.0	1.8	60	1.7	211,540
Sunshine Coast/Powell River						
Sechelt	87	2.6	1.2	118	3.5	2,630
Powell River	85	2.6	0.6	113	3.4	5,510
Other	59	1.6	0.5	76	2.1	8,630
All	231	6.8	2.3	307	9.0	16,770
Greater Vancouver						
	83	4.3	61.6 ^e	559	18.1	782,915

a Direct employment for 17 salmon farming companies plus employment from contract hatchery, marine transport, processing and selling operations

b Full year equivalents

c Residence of worker

d Excludes interregional feedback effects, i.e., when an expenditure in one region generates impacts in another region

e Over three quarters of this figure are expenditures on feed

Source: Derived from surveys of BC salmon farming and supplier companies, from regional multiplier analysis (Home and Robson, 1993), and from the 1991 census (Appendix A)

The "other" category includes hatchery jobs in Sayward and Duncan, fish processing jobs on Quadra Island, etc. The industry provides significant regional benefits to rural communities.

As noted earlier, it is likely that direct and total industry employment at Sechelt and Powell River in 1994 and beyond will be less than the 1993 figures above due to a locational shift in growout sites. Employment in Campbell River and other North Island communities likely will be higher.

Comparison to Commercial Fishing

The bulk of salmon farming jobs are situated in small, coastal communities. In contrast, close to 40% of commercial fishing jobs and 60% of fish processing jobs accrue to residents of the Lower Mainland. Most salmon farming jobs are full-time, whereas many fishing jobs are seasonal.

One repercussion is that, on Vancouver Island excluding the Victoria region, the salmon farming industry provides approximately the same amount of employment in full-time equivalents as does the commercial (wild) salmon harvesting sector.¹

¹ The salmon farming industry provides about 800 direct PYs, or 40,000 person-weeks of employment on Vancouver Island (excluding Victoria). According to DFO statistics, about 1400 commercial salmon vessels are based on Vancouver Island (excluding Victoria), and the average salmon vessel has a crew of 2.3 people and fishes 11.5 weeks for salmon. Some allowance should be made for weeks pre- and post-season repairing boats and gear, business planning, etc. (The ARA Consulting Group, *The Skeena Watershed: Fish Resources and the Economy*, December 1994, Appendices D and E).

Total Community Impacts

Regions and communities benefit from more than just the direct industry jobs and associated wage bills earned. The salmon farming industry has linkages to regional suppliers of goods and services, the so-called indirect effects.

Moreover, wages earned by direct and indirect employment generate jobs in consumer industries through the respending of worker incomes, so-called induced impacts. Exhibit 5.3 presents the total direct plus indirect and induced industry impacts, and compares industry employment to total employment in communities.²

The total community impacts can be anywhere from 20% to 60% greater than the direct effects alone, i.e., the regional multiplier is from 1.2 to 1.6.

Although the salmon farming industry may generate only about 1% of total employment in the regions, this employment is important because it consists of mostly full-time jobs with career potential.

The job contribution to any one community can be greater. For example, 14% of all jobs

² The total community employment figures refer to June 1991 employment, and are drawn from the supporting exhibits in Appendix A, namely the line entry, "1991 Labour Force (15 yrs +)-Employed." Statistics Canada provides only labour force by industry, and not employment by industry in its Census tabulations (the labour force is the sum of the employed plus unemployed). The fishing industry, as defined by Statistics Canada, includes establishments primarily engaged in: harvesting fish and shellfish from the wild; fish and shellfish farming; and services incidental to fishing (fisheries consulting, fish hatcheries, net mending services, fishing inspection and protection services, etc.).

in Tofino are derived from the salmon farming industry.

The average salmon farming site generates 12 hatchery, growout, processing, and other direct jobs, and a further 12 jobs in support and service industries.

Business Development

Many businesses have set up in rural communities solely to service salmon farming companies and the industry. These include companies providing styrofoam containers, steel net pens, pharmaceuticals, and so on. Without the salmon farming industry, these companies and related services would cease to exist.

In other cases, existing supplier companies have expanded their facilities and hired workers to service the industry.

A Case Study: Browns Bay Packing³

The Browns Bay Packing Company of Campbell River was formed to process farmed salmon. Live salmon is delivered to the plant where it is dressed, washed, graded, chilled, and boxed for the premium fresh market.

Today, the company processes in excess of 10 million lbs (4500 tonnes) per year, and provides year-round jobs for 50 people and employs up to 50 more people during peak periods. The company payroll injects \$2 million into the local economy.

The success of Browns Bay Packing created spin-off businesses. A host of companies,

³ Information provided by Browns Bay Packing Company.

such as Noboco Ltd. to produce boxes and Kelly Transport to provide trucking, were launched in Campbell River to service Browns Bay Packing and the salmon farming industry.

Clearly the salmon farming industry has provided an important stimulus to Campbell River businesses and the local economy.

6.0 Industry Outlook and Constraints

The outlook for the BC salmon farming industry is promising. With excellent growing conditions and increasing consumer demand for healthy food products, the industry seems well-positioned to expand its existing markets and to develop new ones.

Nevertheless, there are several existing and potential constraints to industry expansion and viability. Some of these are external, and are related to market conditions, fluctuations in exchange rates, and environmental factors.

For example, the three-fold increase in total world (wild plus farmed) salmon supply over the past 15 years has dampened prices. Stiff competition, especially from Chile, which has equal if not better growing conditions and lower production costs, can be expected to continue.

The BC farmed salmon industry is vulnerable to increases in the value of the Canadian dollar. The industry is also susceptible to algae blooms and other natural disasters.

But some of the other major constraints of the industry appear to be internal in nature, primarily related to land tenure and other regulatory dimensions.

6.1 Land Tenure Considerations

Long term, secure aquatic lands for farming is a primary goal of the salmon farming industry. Salmon farming companies interviewed identified three main areas of concern — renewal of land tenures, lack of access to new sites, and First Nations land claims issues.

Renewal of Land Tenure

Within the next three years, many ten-year Licenses of Occupation, the more common form of tenure granted to the industry, must be renewed. A number of companies fear they are at risk of not having their licenses renewed and that substantial investment and capital could be jeopardized.

The planning horizons of private companies are generally in the twenty-year range. The ten-year term of licenses is therefore too short, but the longer term Crown Leases are difficult to obtain.

Access to New Sites

The ability to access and secure new grow-out sites is an important issue for two reasons. First, new site access allows better operating and growing conditions at existing production levels. Many farms want to operate several sites in a given area to allow some sites to lie fallow.

Secondly, additional sites allow expanded production. Without new sites, farms will be forced to achieve higher yields through higher stocking densities. The greater intensity may result in greater risk associated with water quality and disease, and result in greater unit production costs.

Site access is proving to be increasingly difficult, even in remote areas.

First Nations Land Claims

The settlement of aboriginal land claims may preclude access to some coastline by non-aboriginals. The industry's perception is that the Province is reluctant to issue 30-year Crown Leases because of the land claims issue.

6.2 Other Issues

Other internal areas of concern for salmon farmers include restricted access to high quality genetic stock, and what they consider to be a lack of appreciation for the industry.

Greater access to seedstock and selective breeding would allow greater production and a more competitive industry. Increased production will most likely be in Atlantic salmon. However, the Federal/Provincial Transplant Committee allows only limited quantities of the best-performing Atlantic stocks into BC.

In addition, many farmers are concerned about proposed regulations requiring Atlantic salmon to be sterilized. Sterilization has been shown to be uneconomic and has been discarded in Scotland and Tasmania.

Salmon farming does not yet seem to be fully accepted in BC. Public concerns over salmon farming include aesthetic objections, and concerns about the potential for transfer of disease from farmed to wild salmon.

Part of the concerns and fears undoubtedly are due to the newness of the industry, and the lack of information on its importance and environmental sustainability.

6.3 Concluding Comments

Farmed salmon is the province's leading agricultural export, and generates significant amounts of foreign exchange.

The salmon farming industry in BC has generated considerable employment in rural coastal communities at a time when employment in these resource-dependent areas has been declining.

The salmon farming industry has been one of the fastest growing agricultural industries in the province, with industry sales growing from less than \$1 million in 1980 to \$140 million in 1994.

The gold rush mentality which characterized the industry's early development has been replaced by a new maturity. Recent industry confidence and optimism about its future, as evidenced by on-going investment in supporting infrastructure, has been tempered by lack of access to new sites.

The industry has significant growth potential. However, the expansion in the industry during the next few years will likely be gradual.

Market conditions, difficulties in obtaining new sites, and regulatory issues will constrain production expansion. As a result, companies are likely to concentrate more on profitability rather than growth. Companies may also shift investment to other regions.

Some of the industry's potential can only be achieved through the cooperation and aid of regulatory authorities. A key challenge to governments is to create the conditions under which firms will invest in salmon farming in BC. The prospect of establishing joint ventures with First Nations is equally challenging for individual companies.

As a result of this study, a comprehensive profile and regional impact analysis of the industry is available for the first time. The study provides information which will assist in policy and program development, land use planning, establishment of research and development priorities, and planning of infrastructure support.

It is hoped that the study can lead to greater appreciation of this important industry, and assist in the analysis of resource allocation issues in coastal BC.

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Appendix A

Economic Profiles of Salmon Farming Regions of British Columbia

Exhibit A.1: Southwestern British Columbia

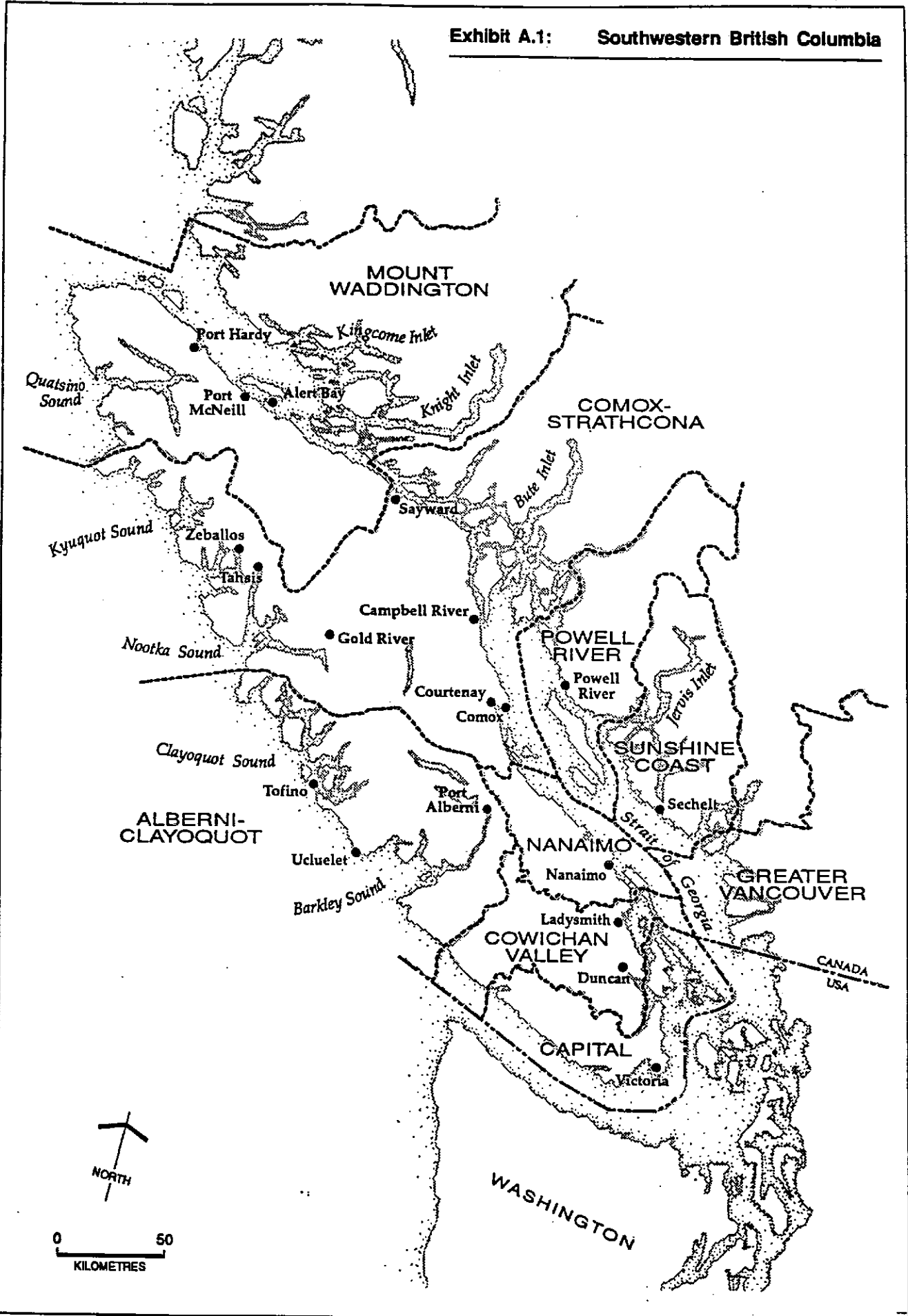


Exhibit A.2: Economic Profile of Salmon Farming Regions¹

	Mount Waddington	Comox-Strathcona	Alberni-Clayoquot	South Island	Sunshine Coast	Powell River	Greater Vancouver	Other B.C.	Total B.C.
1991 Population	13,895	82,730	31,225	461,845	20,785	18,475	1,542,745	1,110,360	3,282,060
1991 Labour Force (15 yrs +)									
Employed	6,705	37,660	13,430	211,540	9,025	7,745	782,915	492,790	1,561,810
Unemployed	940	4,945	2,120	20,960	920	1,205	79,240	68,705	179,035
Not in Labour Force	2,265	20,555	8,230	137,540	6,730	5,465	375,385	275,795	831,965
All	<u>9,895</u>	<u>63,150</u>	<u>23,770</u>	<u>369,870</u>	<u>16,345</u>	<u>14,395</u>	<u>1,237,435</u>	<u>837,690</u>	<u>2,572,550</u>
Unemployment Rate	12.3%	11.6%	13.6%	9.0%	9.2%	13.5%	9.2%	12.2%	10.3%
Participation Rate	77.4%	67.5%	65.5%	62.9%	60.9%	61.9%	69.7%	67.0%	67.7%
1991 Labour Force by Industry²									
Agriculture	20	820	215	3,620	70	120	10,600	25,405	40,870
Fishing	520	1,465	595	2,380	355	195	2,665	1,610	9,785
Forestry	1,410	3,390	1,505	4,410	685	640	3,920	23,180	39,140
Mining	590	800	35	270	70	135	2,790	14,850	19,540
Manufacturing	895	4,875	3,250	16,295	1,420	2,095	94,325	69,835	192,990
Construction	165	3,160	815	18,270	1,030	535	61,040	43,485	128,500
Transportation/Communication	450	2,430	905	13,755	650	450	76,710	45,490	140,840
Wholesaler/Retail	870	6,985	1,960	38,405	1,560	1,385	159,280	92,660	303,105
Finance & Real Estate	165	1,425	500	11,500	380	200	64,370	21,215	99,755
Accommodation/Food & Beverage	600	3,590	1,480	19,610	820	635	64,625	46,905	138,265
Government/Health/Education	1,340	9,115	2,785	70,780	1,650	1,675	169,115	113,905	370,365
Business & Other Services	425	4,130	1,175	29,765	1,110	670	138,925	54,070	230,270
All	<u>7,565</u>	<u>41,880</u>	<u>15,220</u>	<u>228,995</u>	<u>9,850</u>	<u>8,770</u>	<u>849,260</u>	<u>552,120</u>	<u>1,713,660</u>
1991 Income by Source³ (\$ millions)									
Employment	201	1,024	360	5,537	243	233	21,153	14,122	42,874
Pension	6	150	48	1,307	52	37	2,384	1,882	5,866
Investment	14	114	35	1,113	46	24	3,673	1,699	6,717
Government Transfers/Other	18	114	41	572	28	20	1,753	1,446	3,992
All	<u>240</u>	<u>1,402</u>	<u>484</u>	<u>8,529</u>	<u>370</u>	<u>314</u>	<u>29,087</u>	<u>19,209</u>	<u>59,637</u>
1993 Retail Sales⁴ (\$ millions)	98	627	217	3,688	165	118	13,717	7,766	26,396
1993 Tourism Room Revenues⁵ (\$ millions)	4	19	12	128	3	3	350	308	826

¹ Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services. Each region below refers to a regional district with the exception of South Island which includes the Nanaimo, Cowichan, and Capital (Victoria) regional districts.

² Refers to experienced labour force (both employed and unemployed) by industry.

³ British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

⁴ The Financial Post Canadian Markets 1993.

⁵ BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Exhibit A.3: Economic Profile of Mount Waddington Regional District¹

	Port Hardy	Port McNeill	Other	Total
1991 Population	5,080	2,640	6,175	13,895
1991 Labour Force (15 yrs +)				
Employed	2,760	1,405	2,540	6,705
Unemployed	245	95	600	940
Not In Labour Force	655	400	1,210	2,265
All	<u>3,640</u>	<u>1,900</u>	<u>4,355</u>	<u>9,895</u>
Unemployment Rate	8.2%	6.4%	19.1%	12.3%
Participation Rate	82.6%	78.7%	72.2%	77.4%
1991 Labour Force by Industry²				
Agriculture	10	0	10	20
Fishing	130	45	345	520
Forestry	245	600	565	1,410
Mining	590	0	0	590
Manufacturing	235	40	620	895
Construction	55	30	80	165
Transportation/Communication	185	85	180	450
Wholesale/Retail	500	180	190	870
Finance & Real Estate	70	40	55	165
Accommodation/Food & Beverage	250	135	215	600
Government/Health/Education	485	245	610	1,340
Business & Other Services	210	80	135	425
All	<u>2,980</u>	<u>1,485</u>	<u>3,100</u>	<u>7,565</u>
1991 Income by Source³ (\$ millions)				
Employment	88	56	57	201
Pension	2	1	3	6
Investment	8	2	4	14
Government Transfers/Other	9	4	6	18
All	<u>107</u>	<u>62</u>	<u>70</u>	<u>240</u>
1993 Retail Sales⁴ (\$ millions)	NA	NA	NA	98
1993 Tourism Room Revenues⁵ (\$ millions)	NA	NA	NA	4

- 1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.
- 2 Refers to experienced labour force (both employed and unemployed) by industry.
- 3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.
- 4 The Financial Post Canadian Markets 1993.
- 5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Exhibit A.4: Economic Profile of Comox - Strathcona Regional District¹

	Campbell River	Comox/Courtenay	Zeballos	Gold River	Other	Total
1991 Population	21,175	19,905	220	2,165	39,265	82,730
1991 Labour Force (15 yrs +)						
Employed	9,995	8,655	125	1,235	17,650	37,660
Unemployed	1,455	1,105	15	25	2,345	4,945
Not in Labour Force	4,640	5,795	35	290	9,795	20,555
All	<u>16,080</u>	<u>15,555</u>	<u>170</u>	<u>1,560</u>	<u>33,365</u>	<u>63,150</u>
Unemployment Rate	12.7%	11.3%	11.1%	2.0%	11.7%	11.6%
Participation Rate	71.2%	62.7%	79.4%	81.4%	59.9%	67.5%
1991 Labour Force by Industry²						
Agriculture	55	145	0	10	610	820
Fishing	370	130	15	0	950	1,465
Forestry	1,095	335	60	120	1,780	3,390
Mining	510	40	0	0	250	800
Manufacturing	1,545	570	0	600	2,160	4,875
Construction	595	585	10	55	1,915	3,160
Transportation/Communication	700	530	10	25	1,165	2,430
Wholesale/Retail	2,025	2,030	0	90	2,840	6,985
Finance & Real Estate	475	370	0	10	855	1,425
Accommodation/Food & Beverage	1,005	935	15	90	1,545	3,590
Government/Health/Education	1,750	2,810	30	160	4,365	9,115
Business & Other Services	1,120	1,015	0	80	1,915	4,130
All	<u>11,235</u>	<u>9,530</u>	<u>135</u>	<u>1,255</u>	<u>19,725</u>	<u>41,880</u>
1991 Income by Source³ (\$ millions)						
Employment	423	373	5	45	178	1,024
Pension	37	86	0	1	26	150
Investment	42	52	0	1	19	114
Government Transfers/Other	42	46	0	2	23	114
All	<u>545</u>	<u>559</u>	<u>5</u>	<u>49</u>	<u>244</u>	<u>1,402</u>
1993 Retail Sales⁴ (\$ millions)	NA	NA	NA	NA	NA	627
1993 Tourism Room Revenues⁵ (\$ millions)	NA	NA	NA	NA	NA	19

1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.

2 Refers to experienced labour force (both employed and unemployed) by industry.

3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

4 The Financial Post Canadian Markets 1993.

5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Exhibit A.5: Economic Profile of Alberni - Clayoquot Regional District¹

	Tofino	Ucluelet	Port Alberni	Other	Total
1991 Population	1,105	1,595	18,405	10,125	31,225
1991 Labour Force (15 yrs +)					
Employed	645	895	7,555	4,335	13,430
Unemployed	85	120	1,270	645	2,120
Not in Labour Force	120	145	5,310	2,655	8,230
All	<u>850</u>	<u>1,165</u>	<u>14,130</u>	<u>7,625</u>	<u>23,770</u>
Unemployment Rate	11.6%	11.8%	14.4%	12.7%	13.6%
Participation Rate	85.9%	87.1%	62.6%	66.6%	65.5%
1991 Labour Force by Industry²					
Agriculture	10	0	45	160	215
Fishing	110	120	195	170	595
Forestry	10	110	830	555	1,505
Mining	0	0	35	0	35
Manufacturing	35	135	2,105	975	3,250
Construction	35	20	455	305	815
Transportation/Communication	85	40	380	400	905
Wholesale/Retail	60	120	1,235	545	1,960
Finance & Real Estate	10	35	310	145	500
Accommodation/Food & Beverage	160	250	675	395	1,480
Government/Health/Education	115	170	1,555	945	2,785
Business & Other Services	95	45	700	335	1,175
All	<u>730</u>	<u>1,015</u>	<u>8,560</u>	<u>4,915</u>	<u>15,220</u>
1991 Income by Source³ (\$ millions)					
Employment	12	25	208	115	360
Pension	1	1	29	16	48
Investment	1	2	20	11	35
Government Transfers/Other	2	4	23	13	41
All	<u>16</u>	<u>32</u>	<u>282</u>	<u>155</u>	<u>484</u>
1993 Retail Sales⁴ (\$ millions)	NA	NA	NA	NA	217
1993 Tourism Room Revenues⁵ (\$ millions)	NA	NA	3	NA	12

1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.

2 Refers to experienced labour force (both employed and unemployed) by industry.

3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

4 The Financial Post Canadian Markets 1993.

5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Exhibit A.6: Economic Profile of South Vancouver Island Regional Districts¹

	Nanaimo R.D.		Cowichan Valley R.D.	Capital R.D.	Total
	Nanaimo	Other			
1991 Population	60,130	41,605	60,560	299,550	461,845
1991 Labour Force (15 yrs +)					
Employed	26,250	16,455	25,525	143,310	211,540
Unemployed	3,815	2,365	2,830	11,950	20,960
Not in Labour Force	17,200	14,845	17,670	87,825	137,540
All	<u>47,230</u>	<u>33,645</u>	<u>46,020</u>	<u>242,975</u>	<u>369,870</u>
Unemployment Rate	12.7%	12.6%	10.0%	7.7%	9.0%
Participation Rate	63.7%	55.9%	61.6%	63.9%	62.9%
1991 Labour Force by Industry²					
Agriculture	260	475	950	1,935	3,620
Fishing	390	625	355	1,010	2,380
Forestry	710	735	1,470	1,495	4,410
Mining	20	35	30	185	270
Manufacturing	2,780	1,790	4,335	7,390	16,295
Construction	2,670	2,280	2,265	11,055	18,270
Transportation/Communication	2,305	1,135	1,440	8,875	13,755
Wholesale/Retail	6,280	2,990	4,295	24,840	38,405
Finance & Real Estate	1,710	815	1,115	7,860	11,500
Accommodation/Food & Beverage	2,615	1,835	2,235	12,925	19,610
Government/Health/Education	6,260	3,750	6,015	54,755	70,780
Business & Other Services	3,430	2,085	3,175	21,075	29,765
All	<u>29,500</u>	<u>18,455</u>	<u>27,755</u>	<u>153,285</u>	<u>228,995</u>
1991 Income by Sources³ (\$ millions)					
Employment	765	330	681	3,762	5,537
Pension	138	126	139	904	1,307
Investment	107	84	100	822	1,113
Government Transfers/Other	85	50	72	364	572
All	<u>1,096</u>	<u>591</u>	<u>995</u>	<u>5,871</u>	<u>8,529</u>
1993 Retail Sales⁴ (\$ millions)	... 801 ⁶ ...		436	2,461	3,688
1993 Tourism Room Revenues⁵ (\$ millions)	11	13	6	97	128

1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.

2 Refers to experienced labour force (both employed and unemployed) by industry.

3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

4 The Financial Post Canadian Markets 1993.

5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

6 Total retail sales from Nanaimo Regional District.

Exhibit A.7: Economic Profile of Sunshine Coast Regional District¹

	Sechelt	Other	Total
1991 Population	6,125	14,660	20,785
1991 Labour Force (15 yrs +)			
Employed	2,630	6,395	9,025
Unemployed	230	690	920
Not in Labour Force	2,040	4,690	6,730
All	<u>4,905</u>	<u>11,440</u>	<u>16,345</u>
Unemployment Rate	8.1%	9.7%	9.2%
Participation Rate	58.2%	61.9%	60.9%
1991 Labour Force by Industry²			
Agriculture	30	40	70
Fishing	85	270	355
Forestry	265	420	685
Mining	30	40	70
Manufacturing	320	1,100	1,420
Construction	260	770	1,030
Transportation/Communication	180	470	650
Wholesale/Retail	495	1,065	1,560
Finance & Real Estate	105	275	380
Accommodation/Food & Beverage	230	590	820
Government/Health/Education	665	985	1,650
Business & Other Services	325	785	1,110
All	<u>2,820</u>	<u>6,810</u>	<u>9,630</u>
1991 Income by Source³ (\$ millions)			
Employment	82	161	243
Pension	20	32	52
Investment	18	27	46
Government Transfers/Other	9	19	28
All	<u>130</u>	<u>240</u>	<u>370</u>
1993 Retail Sales⁴ (\$ millions)	NA	NA	165
1993 Tourism Room Revenues⁵ (\$ millions)	NA	NA	3

1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.

2 Refers to experienced labour force (both employed and unemployed) by industry.

3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

4 The Financial Post Canadian Markets 1993.

5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Exhibit A.8: Economic Profile of Powell River Regional District¹

	Powell River	Other	Total
1991 Population	12,990	5,485	18,475
1991 Labour Force (15 yrs +)			
Employed	5,510	2,235	7,745
Unemployed	820	385	1,205
Not in Labour Force	3,820	1,645	5,465
All	<u>10,135</u>	<u>4,260</u>	<u>14,395</u>
Unemployment Rate	13.0%	14.7%	13.5%
Participation Rate	62.3%	61.5%	61.9%
1991 Labour Force by Industry²			
Agriculture	40	80	120
Fishing	90	105	195
Forestry	345	295	640
Mining	0	135	135
Manufacturing	1,725	370	2,095
Construction	360	175	535
Transportation/Communication	310	140	450
Wholesale/Retail	1,065	320	1,385
Finance & Real Estate	140	60	200
Accommodation/Food & Beverage	460	175	635
Government/Health/Education	1,135	540	1,675
Business & Other Services	475	195	670
All	<u>6,200</u>	<u>2,570</u>	<u>8,770</u>
1991 Income by Source³ (\$ millions)			
Employment	219	14	233
Pension	34	3	37
Investment	22	2	24
Government Transfers/Other	19	2	20
All	<u>293</u>	<u>21</u>	<u>314</u>
1993 Retail Sales⁴ (\$ millions)	NA	NA	118
1993 Tourism Room Revenues⁵ (\$ millions)	NA	NA	3

1 Unless otherwise noted, information from June 1991 census as provided by Central Statistics, Ministry of Government Services.

2 Refers to experienced labour force (both employed and unemployed) by industry.

3 British Columbia Taxation Statistics - 1991 (January 1994), Central Statistics, Ministry of Government Services.

4 The Financial Post Canadian Markets 1993.

5 BC Tourism Room Revenue Report. Annual 1993. Prepared by Central Statistics, Ministry of Government Services and Ministry of Small Business, Tourism and Culture.

Appendix B
Industry Questionnaires

Economic Impact Study of the B.C. Salmon Farming Industry

The B.C. Salmon Farmers Association (BCSFA) has engaged the ARA Consulting Group Inc., Management Consultants, to undertake an economic impact study of the British Columbia salmon farming industry. This report will highlight the importance of the industry to the regional economy of the province.

In this independent study, statistics are to be compiled on a community, regional district and province-wide basis. Please respond to the survey to the best of your ability (estimate reasonable values if precise data are not available). Report production, employment, investment and expenditure data for all sites that the company operated in 1993.

The information which you provide in this survey will be kept strictly confidential. Only aggregates for the total industry will be published.

For Information Contact:

David Egan or Gordon Gislason
 The ARA Consulting Group Inc.
 402-475 Howe Street
 Vancouver, B.C. V6C 2B3
 Tel. (604) 681-7577 Fax. (604) 669-7390

Please provide us with your name and address in case we need to contact you for clarification on any matters.

Name _____
 Company _____
 Address _____
 Telephone _____ Fax _____

A. OPERATING PROFILE IN CALENDAR YEAR 1993

1. Where is the head office of the company located? _____
2. When was the company formed? _____
3. What type of ownership structure best describes the company? (*check one*)
 - Canadian public company
 - Canadian private company
 - Other (specify) _____
 - Foreign-owned public company
 - Foreign-owned private company
- 4a. On a regional district basis, how many salmon farming sites did the company operate and how many sites produced farmed salmon for sale in 1993? (refer to map)

Regional Districts Where Sites are Located
Mt. Waddington
Comox-Strathcona
Alberni-Clayoquot
South Island ¹
Sunshine Coast
Powell River
Other
Total

Number of Sites in 1993			
Producing Sites		Non-Producing Sites and/or Fallow Sites	Total Sites
	+		=
	+		=
	+		=
	+		=
	+		=
	+		=
	+		=
	+		=
	+		=
	+		=

¹ Includes Regional districts of Nanaimo, Cowichan and Capital

- 4b. How many sites were being applied for at the end of 1993? _____

What is the average length of time these site applications have been under review? _____

5. Which of the following activities did your company conduct in-house in 1993?
- Hatchery/Smolt Production
 - Fish Transport/Hauling
 - Selling/Marketing
 - Other (specify) _____
 - Grow-out
 - Processing
 - Transport to Shipping Point (e.g., Vancouver or Seattle)

6. Many salmon farming companies are not fully integrated and use contracted services to a large degree. Which functions in the production cycle were chartered, subcontracted, or purchased by your company in 1993.

	Contracted Out/Purchased?			If Yes, Who to?
Hatchery/Smolt Production	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Growout	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Fish Transport/Hauling	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Processing	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Selling/Marketing	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Transport to Shipping Point	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Transport to Customer	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____
Fish Health & Diagnostics	<input type="radio"/> No	<input type="radio"/> Yes	⇒	_____

7. Does your company receive revenue from third parties from:
- Smolt Sales No Yes
 - Contract Growout No Yes
 - Transport/Hauling No Yes
 - Processing No Yes
 - Selling/Marketing No Yes
 - Transport to a Shipping Point No Yes
 - Transport to Customer No Yes
 - Other No Yes

B. PRODUCTION AND SALES

8. How many pounds of farmed salmon from all sites did the company harvest and sell in each of the last two years? (Exclude purchases from third parties for processing and sale).

	Lbs. Sold (sales weight)	Revenue from Farmed Salmon Sales
1993	_____	_____
1992	_____	_____

9. In 1993, how were these sales broken down by species and product form?

Species	Lbs. Sold					\$ Sales Revenue
	Fresh Round	Fresh Dressed	Frozen Dressed	Other (specify)	Total	
Atlantic						
Chinook						
Coho						
Other						
Total						

10. Approximately how are your company's sales distributed by:

Sales Region	Selling Agent	Point of Sale
_____ % Within B.C.	_____ % Sold in House	_____ % FOB Farm
_____ % to Rest of Canada	_____ % Cdn. Broker(s)	_____ % FOB Plant
_____ % to United States	_____ % Foreign Broker(s)	_____ % FOB Shipping Point (e.g., Vancouver or Seattle)
_____ % to Japan	_____ % Other	_____ % FOB Customer
_____ % to Other Countries		_____ % Other
100%	100%	100%

C. EMPLOYMENT AND WAGES PAID IN 1993

11. How many people worked for your salmon farm company in 1993?

Category of Employee	Number of Positions*				Total Positions
	Full-time	Part-time	Seasonal		
			Number	Person Months**	
Production*					
Hatchery					
Growout Sites					
Fish Transport/Hauling					
Processing					
Other					
Selling & Administration*					
Selling					
Administration					
Total*					

* Employees only (i.e., excluding subcontractors.)

** For example, two people working four months each is equal to eight person months.

12. How much in gross wages including bonuses but before deductions did your company pay its employees in 1993?

1993 Wage Payments to Employees

\$ _____ Production Employees
 \$ _____ Selling & Administration Employees
 \$ _____ Total

Does the total include employer contributions to UI, CPP, WCB, medical, dental, etc.? (check one)

No Yes

How much would the additional payroll burden comprise in percentage terms above the base T4 wage?

_____ % payroll burden above T4 base

13. Does your company provide room and board and other allowances to your production employees? (check one)

No Yes ⇨ For how many people? _____

14. To assess the economic significance of the industry it is important to know where production employees reside and spend their money. Many employees commute to the farm site for each rotation of shifts from their permanent residence.

For your company, determine which of the following two approaches is most appropriate for determining employee residence and complete one of them: *(check one)*

- provide us with T4 names and addresses from payroll statistics for production employees or with your employee list; or
 complete the table below

Permanent Resident Location	Number of Production Employees	Permanent Resident Location	Number of Production Employees
<i>Mt. Waddington</i>		<i>South Island</i>	
Port Hardy		Nanaimo	
Port McNeil		Greater Victoria	
Other		Other	
<i>Comox-Strathcona</i>		<i>Sunshine Coast</i>	
Campbell River		Sechelt	
Comox/Courtenay		Other	
Zeballos		<i>Powell River</i>	
Gold River		Powell River	
Other		Other	
<i>Alberni-Clayquot</i>		<i>Greater Vancouver</i>	
Tofino		<i>Other Regions in B.C.</i>	
Ucluelet		<i>Outside B.C.</i>	
Port Alberni			
Other		<i>Total</i>	

Note: The total should be the same number as the Production Employees Total in Question 11.

D. CAPITAL EXPENDITURES

15. Please list the major capital purchases in 1993 of your company?

Category	Purchase Cost	% Purchased New	% Purchased Used
Cages			
Boats			
Barges			
Trucks			
Nets			
Buildings			
Equipment			
Other			
Total			

16. Did you purchase any land or long-term leases in 1993?

- No Yes ⇨ At what cost? \$ _____

17. What were your company's total fixed assets net of accumulated depreciation associated with salmon farming at the end of 1993?

\$ _____

D. REVENUE AND OPERATING EXPENDITURES

18. Please describe your company's payments to government in 1993.

	Federal \$	Provincial \$	Municipal \$	Other \$	Total \$
Income Tax					
Corporate					
Personal (note 1)					
Capital taxes					
PST and GST					
UIC/ CPP					
Medical Services Plan					
WCB					
Business licenses					
Property taxes					
Aquaculture Permits and Licences					
Other					
Total					

1 From T4 Summary

19. What were the revenues and operating expenses of your salmon farming company in 1993?

Revenues from Sales of Farmed Salmon	
Gross Sales	
Other Operating Revenues	
Contract Smolt Sales	
Contract Processing	
Contract Trucking & Hauling	
Other	
Subtotal	
Selling & Administration Expenses	
Salaries incl. Payroll Burden	
Selling Expenses and/or Commissions	
Rent & Office expenses	
Other	
Subtotal	

Production Expenses	
Purchase Smolts & Eggs	
Processing	
Trucking & Storage	
Feed	
Wages incl. Payroll Burden	
Crop and Other Insurance	
Repairs & Maintenance	
Containers & Supplies	
Utilities & Fuel	
Vehicle/Boat/Equipment Expenses	
Specialized Services	
Annual Crown Lease Expenditures	
Other	
Subtotal	

Please provide us with an expenditure listing by supplier (including addresses) for 1993. This can be your accounts payable summary. We will use this information to allocate expenditures on a regional and community basis.

E. ISSUES FACING THE INDUSTRY

The industry is facing several issues that affect its growth, health and survival. Do you have any comments on the following?

a) The Role of Government

b) First Nations Issues

c) Competitiveness of the Industry (e.g., labour, feed costs, marketing, etc.)

d) Industry Uncertainty

e) Industry Constraints (e.g., seedstock)

f) Other

Thank You.

Salmon Farming Industry - Supplier Interview

The B.C. Salmon Farmers Association (BCSFA) has engaged the ARA Consulting Group Inc., Management Consultants, to undertake an economic impact study of the British Columbia salmon farming industry. This report will highlight the importance of the industry to the regional economy of the province.

In this independent study, statistics are to be compiled on a community, regional district and province-wide basis. Please respond to the survey to the best of your ability (estimate reasonable values if precise data are not available).

The information which you provide in this survey will be kept strictly confidential. Only aggregates for the total industry will be published.

For Information Contact:

Please provide us with your name and address in case we need to contact you for clarification on any matters.

David Egan or Gordon Gislason

Name _____

The ARA Consulting Group Inc.

Company _____

402-475 Howe Street

Address _____

Vancouver, B.C. V6C 2B3

Tel. (604) 681-7577 Fax. (604) 669-7390

Telephone _____ Fax _____

1. What is the nature of your company's business? _____

2. What was the average number of employees of the business in 1993 (including working owners/parties)?
 What were they paid in 1993?

Class of Worker	Average No. of Workers	Wages & Salaries Paid incl. Benefits
Production/Hourly	_____	\$ _____
Admin/Salaried	_____	\$ _____
Total	_____	\$ _____

3. What were the total sales/revenues of the company in 1993, and what share did sales to the salmon farming industry comprise?

1993 Sales		
To Salmon Farmers	\$ _____	
Other	\$ _____	or What percentage of your total sales in 1993 went to the salmon farming industry? _____ %
Total	\$ _____	

4. Could you provide us with some of your major operating expense items. (Exclude sales taxes from these items.)

Activities	Expense
Raw Materials	\$ _____
Goods for Resale	\$ _____
Fuel, Power, Utilities	\$ _____
Packaging	\$ _____
Other	\$ _____
Total	\$ _____

→
→
→
→
→

% Purchased			
Locally	Rest of BC	Outside BC	Total
			100%
			100%
			100%
			100%
			100%

5. How important is the salmon farming industry to your business? Without salmon farming companies as customers, how would your business change (e.g. scale back, go out of business, seek new markets etc.)

6. Do you have any comments on the role of the salmon farming industry and its suppliers to the economy?
