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Another study
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the cost of
production study

**MARKET ACCESS
AND
PENETRATION STRATEGY
B.C. FARMED SALMON**

FINAL REPORT

The DPA Group Inc.

MARKET ACCESS AND
PENETRATION STRATEGY
B.C. FARMED SALMON

FINAL REPORT

Prepared for:

B.C. Salmon Farmers
Association

Prepared by:

The DPA Group Inc.
and Dr. J. Anderson
and Michael D. Hurst
File: 14487

February, 1987

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CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**

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1.0 STUDY PURPOSE AND METHODOLOGY

1.1 Purpose

Shifts in consumer tastes and preferences have led to an increased demand for seafood. In particular, demand for fresh seafood has been expanding at a faster rate than supply. This trend has stimulated aquaculture development worldwide. Aquaculture is capable of providing a consistent, year-round supply of fresh seafood.

One species that has responded favourably to culturing is salmon. Between 1981 and 1983, world production of all pen-reared salmon, Atlantic and Pacific, doubled from 12,132 to 24,512 tonnes. During this period, approximately 70% of the world production of farmed salmon was produced in Norway, which exports almost all of its production. Approximately 85% of Norwegian exports are distributed fresh on ice; the remainder is either frozen, smoked, or marinated.

In 1982, 20 countries received fresh cultured salmon from Norway. By May of 1985, this number had grown to 32. Recently, the U.S. became the largest importer of farmed salmon, a position previously held by France. Lucrative markets for fresh salmon have encouraged other regions, including B.C., to establish salmon farming and ranching industries. Producers in many of these producing regions are also looking to supply the large U.S. market.

British Columbia producers appear ideally situated to supply the North American market. However, marketing issues have yet to receive sufficient attention in the B.C. aquaculture community. Producers have been primarily concerned with establishing facilities, obtaining supplies of smolts and feed, and mastering the technical aspects of pen-rearing salmon. Market research to date in this area has been general in scope and has focussed on identifying key

parameters such as market size, growth trends, and experience of competitors.

To develop more meaningful market information, the B.C. Salmon Farmers Association (BCSFA) commissioned this study to develop a practical, action-oriented marketing plan for the Association and its members. The BCSFA was incorporated July 11, 1984 under the Societies Act of British Columbia to serve as a producers' organization dedicated to furthering the salmon farming industry and the interests of its members. In November, 1986, the Association membership totalled 72, representing approximately 95% of active salmon farmers in B.C.

Funding for this marketing study was provided under the Canada-B.C. Subsidiary-Agreement on Industrial Development, a joint federal-provincial agreement administered by the Department of Regional Industrial Expansion and the B.C. Ministry of Economic Development.

This study has three primary purposes:

- (1) to examine key demand and supply factors which affect market access and penetration;
- (2) to recommend strategies and methods in production, pricing, distribution, and promotion with a view to maximizing returns to farmed salmon producers;
- (3) to recommend a role for the BCSFA in the marketing area.

1.2 Methodology

The study was conducted in three phases. Phase I involved an analysis of existing marketing studies and production statistics. The objectives were to identify: major potential markets; key demand and supply conditions; factors affecting B.C.'s competitive advantage; and key product attributes that affect buyer's preferences.

Phase II developed the essential elements of a market access

and penetration strategy for the industry. This included an identification of target markets, and an overall product positioning strategy vis-a-vis competitive products. This was followed by recommended strategies for production, pricing, distribution and promotion.

Phase III examined the Association's role in marketing and developed a summary of the marketing plan and implementation schedule. Methodology is described in the following paragraphs.

Phase I

To identify key demand and supply conditions facing the B.C. industry, existing market studies and statistics on salmon aquaculture production were extensively reviewed. One of the primary sources of data for the first phase was a recent study conducted for the Pacific Region of Fisheries and Oceans Canada entitled Conjoint Analysis of the New England Salmon Market, by James L. Anderson. The primary objective of this research was to determine buyer preferences for salmon products in New England. New England was selected for consumer research because consumption of fish in this state, including salmon, is high and Norwegian producers have successfully introduced farmed Atlantic salmon product in that market.

Dr. Anderson extended the original conjoint analysis research in Phase I of the study to identify those market segments where B.C. farmed salmon would be most competitive.

Conjoint analysis treats a product or service as a bundle of attributes. It identifies which attributes are most important in the consumer purchase decision.

The attributes and attribute levels used to define salmon products are outlined in Exhibit 1.1. Combinations of these

EXHIBIT 1.1: ATTRIBUTES AND ATTRIBUTE LEVELS FOR SALMON PRODUCTS

1. Species
 - 1.0 Atlantic Salmon
 - 1.1 Silver (Coho) Salmon
 - 1.2 King (Chinook) Salmon
 - 1.3 Red (Sockeye) Salmon
 - 1.4 Chum Salmon
2. Source
 - 2.0 Canadian
 - 2.1 Norwegian
 - 2.2 New England
 - 2.3 Western US
 - 2.4 Scotland
 - 2.5 New Zealand
 - 2.6 Chile
3. Type
 - 3.0 Farmed (Ocean Pen-Raised)
 - 3.1 Wild, Troll Caught
 - 3.2 Wild, Gillnetted
 - 3.3 Wild, Seine Netted
4. Quality

4.0 Fresh:	Top Quality	- no discoloration in belly flesh - no cuts or scars/no fishy odor - 8+ day shelf life at 32 degrees
4.1 Fresh:	Good Quality	- little discoloration in belly flesh - 1 or 2 minor marks on fish/minor odor - 5-7 day shelf life at 32 degrees
4.2 Fresh:	Lower Quality	- discoloration in belly flesh (10%+) - some cuts or scars/fishy odor - 2-4 day shelf life at 32 degrees
4.3 Frozen:	Top Quality	- no discoloration in belly flesh - no cuts or scars/no fishy odor - 6 month shelf life frozen
4.4 Frozen:	Good Quality	- little discoloration in belly flesh - 1 or 2 minor marks or scars/minor odor - 3 month shelf life frozen
5. Size
 - 5.0 Head-on, Dressed 6-9 lbs
 - 5.1 Head-on, Dressed 9+ lbs
 - 5.2 Head-off, Dressed 4-6 lbs
 - 5.3 Head-off, Dressed 6-9 lbs
 - 5.4 Steaks 8-10 oz
 - 5.5 Portioned Fillets, 8-10 oz
 - 5.6 Portioned Fillets, 6-8 oz
 - 5.7 Head-on, Dressed, Pan sized
6. Colour
 - 6.0 Pale pink
 - 6.1 Pink red
 - 6.2 Deep red
7. Availability
 - 7.0 Consistent Supply May-November Only
 - 7.1 May-November Only with Frequent Shortages
 - 7.2 Consistent Supply Year Round
 - 7.3 Year Round with Frequent Shortages
8. Delivery
 - 8.0 Guaranteed 36 hr from Time of Order
 - 8.1 3-4 Days from Time of Order
9. Minimum Order Quantity
 - 9.0 10 lbs
 - 9.1 20 lbs
 - 9.2 50 lbs
 - 9.3 100 lbs
10. Price
 - 10.0 \$1.25/lb
 - 10.1 \$2.75/lb
 - 10.2 \$3.75/lb
 - 10.3 \$4.75/lb
 - 10.4 \$6.75/lb

attribute levels can be used to create a set of salmon products.

Through survey techniques, buyers in New England ranked and scaled a set of hypothetical salmon products, and then assigned a relative weighting to the importance of each individual attribute. Econometric analysis was then applied to determine a numerical value for each attribute.

By combining the scores of each attribute of a product, composite preference scores for a series of competitive products can be obtained.

The conjoint analysis model was used to evaluate and test a number of assumptions regarding buyer preferences. Specifically, we determined which of 77 competitive salmon products were preferred by three market segments. The segments analyzed were restaurants, fish shops and grocery supermarkets. Restaurants were further divided into four sub-segments.

The 77 salmon products involved various combinations of attributes including species, size, quality, price, product form, and country of origin. The list was composed of salmon products we expect the B.C., Norwegian, and other salmon farming regions, and the wild fishery, to deliver to the North American marketplace over the next few years.

The conjoint analysis model assigns a preference score (0-120) to each product. The major contenders for market share in each market segment are those with the highest scores. This provided one means of determining market segments in which B.C. farmed salmon would be most competitive.

The conjoint analysis model was also used to estimate potential demand for fresh and frozen salmon in North America.

Results from the conjoint analysis were used by Anderson to estimate current and potential demand for fresh and frozen salmon in every U.S. state, and major Canadian regions.

Phase II

The second phase of the study was devoted to a number of specific interviews to fill data gaps identified in Phase I.

We surveyed six salmon smokers in Vancouver and New York to investigate markets for secondary products and conducted several interviews with local representatives of major Japanese trading houses to determine the potential for exports to Japan.

To determine the quantity and nature of future supplies of B.C. farmed salmon, we interviewed eight Association members and five major processors in the traditional fishery. We also investigated future supplies of farmed salmon as well as competitive strategies of other producing countries by analyzing previous studies and interviewing industry experts.

To determine the distribution strategy that would maximize producer returns, we analyzed the seafood distribution system in North America. Our analysis included reviewing previous studies and conducting personal and telephone interviews with 15 fish brokers, wholesalers, and retailers in the major salmon trading centres of Vancouver, Seattle, San Francisco, Los Angeles, and Chicago.

We also analyzed transportation and distribution costs to service each target market identified.

Phase III

The third phase reviewed the results of a two-day workshop on quality control and grading of farmed salmon (sponsored

jointly by the B.C. Ministry of Agriculture and Fisheries and the BCSFA). This review became part of our recommendations with respect to product packaging and promotion strategies. We also examined the structure and promotional campaigns of several other fish farming Associations, including those in Norway, Scotland, Ireland, New Zealand, and the U.S.

In addition, we conducted interviews with the Fisheries Council of B.C. to assess the likelihood of joint promotion.

1.3 Report Organization

The structure of the report is outlined in Exhibit 1.2.

Sections 1.4 and 1.5 provide an introduction to the farmed salmon product and the markets in which it is sold.

Sections 2.0, 3.0, and 4.0 discuss the demand conditions relevant to selling B.C. farmed salmon. Potential export markets worldwide are discussed first (Section 2.0), followed by a detailed assessment of current and potential demand for fresh and frozen salmon by market segment in North America (Section 3.0). Finally, buyer preferences (for characteristics such as size, colour, species, and quality) are discussed for each market segment in Section 4.0.

Section 5.0 focuses on supply conditions. Supplies of salmon from B.C. and other regions are projected for the North American marketplace. Competitive strategies of other regions are discussed. Finally, the supply/demand balance over the short and long term and implications for prices are discussed.

Section 6.0 discusses marketing issues and problems related to marketing fresh seafood in North America. Demand-related, supply-related, and market structure/coordination issues are assessed.

EXHIBIT 1.2: OVERVIEW OF REPORT STRUCTURE

Overview of Product and Markets
(1.4 and 1.5)

Demand Conditions

- . World (2.0)
- . North America (3.0)
- . Preferences by Segment (4.0)

Supply Conditions

- . Projected Supplies by Producing Region (5.0)
- . Supply/Demand Balance (5.0)

Key Marketing Issues and Challenges
(6.0)

Product Positioning and Target Markets for B.C. Farmed Salmon
(7.0)

Product Strategy
(8.0)**Pricing Strategy**
(9.0)**Distribution Strategy**
(10.0)**Promotion Strategy**
(11.0)

BCSFA Marketing Role
(12.0)

Section 7.0 assesses B.C.'s competitive advantages and discusses potential target markets for B.C. production. Overall product and image positioning for the B.C. farmed salmon product is proposed.

Sections 8.0 to 11.0 present specific recommendations for product, distribution, pricing, and promotion strategies for the B.C. industry.

Section 12.0 presents recommendations for the role of the BCSFA in marketing.

1.4 Overview of the Product

World production of salmon in 1983, which is the most recent data available from the Food and Agriculture Organization, is shown in Exhibit 1.3. In 1983, world production totalled 688,522 tonnes. Atlantic salmon accounted for 4% of world production, the majority of which was farmed in Norway. Pacific salmon accounted for 96% of world production. Leading species were pink, chum, and sockeye.

EXHIBIT 1.3: WORLD PRODUCTION OF SALMON BY SPECIES IN 1983^a
(tonnes)

Atlantic		
wild	7,518	1%
farmed	<u>17,795</u>	<u>3%</u>
	25,313	4%
Pacific (wild)		
Chinook	19,784	3%
Chum	188,850	27%
Coho	34,445	5%
Pink	252,830	37%
Sockeye	164,000	24%
Masu	<u>3,300</u>	<u>-</u>
	663,209	96%
Total All Salmon	688,522	100%

^a World production of farmed Pacific salmon is not shown, but is estimated to be less than 1% of total salmon supplies.

Source: FAO Production Statistics (various).

Salmon farming falls into the broad category of aquaculture, which is the controlled cultivation and harvest of aquatic plants and animals. With salmon, a pen-rearing technique is usually employed. This involves raising salmon from smolts in pen or cage enclosures situated in marine locations. The grow-out period can take up to three years, although fish may be harvested within one year after introduction into seapens, depending on market and other conditions.

Three species of salmon are currently being cultured in various parts of the world; all three species are produced by the B.C. salmon farming industry.

The primary species being farmed in B.C. are two Pacific species: chinook and coho. Chinook (also known as spring or king salmon) is generally considered a premium quality salmon and, in the wild, usually weigh between 4 and 20 kilograms. Wild chinook are typically larger than either Atlantics or coho. Wild chinook are distinguished by their red flesh colour. The redness, plus high oil content, have made large chinooks a preferred species in the smoking trade both in Europe and North America.

Coho (also known as silver salmon) are generally available in sizes between 2 and 4 kilograms and have paler red flesh. Their smaller size is preferred in certain market segments.

Sockeye, which is also a premium fish in fresh/frozen form is not farmed due to biological constraints.

Atlantic salmon are also farmed to a small extent in B.C. waters. Atlantics are distinguished by an orange/red flesh colour.

Factors affecting the market for salmon products are complicated by the perception that seafood products are becoming increasingly heterogeneous and differentiated. In addition, markets for salmon are dynamic: new supply regions and the

advent of aquaculture allow consumers to purchase salmon in a variety of forms, sizes, quality levels, and prices.

The typical farmed salmon "product" has a number of distinguishing characteristics which are important in assessing its market potential. These include:

- . It is sold predominantly in a fresh form (dressed, head-on).
- . To date, it has been sold predominantly as a high-value, gourmet item to premium markets where high prices can be commanded (e.g., white table cloth restaurants).
- . It has a reputation in the trade for high quality, largely because it has a longer shelf life than wild products and has an excellent physical appearance (i.e., no cuts or bruises).
- . It is uniformly and consistently sized.
- . It has consistent prices.
- . It is potentially available year round, especially during the November-April period when no fresh wild-caught salmon are available.

Production forecasts for the B.C. salmon farming industry are shown in Exhibit 1.4.

EXHIBIT 1.4: PRODUCTION FORECASTS FOR THE B.C. SALMON FARMING INDUSTRY

Year	Tonnes
1986/87	1,000 ^a
1987/88	2,500 ^a
1988/89	10,000 ^a
1989/90	13,000 ^b
1990/91	16,000 ^b

Source: ^a B.C. Salmon Farmers Association.
^b The DPA Group Inc., Industrial Organization of The B.C. Salmon Farming Industry, 1986.

As shown in the exhibit above, production is projected to increase significantly during the next five years. In particular, substantial increases are projected for 1988.

There is considerable uncertainty about production estimates because of the newness of the industry and the uncertainty of the survival rates.

1.5 Potential Markets

Markets for salmon are actually a series of interrelated markets that currently consume a variety of species from different sources and in different product forms. For example, shortages of supplies of frozen sockeye from the U.S. and Canada in 1986 resulted in strong demand for frozen coho in Japan. B.C. farmed salmon therefore is not sold in a vacuum but in a complex market.

Most market analyses of farmed salmon focus on its consumption in a fresh and frozen form in two distribution channels:

- . the hotel, restaurant, and institutional (HRI) trade;
- . the retail sector, composed of grocery stores and specialty fish shops.

The importance of each market differs considerably by country. For example, the smoking trade is a more important outlet for farmed salmon in Europe than in North America.

Canned salmon, one of the predominant salmon product forms in North America, is not usually included in market potential analysis for farmed salmon because of lower selling prices. Canned salmon utilizes sockeye and lower-valued species of Pacific salmon other than those farmed (i.e., chum and pink, rather than chinook and coho).

Two further distinctions with respect to salmon markets are useful when investigating farmed salmon potential. The first relates to the fresh/frozen question. Much of the data on the consumption and trade of salmon combine statistics on fresh and frozen salmon. It is useful to separate the two forms for a number of reasons. First, the majority of farmed salmon is sold in a fresh form and the consumption of fresh salmon is the fastest growing segment of total seafood consumption. Second, the competitive circumstances for fresh salmon may differ from those for frozen salmon. For example, fresh salmon does not compete with frozen salmon in certain segments of the HRI trade such as expensive seafood restaurants. Rather, it competes with other forms of fresh seafood.

The second distinction relates to individual species. Farmed chinook and coho primarily compete with their wild-caught counterparts and farmed Atlantics. These three groups of species command premium prices and are considered higher quality than chum and pink salmon.

Section 2.0 presents an overview of the major potential markets for B.C. farmed salmon. Unless otherwise stated, all dollars shown are expressed in U.S. dollars.

2.0 WORLD MARKETS FOR B.C. FARMED SALMON

2.1 Introduction to World Markets for Fresh and Frozen Salmon

The main market areas for salmon are Japan, Europe, and North America. Within Europe, the four largest markets are France, the U.K., West Germany, and Sweden. Smaller markets also exist in South Africa, Hong Kong, and Singapore.

Fresh and frozen salmon consumption by principal consuming countries is provided in Exhibit 2.1. As indicated in the exhibit, Japan has the largest per capita consumption of salmon. Japan consumes over 5 times as much salmon as the U.S. The U.S., in turn, consumes more fresh/frozen salmon in total than all of the principal salmon-consuming European countries combined.

EXHIBIT 2.1: CONSUMPTION OF FRESH/FROZEN SALMON IN 1983

	Consumption (tonnes)	Per Capita Consumption (kg)
	273,	2.33
North America		
U.S.	52,700	0.23
Canada	12,100	0.50
Europe		
France	21,100	0.39
U.K.	10,600	0.19
Sweden	6,800	0.82
Denmark	6,200	1.21
West Germany	5,300	0.09
Total	388,400	
% of Total Salmon Production		
Worldwide (including canned)	56%	
Source: derived from FAO statistics.		

The main trading flows for fresh and frozen salmon of all types are shown in Exhibit 2.2. The exhibit provides further indication of the major consumption areas and the major sources of supply for salmon.

A significant trend occurring in the 1980s is the increase in consumption of fresh salmon. This trend is shown graphically in Exhibit 2.3, where the average annual percentage increase of imports of fresh salmon are compared to those for frozen salmon in major markets from 1981 to 1984. Fresh salmon imports have increased at a much faster rate than frozen salmon imports in each major market.

This trend results largely from the increased production of Norwegian farmed salmon as evidenced by the increased market share of fresh imports held by Norway in major markets. Norway now holds the largest share of fresh imports in each major market. In contrast, the market shares of frozen imports held by the U.S. and Canada have remained relatively static.

2.1.1 Japan

Japan is the world's largest salmon market and the largest importer. It currently consumes more than five times as much fresh and frozen salmon as the US, the next largest consumer.

In recent years, Japan's high seas catch has declined and imports have increased, from 8,300 tonnes in 1974 to 116,000 tonnes in 1985. This large increase is due to the loss of access to foreign fishing grounds as a result of the establishment by several countries of 200-mile fish zones in 1977. However, imports have also increased as a result of a growing demand for salmon by increasingly affluent Japanese consumers, and more favourable exchange rates. Moreover, domestic production is mostly chum and therefore, Japan must rely on U.S. and Canadian imports of sockeye to satisfy a large domestic demand for this specie. Japan's domestic

EXHIBIT 2.2: TRADING FLOWS FOR FRESH/FROZEN SALMON IN 1984

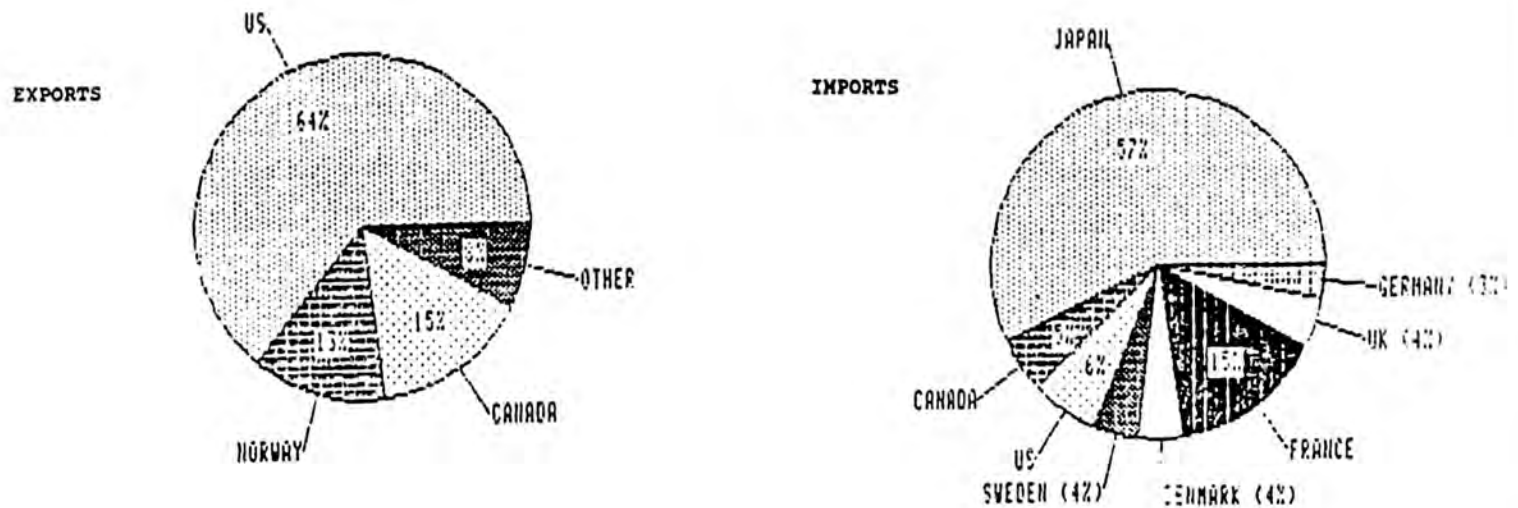
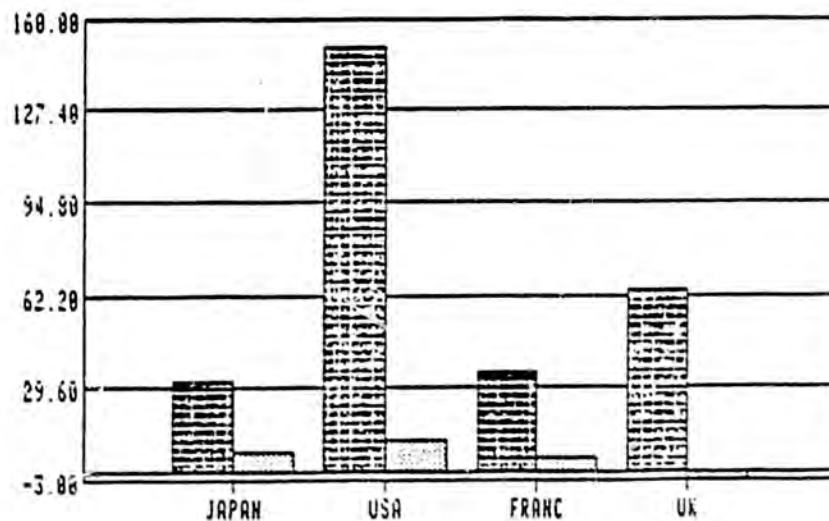


EXHIBIT 2.3: AVERAGE ANNUAL INCREASE IN IMPORTS OF FRESH SALMON IN MAJOR MARKETS (1981-1984)



FROZEN
 FRESH

production of fresh/frozen salmon in 1983 was 178,000 tonnes, 75% of which was chum. Imports of fresh/frozen salmon were 90,000 tonnes, mostly sockeye from the U.S.

Salmon farming has also begun in Japan. Pen-raised coho production increased from 72 tonnes in 1978 to 6,430 tonnes in 1985. Production in 1985 represented about 2% of total salmon supplies.

The Norwegians have introduced farmed Atlantic salmon to Japan. Imports of fresh salmon from Norway in 1985 were 281 tonnes. Japan also imported approximately 11 tonnes of farmed salmon from the U.K. in 1985.

Despite the huge size of the Japanese market for farmed salmon, only limited penetration has been achieved by European exporters. Reasons for this include:

- . Traditionally, Japanese consumers have favoured salted and smoked salmon over fresh salmon.
- . Prices for imported farmed salmon are considerably higher than for other imports.
- . Atlantic salmon, which has a different flavour and colour than Pacific species, is not indigenous to Japan.

2.1.2 Europe

France

France is the largest salmon market in Europe. Salmon demand in France is growing steadily, particularly for fresh product. France is considered a species-conscious, well informed market where Pacific chinook and coho and Atlantic salmon have strong, established market positions. Canada is a significant supplier of wild frozen salmon to French smokers, accounting for 35% of frozen imports in 1984.

However, Canada's market share is showing signs of eroding, mainly due to declining catches. Also there is some substitution of farmed Atlantic salmon for frozen Pacific salmon occurring, particularly with smokers using coho. Farmed salmon offers attractive features to smokers such as lower inventory costs and higher yields. In contrast, chinook is likely to maintain its market niche because of its large size and high oil content.

Further market penetration by farmed Atlantics will depend very much on price. The fresh sector is also mature and well developed, and price will be important in determining future market developments. Large rainbow trout are particularly strong competitors in lower weight classes (1-3 kilograms).

In such a price sensitive market, the potential for fresh B.C. farmed salmon in France is severely limited by transportation cost disadvantages and poor proximity to market vis a vis Norwegian and U.K. production.

United Kingdom

Generally the U.K. is considered a primary market for canned salmon as well as a large market for fresh and frozen salmon. The U.K. salmon market has been expanding, due largely to a growing farmed salmon industry concentrated in Scotland. Production of U.K. farmed Atlantic salmon has increased from 600 tonnes in 1980 to 3,900 tonnes in 1984.

In recent years, Scottish farmed salmon and imports of Norwegian farmed salmon have eroded the market share held by frozen Pacific salmon. In particular, farmed salmon has replaced some of the position previously held by frozen Pacific salmon in smoking markets. A major factor affecting this has been the value of the U.S. and Canadian dollar relative to the British pound and the Norwegian kroner.

Other European Countries

Historically West Germany has been a low consumer of salmon. It imported and consumed about 5,500 tonnes of fresh/ frozen salmon in 1984. However, as in most other European countries, fresh Norwegian salmon consumption is increasing rapidly.

Denmark is a major centre for salmon smoking. However, most imports of fresh/frozen salmon from Norway, the U.S. and Canada are processed into smoked form, and exported. Imports were about 7,400 tonnes and exports were 5,500 tonnes in 1984. As a result, consumption in Denmark is low at about 1,900 tonnes in 1984. As in France and the U.K., farmed Atlantic salmon is increasingly being used by smokers.

Due to the increasingly entrenched position of European farmed salmon producers, it is unlikely that market penetration of farmed Pacific salmon could be easily obtained.

2.1.3 North America

United States

The market for fresh and frozen salmon in the U.S. in 1984 is shown in Exhibit 2.4. Domestic production of fresh and frozen salmon formed about 93% of the total available supply in 1984. However, only about 32% of this total was consumed in the U.S.; the majority of frozen salmon production was exported. The remainder of supplies were imported from the following sources:

- . 94% of the fresh imports of farmed salmon were from Norway in 1984. Small quantities were also imported from the U.K., Canada, and Chile.
- . 93% of imports of fresh wild-caught salmon were from

Canada in 1984. Chinook salmon constituted about 30% of these imports.

. Frozen imports of salmon were nearly all from Canada in 1984.

EXHIBIT 2.4: THE US MARKET FOR FRESH AND FROZEN SALMON IN 1984^a

IMPORTS			DOMESTIC	
Fresh Imports (farmed)	Fresh Imports (wild)	Frozen Imports	Fresh Domestic Production	Frozen Domestic Production (wild)
5,200 ¹	2,600 ¹	3,900 ¹	14,000 ²	139,800 ²
Total Available Supply				
165,500				
Exports (Frozen) ³			Fresh/Frozen Consumption	
102,600			62,900	

^a All figures are rounded.

Sources:

1. U.S. Department of Commerce.
 2. DPA estimates derived by aggregating catch statistics from Alaska, Washington, Oregon and California.
 3. FAO.
-

Canada

The Canadian market for fresh and frozen salmon consumed approximately 14,000 tonnes in 1984, the vast majority of which was wild-caught Pacific salmon from B.C. Despite being one of the largest producers of salmon in the world, Canada's per capita consumption of salmon is not high relative to many other industrialized countries.

Canada's market is also geographically dispersed. The largest markets are in large urban centres. As a result, demand is greatest in Central Canada. Although official statistics are not available for total per capita consumption of salmon by province, per capita consumption in B.C. is likely much higher than the rest of Canada. Recent surveys conducted by DFO on the number of fish caught by sport fishermen suggest that per capita consumption of salmon in B.C. is as high as in Japan.

Currently, Fisheries and Oceans Canada requires that imports from Europe of dead salmonids be certified free of two diseases: whirling disease and viral hemorrhagic septicemia (VHS). As of January, 1987 only one farm in Norway and two farms in Scotland produced farmed salmon with this certification. As a result, very little Norwegian and Scottish farmed salmon is imported into Canada. B.C. producers should therefore face less competition in the Canadian market than in the U.S.

The market for fresh and frozen salmon in Canada is segmented similar to that in the U.S., a factor discussed in detail in Section 3.0.

2.1.4 Overall Prospects for B.C. Farmed Salmon

Japan represents a huge potential market for B.C. producers, but the short-term potential for B.C. farmed chinook and coho salmon is limited. This conclusion was reached from interviews with representatives of four Japanese trading companies in Vancouver. (More detailed findings from these interviews are presented in Section 6.0.) The limited potential is due to the Japanese preference for deep red salmon (which farmed chinook and coho have yet to attain), the relatively high cost of B.C. farmed salmon, and the current limited consumption of fresh salmon.

Salmon has a high quality image in European countries, and markets for fresh salmon will continue to grow because of rising per capita incomes and existing low per capita consumption levels. However, some market analysts feel that further growth in demand will depend on decreases in the real price of Atlantic salmon. A recent University of Stirling study concludes that a price decline of 20-30% at the retail level would be sufficient to absorb the expected doubling of Atlantic farmed salmon supply by 1990.

B.C. farmed salmon producers would have great difficulty successfully competing in Europe because the competitive position of producers of farmed Atlantic salmon is very strong, due to proximity to markets and changing preferences toward Atlantics. European prospects for B.C. farmed salmon are not expected to improve given anticipated real price declines for Atlantic salmon. Significant air transportation costs will probably lead to uneconomic prices at the B.C. producer level.

At present, North America represents the largest, most immediate market for B.C. farmed salmon. In particular, the U.S. marketplace has the greatest potential for sales. For this reason, our research efforts concentrated on that market. The following section describes the North American market for fresh and frozen salmon in more detail, providing estimates of current and potential demand by principal market segment and region.

3.0 CURRENT CONSUMPTION AND POTENTIAL DEMAND FOR FRESH AND FROZEN SALMON IN NORTH AMERICA

This section describes the current size of the fresh and frozen salmon market in North America by region and market segment and presents the results of the conjoint analysis indicating the growth potential of each segment.

3.1 Current Consumption

No statistics are available on the amount of fresh salmon consumed in the U.S. and Canada; nor is there much data on the quantity of fresh or frozen salmon shipped into food service and retail markets.

We used two approaches for estimating current consumption. Both yielded similar results. One estimate of total consumption can be derived from analysis of catch and other statistics, as shown in Exhibit 3.1. Consumption in the U.S. is calculated as a residual amount. In contrast to the U.S., Canadian production of fresh/frozen salmon is actually compiled. (Only B.C. production totals are included in the Canadian total because Atlantic production is nominal.)

EXHIBIT 3.1: SIZE OF THE NORTH AMERICAN FRESH AND FROZEN SALMON MARKET IN 1985 (TONNES)

	U.S. ¹	Canada	Total
Total Salmon Catch	329,815	38,158 ²	
Less: Exports	(151,172)	(23,698) ³	
Less: Canned pack	(112,616)		
Plus: Imports	14,474		
Changes in Inventory	<u>10,293</u>	<u> </u>	<u> </u>
Apparent Consumption	70,208	14,460	84,668

Sources: 1. National Marine Fisheries Service.
 2. B.C. Ministry of Environment and Parks.
 3. Statistics Canada.

The size of the market can also be estimated by extrapolating Anderson's conjoint analysis results to the rest of North America. Using this method, the size of the fresh/frozen market is estimated at 86,200 tonnes. This figure is within 4% of the estimate in Exhibit 3.1. A further advantage of Anderson's market estimate is that it provides a detailed breakdown by both market segment and geographic area.¹

Size of Segments

A summary of current consumption in the U.S. in 1985 by segment is shown in Exhibit 3.2. The quantities shown are estimates only; actual quantities will vary somewhat due to idiosyncrasies in various markets.

As indicated in the exhibit, restaurants comprise the largest segment for fresh/frozen salmon. The split shown in Exhibit 3.2 is generally consistent with splits determined in other recent studies of the U.S. market, which are summarized in Exhibit 3.3. The percentage sold in each segment as identified in the Ference and Lin studies are based on surveys of wholesalers; the Oslo and Woods Gordon percentages are estimates only.

EXHIBIT 3.2: CONSUMPTION BY SEGMENT IN THE U.S. IN 1985

	Tonnes	% of Total
Food Service		
Restaurants	43,200	60%
Retail		
Grocery Supermarkets	14,100	19%
Fish Markets	<u>15,400</u>	<u>21%</u>
Total	72,700	100%

Source: The DPA Group Inc. and J. Anderson

EXHIBIT 3.3: PERCENTAGE OF CONSUMPTION IN RETAIL VS FOOD SERVICE SEGMENTS IN THE U.S.

	DPA (1985)	Ference ¹ (1986)	Rogness ² & Lin (1986)	Oslo ³ (1986)	Woods ⁴ Gordon (1983)
Food Service	60	45	59	55	50
Retail	<u>40</u>	<u>55</u>	<u>41</u>	<u>45</u>	<u>50</u>
	100	100	100	100	100

Sources:

- 1 Don Ference & Associates Ltd., B.C. Indian Aquaculture Study - Market Potential for Farm Salmon Products, B.C. Aboriginal People's Fisheries Commission, June 1986.
 - 2 R.V. Rogness, B. Lin The Marketing Relationship Between Pacific and Pen-raised Salmon: A Survey of U.S. Seafood Wholesalers, University of Alaska, Alaska Sea Grant Report 86-3, September, 1986.
 - 3 E. Dale, J. Owens, A. Stenseth: Tilling the Sea - Prospects for Norwegian Aquaculture, Royal Norwegian Council for Scientific and Industrial Research, July, 1986.
 - 4 Woods Gordon, U.S. Market Opportunities for Farmed Atlantic Salmon, New Brunswick Commerce and Development, October, 1983.
-

An analysis of production statistics for fresh wild-caught salmon from B.C. and Alaska and the level of imports of fresh farmed salmon indicate that total consumption of fresh salmon varies between a quarter and one-third of the total fresh/frozen salmon. This is confirmed by results of the survey of wholesalers conducted in the Ference study.

Exhibit 3.4 shows an estimate of fresh and frozen salmon production by species in 1984. Estimates were developed from a breakdown of B.C. wild and farmed salmon production and imports of farmed Atlantic salmon in 1984. As indicated in the exhibit, two-thirds of total production is frozen. Production of coho is highest, and is mostly frozen. Production of coho and chinook constitutes 40% of the total market. Atlantic production constitutes 11%. The majority of Atlantic is sold fresh.

**EXHIBIT 3.4: PERCENTAGE OF FRESH AND FROZEN SALMON
PRODUCTION BY SPECIES IN 1984¹**

	Frozen	Fresh	Total
Coho	22%	5%	27%
Chum	17%	6%	23%
Sockeye	12%	3%	15%
Chinook	7%	6%	13%
Pink	8%	3%	11%
Atlantic	<u>1%</u>	<u>10%</u>	<u>11%</u>
	67%	33%	100%

- 1 A breakdown for 1984 is shown because more recent statistics on fresh production from Alaska were not available.

Source: DPA Group Inc.

Atlantics, chinook, coho, and sockeye compete at the upper end of the market, as would premium quality farmed salmon products. Chums and pinks, which constitute 34% of the market, are at the lower end of the price scale. Lower quality farmed salmon products would compete in this category.

According to FAO statistics, approximately 10% of current supplies of frozen salmon production are further processed into smoked salmon.

3.1.1 Regional Demand

A summary of current demand in North America by region is shown in Exhibit 3.5. The results are extensions of Anderson's survey of buyers conducted in the spring of 1986 which reflects consumption during the June, 1985 to June, 1986 period.

As indicated in the exhibit, the U.S. represents 84% of total North American demand. Demand is highest in the Mid Atlantic region, followed by the Pacific and South Atlantic regions. Combined, these three regions represent 61% of the U.S.

demand and 52% of the total North American demand. A detailed breakdown of the U.S. market by state is included in Appendix B. As indicated in the appendix, the majority of demand in the Mid Atlantic regions is in New York and the majority of demand in the Pacific region is in California.

Canada represents 16% of total North American demand. Ontario and Quebec account for 62% of Canadian demand and 10% of North American demand. B.C., with a small population compared to other regions, accounts for only 2% of total demand.

Some differences in the relative size of segments also exist between Canada and the U.S. Canada has a higher proportion of sales to restaurants than the U.S. Also, more sales are made to grocery chainstores than to fish markets in Canada.

EXHIBIT 3.5: EXISTING REGIONAL CONSUMPTION FOR FRESH/FROZEN SALMON IN NORTH AMERICA IN 1985 (TONNES)

	Restaurants	Grocery Supermarkets	Fish Markets	Total	% of Total
US					
New England	4,600	1,000	2,500	8,200	10%
Mid Atlantic	9,000	3,300	5,000	17,300	20
NE Central	5,500	1,500	700	7,700	9
NW Central	1,100	400	100	1,600	2
SO Atlantic	5,600	2,900	3,000	12,000	14
SE Central	2,600	1,200	1,000	4,800	6
SW Central	2,700	1,400	500	4,700	5
Mountain	700	300	100	1,100	1
Pacific	10,900	2,000	2,400	15,300	18
	<u>43,200</u>	<u>14,100</u>	<u>15,400</u>	<u>72,700</u>	<u>84%</u>
	60%	19%	21%		
Canada					
B.C.	1,000	300	200	1,500	2
Prairies	1,600	500	300	2,400	3
Ontario	3,200	1,000	600	4,800	6
Quebec	2,300	800	400	3,500	4
Maritimes	800	300	200	1,200	1
	<u>8,900</u>	<u>2,900</u>	<u>1,700</u>	<u>13,500</u>	<u>16%</u>
	66%	22%	12%		
Total	52,100	17,000	17,100	86,200	100%
	60%	20%	20%	100%	

Source: The DPA Group Inc. and J. Anderson

3.2 Potential Demand

The conjoint analysis model can be used to predict growth by segment based on the availability of preferred products. In the model, preference, price, and demographic variables, such as changes in population and per capita income, are held constant. The model predicts additional quantities demanded as a result of perfect supply availability of most preferred salmon products. These were comprised of the highest-ranked products from the list of 77 we assumed would be available from a variety of farmed and wild salmon supply regions, including B.C. In effect, the buyers in the sample were asked how much more salmon they would buy at current prices if their preferred salmon products were available.

The growth potential for each segment is shown in Exhibit 3.6.

EXHIBIT 3.6: GROWTH POTENTIAL BY SEGMENT

	Existing Shares	Growth Potential	Potential Shares
Food Service: Restaurants	60%	42%	55%
Retail:			
Groceries/Supermarkets	20%	109%	27%
Specialty Fish Stores	<u>20%</u>	<u>43%</u>	<u>18%</u>
Total	100%	<u>overall</u> 57%	100% (157% of 1985) at current prices

As indicated above, good growth potential exists in all segments. The largest growth opportunity is in the grocery supermarket segment, but it is at present the smallest segment. Overall growth potential for all segments is 57%.

Potential demand by region for existing production is shown in Exhibit 3.7. The results are extrapolated from New England

survey data and modified to account for per capita consumption by region; the exception is Canada where per capita consumption by province is not known.

EXHIBIT 3.7: POTENTIAL REGIONAL DEMAND FOR FRESH/FROZEN SALMON IN NORTH AMERICA

	Restaurants	Grocery Supermarkets	Fish Markets	Total
US				
New England	6,600	2,200	3,600	12,400
Mid Atlantic	12,800	6,900	7,100	26,800
NE Central	7,900	3,000	1,100	12,000
NW Central	1,600	900	100	2,600
SO Atlantic	8,500	6,100	4,400	18,900
SE Central	3,800	2,500	1,400	7,600
SW Central	3,900	3,000	700	7,600
Mountain	900	700	200	1,800
Pacific	<u>15,600</u>	<u>4,200</u>	<u>3,500</u>	<u>23,200</u>
	61,400	29,400	22,100	113,000
	54%	26%	20%	
Canada				
B.C.	1,400	700	300	2,400
Prairies	2,000	1,100	400	3,700
Ontario	4,500	2,200	900	7,600
Quebec	3,300	1,600	600	5,500
Maritimes	<u>1,100</u>	<u>500</u>	<u>200</u>	<u>1,800</u>
	12,600	6,100	2,400	21,000
	60%	29%	11%	
Total	74,000	35,500	24,500	134,000
	55%	27%	18%	
	21,900	18,500	7,400	47,800

Source: The DPA Group Inc. and J. Anderson.

As shown in the exhibit, existing and unfulfilled (or latent) demand in North America for fresh/frozen salmon is estimated to be 134,000 tonnes. When unfulfilled demand is included with existing demand, restaurants still represent the largest market segment. However, the percentage sold in restaurants decreases from 60% to 55%. The percentage sold in grocery supermarkets increases from 20% to 27%. The percentage sold in fish markets decreases from 20% to 18%.

3.3 Summary and Implications of Demand Projections

There appears to be considerable scope to increase consumption of fresh and frozen salmon in North America without dramatic shifts in determinants of demand such as prices or preferences. The analysis presented above suggests that potential demand for fresh/frozen salmon could increase by more than 50% if supply of preferred salmon products were consistently available.

It also implies that restaurants will remain a large, important market outlet for fresh salmon. Although the expected growth rate in the grocery/supermarket sector is by far the largest, it presently handles only 20% of demand.

Further implications of these results on the overall demand/supply balance, prices, and the design of strategies are discussed in later sections.

FOOTNOTES

1. The components used to estimate aggregate demand using Anderson's sample results are shown below.

Current demand by segment (New England)	X	Adjusted No. establishments by segment in each state	X	Adjustment factor for variations in regional per capita consumption	=	Aggregate Demand
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The current demand by segment was derived from Anderson's survey of buyers (see Appendix A). Weekly demand adjusted for demand differences in summer and winter by segment was multiplied by 52 to estimate annual demand. The number of establishments by sector in each state was determined from the 1986 edition of American Business List Inc. This publication contains current yellow page listings of the total number of establishments by state and province. An adjustment was

made to the food store totals: only one-third of the total food stores was assumed to be grocery supermarkets, which effectively eliminated food convenience stores. An adjustment was also made to restaurant totals to capture those most likely to use salmon. Based on Anderson's New England sample, only 32% of all restaurants had salmon on their menus. (The remainder were fast food/coffee shops, ethnic restaurants, bars, or firms out of business.)

An adjustment factor for variations in regional per capita consumption of finfish was included in the calculation because per capita fish consumption in New England is higher than in other regions. The most recent national fish consumption survey conducted in the U.S. by the National Marine Fisheries Service was used.

4.0 BUYER PREFERENCES BY MARKET SEGMENT

This section discusses North American buyer preferences for fresh and frozen salmon. The product characteristics or attributes considered the most important by the restaurant and retail market segments are discussed. Then the results from Anderson's conjoint analysis are extended to analyse the extent to which B.C. farmed salmon products might be more (or less) preferred in each market segment compared to competing wild and farmed products. This indicates what types of B.C. farmed products are likely to be the most competitive in each market segment.

The results of this analysis are used later in developing recommended product and promotion strategies.

4.1 Purchase Criteria

Any salmon product can be viewed as a bundle of attributes or characteristics. Species, size, colour, product form, quality level, price, country of origin, and availability are examples of the features buyers may consider important in their purchase decision. The important attributes differ across market segments. For example, retail segments are very price conscious and concerned about consistent availability; white table cloth restaurants are more concerned with freshness, quality and size. The key to an effective marketing strategy is to match (or adapt) product characteristics with the demands of particular market segments. Extending the above examples, this strategy means not marketing high cost, 12-pound chinook available only six weeks a year to the retail segment. Similarly, inexpensive two to four pound early maturing coho should not be sold to upscale seafood restaurants.

This section summarizes the results of recent market research with respect to the most important product attributes in each

market segment. This is useful in several ways. First, comparing these characteristics with expected B.C. supply over the next five years will indicate the most promising opportunities. Second, it suggests the important characteristics that should be stressed in product promotion. Third, it indicates features that could be incorporated in future product design, an important point. Control over the product gives salmon farmers the ability to modify or change their products to meet changing market demands.

The following paragraphs describe the general characteristics of the restaurant and retail segments and the characteristics of the salmon product considered most important by buyers in each segment. The purchase criteria of brokers/ wholesalers are also discussed.

One point needs to be qualified before reviewing current market research. This research identifies product preferences as they exist today. Tastes and preferences change over time, and can be modified by advertising and promotion. This points to the need to continually monitor tastes and preferences in the marketplace. However, the information is based primarily on Anderson's research in 1986 and in New England which is considered ahead of other areas in terms of seafood consumption trends. The results are therefore indicators of general trends in North America.

4.1.1 The Hotel, Restaurant, and Institutional (HRI) Trade

General Characteristics

This segment absorbs approximately 60% of all fresh and frozen salmon sales. The segment is broadly split between three groups: the fast food industry; the low-priced coffee shop, cafeteria, and institutional trade; and medium to high-priced family and fine dining restaurants. Although approximately 35% of all fish sales are made to the first two sub-segments, only about 10% of this total is salmon. These

sub-segments are highly price conscious, and therefore purchase only lower-priced salmon. As a result, about 90% of salmon sales to this segment are to medium and high-priced restaurants.

Anderson's conjoint analysis further separates the medium to high priced restaurant segment into four categories:

Type of Restaurant	Average Price of Entrees
Seafood	
Expensive	>\$11.30
Non-expensive	<\$11.30
Non Seafood	
Expensive	>\$11.30
Non-expensive	>\$11.30

As will be shown, each type of restaurant has different preferences when purchasing salmon.

Restaurants usually operate with fixed menus, and therefore require reliable supplies. Because fish supplies are generally less reliable than meat or poultry, markups on fish tend to be higher. Chefs tend to do the buying for restaurants. Several suppliers typically supply all seafood requirements.

One of the important features of the HRI segment is the diverse and decentralized purchasing of products. Even large hotels and restaurants that are part of a chain typically buy fish locally from a wholesale outlet.

Gourmet restaurants have strong preferences for fresh fish which generally override their preference for particular species, and many do not substitute between fresh and frozen salmon. As a result, the main competitive products for B.C. farmed salmon will be other sources of farmed salmon, wild fresh salmon in the June-October period, and other premium-priced seafood items (e.g., swordfish, halibut, lobster, crab etc.).

Purchase Criteria -- HRI Sector

The most preferred combination of product attributes for each segment of the HRI sector are shown in Exhibit 4.1. These are largely based on conjoint analysis carried out by Anderson, supplemented with information from other sources (e.g., Ference 1986). A brief interpretation of the findings presented in Exhibit 4.1 follows.

The two most important purchase criteria in the restaurant segment are **fresh** (as opposed to frozen) product and **overall quality level**. These will probably not come as a surprise to anyone in the salmon farming business. The importance of a fresh product, however, has some critical implications that may not be obvious. For example, freezing a farmed product will greatly reduce its market attractiveness. The short product life of a fresh, perishable item means that orderly production scheduling and efficient distribution are all important if maximum producer returns are to be achieved.

Although fresh salmon is generally preferred, it depends on its expected shelf life (which is a proxy for quality). For example, inexpensive non-seafood restaurants prefer a frozen, top quality (6-month shelf life) product to a low or medium quality (3-4 day shelf life) fresh product. This is consistent with the fact that fast food and inexpensive restaurants often use frozen products because of ease of handling and more consistent supply and prices.

With respect to **type** (wild vs farmed), wild-caught salmon are preferred to farmed salmon in most market segments. This is a significant finding with regard to promotion programs.

With respect to other purchase criteria, **product form** is important. The importance of product form (which incorporates both size class and product type -- whole, head on/off, fillet or steak) has significant implications for marketing strategy. Each restaurant type exhibited different

EXHIBIT 4.1: SALMON PRODUCTS MOST LIKELY TO BE HIGHEST SCALED: RESTAURANTS

	Seafood Entree > \$11.30	Seafood Entree ≤ \$11.30	Non Seafood Entree > \$11.30	Non Seafood Entree ≤ \$11.30
Species	Chinook (King)	Atlantic Sockeye or Chinook	Atlantic or Coho	Sockeye or Coho
Country of origin	Western U.S.	Norway	Norway (Not West U.S.)	Norway (Not New England, Chile or Canada)
Type (wild vs farmed)	Indiff.	Wild	Wild	Wild
Fresh/Frozen	Fresh	Fresh	Fresh	Fresh
Quality	Top Quality (n.s.)	Top Quality	Top Quality	Top Quality
Shelf Life	8+ days (n.s.)	8+ days	8+ days	8+ days
Product Form	Whole, head-on or head-off	Whole, head-off, fillets	Whole, head-off	Steaks or fillets
Weight	9+ lbs.	9+ lbs. (8-10 oz.)	9+ lbs.	8-10 oz.
Color	Indiff. (n.s.)	Indiff. (n.s.)	Indiff. (n.s.)	Indiff. (n.s.)
Yr. Rd./Seasonal	Indiff. (n.s.)	Indiff. (n.s.)	Seasonal	Indiff. (n.s.)
Consistent/Shortages	Consistent	Consistent	Indiff. (n.s.)	Consistent
Delivery Time	3-4 days	Indiff. (n.s.)	Indiff. (n.s.)	Indiff. (n.s.)
Minimum Order	10 lbs.	10 lbs.	10 lbs.	10 lbs.
Price	low as possible	market (n.s.)	above market	market (n.s.)

* (n.s.) = not significant

Source: Anderson (1986)

preferences in this regard.

The expensive seafood restaurants preferred large (6-9 or 9+ lbs) head-on fish, while less expensive seafood and non-seafood restaurants prefer a pre-cut (fillet or steak product), presumably for convenience, portion control and ease of preparation. Filleting and/or steaking before export may not be feasible unless sales are direct to retailers and/or restaurants because of lower shelf life and problems with quality assurance (i.e. quality of a whole fish is easier to detect). At the very least, more cutting and pre-packaging of fish at the wholesaler distributor level needs to be further explored as a means of increasing market share. Pre-cut fresh fish definitely appears to be a trend of the future that other producer countries are seriously examining.

With respect to **species**, the most significant preference ranking existed in the expensive restaurant class, where chinook were strongly preferred. Most of the other three restaurant sub-segments were relatively indifferent among species, perhaps due to general lack of experience and familiarity with salmon. To these groups, the marketing adage "a salmon is a salmon is a salmon" might best apply. This means initially that Pacific salmon species will have no particular positive or negative image vs Atlantics among these market segments.

Colour is a controversial attribute in salmon marketing. Anderson's research indicates that it is a relatively insignificant factor in the salmon purchase decision among Eastern US buyers. This contradicts the conventional wisdom of salmon marketing on the Pacific Coast which has operated under the familiar "the redder, the better" adage in terms of flesh colour. Further discussion with US fish brokers during the study provides the following insights with respect to the issue.

First of all, it appears that flesh colour is used as an

indicator of overall product quality and value, especially in Western U.S. markets familiar with Pacific salmon species. It appears most critical that the flesh colour not be pale pink, or have a bleached, whitish appearance. Achieving a deep red flesh colour may be useful in visually differentiating the B.C. product from its paler Norwegian Atlantic counterpart.

Minimum order size emerged as an important purchase criterion in the restaurant segment. To a large extent, this attribute is controlled at the distributor/wholesaler level. From the buyers in the restaurants' perspective, the smaller the weekly order, the better. While the economics of distribution determine the ability of distributors to satisfy this requirement, it is nonetheless a product characteristic that should be discussed with distributors.

One attribute not possible to accurately evaluate in Anderson's research was taste. Taste preferences among individual consumers will vary widely. Several industry observers contended that the farmed product to date is characterized by a milder, blander taste than its wild counterpart. There were dissenting opinions on the effect of this on marketing success. Some felt that it would make it difficult to market to traditional salmon consumers. Others felt that its milder flavour would increase its likelihood of acceptance among the growing numbers of new salmon (and fish) consumers.

4.1.2 Retail Segment (Grocery/Supermarket and Specialty Fish Stores)

General Characteristics -- Grocery/Supermarket

Sales to this segment represent approximately 20% of all fresh/frozen salmon sales in North America. Fresh/frozen and canned fish products are normally sold separately in grocery stores in separate sections. Fresh seafood counters are a

recent innovation in major chain stores. They have been one of the most successful of the specialty shop/counters now found in many grocery stores and the larger, one-stop superstores.

Supermarket chains utilize centralized ordering and warehousing facilities. They also generally establish listed products, which will be warehoused at a central location. The individual store managers then generally select products from this list. Although fresh fish may not be purchased in this fashion, grocery chain stores may offer the advantage of more centralized buying points, relative to other segments.

General Characteristics -- Specialty Fish Stores

Fish stores, on average, represent 20% of the fresh and frozen salmon market in North America. Retail fish shops represent a knowledgeable buyer group. Traditionally in this segment, emphasis is placed on the availability of a wide range of fresh seafood products. Retail fish shops carry higher-valued fish products than grocery chainstores. As a buyer group, they are highly de-centralized, i.e. represented by large numbers of single-outlet enterprises. As a result, they command less buying power than grocery chainstores. Also, they typically use more suppliers than chain store operations.

Generally, retail fish shops have full-service counters. They prefer to do their own cutting and therefore prefer whole dressed salmon. As a result, they impose higher markups than supermarkets.

More competitive products exist in this segment than other segments, and it sells a higher proportion of fresh product than other segments.

Purchase Criteria - Retail Segment

The most preferred product characteristics for the two retail market segments are presented in Exhibit 4.2. An interpretation of these findings with respect to B.C. farmed salmon is discussed below.

Similar to the restaurant segment, quality and freshness were top-ranked criteria. It is important to note that price was ranked more importantly in the grocery/supermarket segment than in either fish stores or restaurants. This is consistent with the price and margin consciousness of large volume retailers. This does not necessarily mean that retailers will pay lower prices than other segments. However, it does mean that pricing will be more competitive, and retailers will be more prone to switch among suppliers and substitute products on the basis of price.

For example, retailers will be less likely to carry farmed products when less expensive, wild products are available. It also means that "previously frozen" product might be offered as a competitive substitute for the fresh farmed product in the winter period.

The wide range of substitutes and price consciousness has prompted many industry analysts to contend that real prices will have to decline before farmed salmon penetrates the grocery store market to any significant extent.

Species was not deemed a significant purchase criterion among the grocery/supermarket segment. Coho was slightly preferred among the grocery/supermarkets, but probably due to the fact that the descriptive word "silver" has positive connotations. In general, this segment is not well informed about salmon species. The more knowledgeable fish store segment, however, exhibited a slight preference for chinook or coho, probably due to their traditional exposure to wild Pacific varieties.

**EXHIBIT 4.2: SALMON PRODUCTS MOST LIKELY TO BE HIGHEST
SCALED: RETAIL SEGMENTS**

	Fish Shops	Grocery Stores
Species	Chinook (King)	Coho (Silver)
Country of Origin	Norway (not Canada, Chile or Scotland)	Indifferent
Type (Wild vs Farmed)	Indifferent	Indifferent
Fresh vs Frozen	Fresh (but shelf life important)	Fresh (n.s.)
Quality	Top Quality	Top Quality (n.s.)
Shelflife	8+ days	8+ days
Product Form	Whole (not fillets/steaks)	Filletts (8-10 ounces)
Preferred weight (if not cut)	Smaller sizes (n.s.) (2-3 kg)	Smaller sizes (2-3 kg)
Colour	Indifferent (n.s.)	Indifferent (n.s.)
Year Round/seasonal	Year round	Indifferent (n.s.)
Consistent/shortages (n.s.)	Shortages are ok	Indifferent
Price	Market Price	Very price and margin conscious

n.s. = not significant

Source: Anderson (1986) and Ference (1986)

Product form again was a significant purchase factor in the grocery/supermarket segment. Buyers indicated the strongest preference for a pre-cut product, such as an 8-10 ounce fillet. With respect to whole fish, the retail segment generally prefers smaller fish than the restaurant segment. Ference (1986) reported that 70% of grocery trade purchasers preferred salmon under 3 kg with the most popular range in the 2-3 kg range. This has important implications for the B.C. farmed coho sales.

Retail fish stores prefer both whole, head-on fish and generally larger size classes than the grocery/supermarket segment. This is because fish stores prefer to do their steaking and filleting, and the larger size classes produce better yields.

The ability to supply salmon year round versus seasonally was not a particularly important attribute for determining product preference, according to Anderson's research. Chain retail stores have traditionally been willing to switch among species and/or supply sources throughout the year to maintain fresh product for their customers.

The issue of supply continuity and availability of fresh product is a more important factor in the relationship between the distributor/wholesaler and the retail store, than between the individual farmer/producer group and the retailer (unless one plans to sell directly). However, many industry analysts feel that the inability of the seafood industry to provide consistent, year-round supply of high quality product is a major reason why North American seafood consumption is so low. Thus, supply continuity and year-round availability may be more critical in stimulating overall demand than in determining preferences for individual products.

Subsequent interviews with brokers and retail segment buyers indicated some critical aspects of product availability that will be essential in marketing on a large scale to large

retail grocery chains. These factors were: consistent supply over an extended period of time and the capacity to supply minimum volumes on a weekly basis. It is apparent that before chain stores will effectively promote products in their weekly promotional flyers, they need the assurance of large minimum volumes for extended periods of time. The salmon farming industry has generally been unable to meet these requirements to date.

4.1.3 Wholesalers/Distributors/Brokers

Purchase Criteria

The purchase criteria of this segment are important to salmon producers because they constitute a critical point of sale in the distribution chain. Salmon producers usually will be selling their product to this group, who in turn sell and distribute it further down the chain to the end-consumer. In theory, this segment's preferences should reflect those of the restaurant and retail markets they serve. However, it is important to identify any particular preferences they may have due to the nature of the services they provide.

Consistency of both supply and prices was considered the most critical by this industry segment. To market effectively and service their restaurant and retail clientele, the ability to forecast available supply, and receive it on a consistent basis, were key requirements. In addition, price considerations are more important to this segment than other parts of the distribution chain due to the low margins and competitive aspects of their industry.

Consistency in prices over time was also deemed important. The remarkable consistency of Norwegian landed prices in the US over the period 1982-1985 easily met this requirement.

Consistency in both supply and prices gives distributors much more capability to promote and forward sell the product.

Many industry analysts feel that these potential characteristics of farmed salmon provide tremendous scope to expand sales without serious pressure on prices.

4.2 Preferences Among Salmon Products

This section assesses the preference for actual competing products by market segment. This analysis indicates what type of B.C. farmed salmon products would be most competitive in each market segment. It is based on an extension of Anderson's conjoint analysis research.

Based on interviews with BCSFA members and brokers in Seattle, San Francisco, Chicago, Los Angeles and Boston, 77 salmon products were defined in terms of specific attribute levels. The possible attribute combinations that produce different salmon products was drawn from Exhibit 1.1 (e.g.: B.C. farmed coho, 4-6 pounds, 8-day shelflife, etc.).

Included in the list were B.C. farmed chinook and coho and expected competing products, such as Norwegian, Chilean and Scottish farmed salmon, and a variety of wild salmon products.

Each product (as defined by its attributes) was inserted into conjoint analysis scale equations to produce a preference score (0-120) in each of the six market segments. The higher the preference score, the more preferred the product, and the greater the likelihood that the buyer would choose it over a lower scoring competitor.

Confidence intervals around the highest ranked products in each sub-group were used to establish cut-off values. Competitive products scoring above the cut-off values were considered insignificantly different than the highest ranked product. This process effectively established the set of major contenders for each market segment.

For example, in the expensive seafood restaurant segment, the highest ranked product in the winter period was a Canadian, farmed, top quality, eight-pound chinook. It earned a preference score of 93. The standard error of prediction was ± 12 scale points, so any product scoring 81 or higher was considered insignificantly different than the highest ranked market product. The predicted contenders for market share in each restaurant and retail segment are displayed in Exhibits 4.3 to 4.8 (at the end of this section). For each segment and subsequent, scores are shown for products which are identified by specie, method of production [farmed vs. wild] and country of origin. The other attributes identified in Section 1.2 for each salmon product are not identified in the exhibits. In other words, some products in the exhibits may seem identical, but in reality have some differing attribute.

Canadian farmed product emerged as a contender for market share in all but one restaurant subsegment. The following observations can be made about the contenders in each market segment.

Expensive Seafood Restaurants

- . Five of the seven contending products in the winter are farmed Chinook from Canada (B.C.). Even with a five-day shelf life, lower quality B.C. Chinook was one of the preferred products. The significant variable here is the species, Chinook, not the country of origin.
- . During the summer period, no farmed products are preferred. The contending products are all U.S. troll-caught Chinook. This indicates that the dominant purchase criteria are species (Chinook) and method of catch (troll-caught), the latter being a proxy for quality.

Non-Expensive Seafood Restaurant

- . Norwegian farmed Atlantic products are preferred in both summer and winter.
- . This is the only segment where B.C. farmed product was not a contender. However, a filleted Canadian product would receive a higher preference rating than a whole Norwegian product.

Expensive Non-Seafood Restaurants

- . Norwegian farmed Atlantic product is predominant in this category, perhaps due to their prevailing market reputation for quality. As well, this was one segment where the Canadian origin attribute was significantly negative. However, this likely does not extend to B.C. so much as to the East Coast which has a poorer reputation for quality. In addition, farmed (as opposed to wild) salmon dominates this segment in winter or summer.

Non-Expensive, Non-Seafood Restaurants

- . This segment features the largest number of contending products. This perhaps indicates that because of little experience with salmon products, no firmly established purchase criteria exist.
- . While farmed products appear to dominate in winter and summer, a wide variety of species and countries of origin exist.

Fish Stores

- . A number of contending products exist here (e.g. nine insignificantly different products in the winter). This

is consistent with the practice of fish stores offering more product variety than other segments.

- . Farmed Chinook in a variety of sizes and product forms dominates both the winter and summer markets. It is interesting to note that farmed Chinook is preferred in presumably the two most informed segments about salmon: fish stores and expensive seafood restaurants.
- . All products demanded were whole, not pre-cut fish.

Grocery/Store Supermarkets

- . Coho (Silver) was the most preferred species, both winter and summer. This might be because buyers in this group (in New England) typically are not well-informed about salmon species, and the word silver has positive connotations, not the actual species.

4.3 Summary and Implications for B.C. Farmed Salmon

The conjoint analysis of preferences for salmon products indicates good market potential for B.C. farmed salmon in the U.S. B.C. farmed salmon products that match the quality and size characteristics of their competitors would be strong contenders for market share in every market segment.

B.C. farmed chinook enjoyed the highest preference ranking in the expensive restaurant segment, where Norwegian salmon has enjoyed its greatest success. This lends further support to the contention that Norwegian salmon has essentially been filling a supply vacuum that existed for fresh salmon in the winter period. Experienced U.S. salmon buyers still appear to prefer indigenous Pacific species such as chinook, provided that comparable quality attributes to other farmed sources are supplied. This is a critical requirement. The product strategy recommended in Section 8.0 discusses how this requirement can be met.

*Seems likely that if quality AK Salmon
would also be competitive*

Non-Expensive Seafood Restaurant

- . Norwegian farmed Atlantic products are preferred in both summer and winter.
- . This is the only segment where B.C. farmed product was not a contender. However, a filleted Canadian product would receive a higher preference rating than a whole Norwegian product.

Expensive Non-Seafood Restaurants

- . Norwegian farmed Atlantic product is predominant in this category, perhaps due to their prevailing market reputation for quality. As well, this was one segment where the Canadian origin attribute was significantly negative. However, this likely does not extend to B.C. so much as to the East Coast which has a poorer reputation for quality. In addition, farmed (as opposed to wild) salmon dominates this segment in winter or summer.

Non-Expensive, Non-Seafood Restaurants

- . This segment features the largest number of contending products. This perhaps indicates that because of little experience with salmon products, no firmly established purchase criteria exist.
- . While farmed products appear to dominate in winter and summer, a wide variety of species and countries of origin exist.

Fish Stores

- . A number of contending products exist here (e.g. nine insignificantly different products in the winter). This

EXHIBIT 4.3: PREFERRED SALMON PRODUCTS IN EXPENSIVE SEAFOOD RESTAURANT SUB-SEGMENT

WINTER								
PRODUCT	Chinook, farmed, Canada (8lbs)	Chinook farmed, Canada (11lbs)	Chinook farmed, frozen Canada (8lbs)	Chinook farmed, Canada (8lbs and GQ)	Chinook farmed, Canada (8lbs)	Chinook farmed, Canada (8lbs)	Chinook farmed New Zealand (8lbs)	Atlantic farmed Norway (11lbs)
Preference Score	93	89.4	89.1	89	88.2	85.2	84.6	81.5
Price/lb	\$5.00	\$5.50	\$3.50	\$4.00	\$4.50	\$4.50	\$4.50	\$5.00

SUMMER				
PRODUCT	Chinook, troll, US (11lbs, hd.off)	Chinook troll, US (8lbs, hd.off)	Chinook troll, US (5lbs, hd.on)	Chinook troll, US (11lbs, hd.on)
Preference Score	131.2	124	122.4	120.4
Price/lb	\$3.50	\$3.00	\$2.50	\$3.00

*Note significantly higher
pref scores and lower prices
for US chinook during summer.
Prefers for 11-15 lb large red,
most likely CA products
WA
OR*

Notes: All farmed products are "Top" Quality (8+ days shelflife) unless other noted.
"Good" quality (GQ) is a 5-day shelflife product.

**EXHIBIT 4.4: PREFERRED SALMON PRODUCTS IN NON-EXPENSIVE
SEAFOOD RESTAURANT SUB-SEGMENT**

WINTER

PRODUCT	Atlantic farmed, Norway (11lbs)	Atlantic farmed, Norway (8lbs)	Atlantic farmed, Norway (5lbs)
Preference Score	104.6	102.9	101.1
Price/lb	\$5.50	\$5.00	\$4.50

SUMMER

PRODUCT	Atlantic farmed, Norway 11lbs	Atlantic farmed, Norway 8lbs	Atlantic farmed, Norway 5 lbs
Preference Score	104.6	107.9	101.1
Price/lb	\$5.50	\$5.00	\$4.50

Notes: All farmed products are "Top" Quality (8+ shelflife) unless other noted. "Good" quality (GQ) is a 5-day shelflife product.

EXHIBIT 4.5: PREFERRED SALMON PRODUCTS IN EXPENSIVE NON-SEAFOOD RESTAURANT SUB-SEGMENT

	?		WINTER				?		
			all farmed (= quality)						
PRODUCT	Coho farmed, <u>frozen</u> Canada (8lbs)	Atlantic farmed, Norway (11lbs)	Atlantic farmed, Norway (8lbs)	Atlantic farmed, Canada (11lbs)	Atlantic farmed, Norway (5lbs)	Chinook farmed, <u>frozen</u> Canada (8lbs)	Atlantic farmed Canada (8lbs)	Atlantic farmed Canada (5lbs)	
Preference Score	78.3	75.1	73.0	71.4	70.8	70.8	69	66.8	
Price/lb	\$3.50	\$5.50	\$5.00	\$5.00	\$4.50	\$3.50	\$5.00	\$4.50	
			SUMMER						
PRODUCT	Coho farmed, frozen, Canada (8lbs)	Atlantic farmed, whole Norway (11lbs)	Atlantic farmed, whole Norway (8lbs)	Atlantic farmed, Canada (11lbs)	Atlantic farmed, Norway (5lbs)	Chinook farmed, frozen Canada (8lbs)	Atlantic farmed Canada (8lbs)	Atlantic farmed Canada (5lbs)	
Preference Score	78.3	75.1	73	71.4	70.8	70.8	69	66.8	
Price/lb	\$3.50	\$5.50	\$5.00	\$5.50	\$4.50	\$3.50	\$4.00	\$4.50	

*all farmed
(= quality)*

EXHIBIT 4.6: PREFERRED SALMON PRODUCTS IN NON-EXPENSIVE NON-SEAFOOD RESTAURANT TO SUB-SEGMENT

Pan size?															
WINTER															
PRODUCT	Coho farmed, US (5lbs)	Coho farmed, Canada (8lbs)	Coho farmed, Canada (5lbs)	Atlantic farmed, Scotland (8lbs)	Atlantic farmed, Canada	Chinook farmed, Canada (11lbs)	Coho farmed, froz. Canada (8lbs)	Atlantic farmed, Canada (8lbs)	Atlantic farmed, Norway	Chinook farmed, Canada (8lbs)	Atlantic farmed Canada (5lbs)				
Preference Score	113.7	109.9	106.8	103.8	103	101.7	100.8	99.8	98.8	98.6	96.6				
Price/lb	\$4.00	\$4.50	\$4.00	\$5.00	\$5.00	\$5.50	\$3.50	\$5.00	\$5.50	\$5.00	\$4.50				
SUMMER															
PRODUCT	Coho farmed, US (5lbs)	Coho farmed, Canada (8lbs)	Coho farmed, Canada (5lbs)	Atlantic farmed, Scotland (8lbs)	Atlantic farmed, Canada (11lbs)	Chinook farmed, Canada (11lbs)	Coho farmed, froz. Canada (8lbs)	Atlantic farmed, Canada (8lbs)	Atlantic farmed Norway	Chinook farmed, Canada (8lbs)	Atlantic farmed Canada (5lbs)	Coho troll, US (8lbs)	Coho troll, Canada (8lbs)	Coho troll US (8lbs)	Chinook troll US (8lbs)
Preference Score	113.7	109.9	106.8	103.8	103	101.7	100.8	99.8	98.8	98.6	96.6	100.6	99.9	98.8	96.9
Price/lb	\$4.00	\$4.50	\$4.00	\$5.50	\$5.00	\$5.50	\$3.50	\$5.00	\$5.00	\$5.00	\$4.50	\$3.00	\$3.50	\$3.50	\$3.50

EXHIBIT 4.7: PREFERRED SALMON PRODUCTS IN FISH STORES SEGMENT

WINTER									
PRODUCT	Coho farmed, Canada (TQ)(5lbs)	Atlantic farmed, Norway (GQ)(5lbs)	Atlantic farmed, Norway (8lbs)	Atlantic farmed, Norway (11lbs)	Atlantic farmed, Scotland (8 lbs)	Coho farmed, Chile (5 lbs)	Chinook farmed, Canada (8lbs)	Atlantic farmed, Canada (5lbs)	
Preference Score	87.1	80.8	80.4	80	77.8	74.3	73.8	70	
Price/lb	\$4.00	\$4.50	\$5.00	\$5.50	\$5.00	\$3.50	\$4.50	\$4.50	
<i>pay more for lower quality Norwegian TQ Cdn</i>									
SUMMER									
PRODUCT	Coho farmed, US (TQ)(5lbs)	Atlantic farmed, Norway (GQ)(5lbs)	Atlantic farmed, Norway (8lbs)	Atlantic farmed, Norway (11lbs)	Atlantic farmed, Scotland (8lbs)	Coho farmed, Chile (5lbs)	Chinook farmed, Canada (8lbs)	Atlantic farmed, Canada (5lbs)	Chinook troll, US (5lbs)
Preference Score	87.1	80.8	80.4	80	77.8	74.32	73.8	70	79.5
Price/Lb	\$4.00	\$4.50	\$5.00	\$5.50	\$5.00	\$3.50	\$4.50	\$4.50	\$2.50

TQ = Top quality (8+ day shelf life)
GQ = Good quality (5-7 day shelf life)

EXHIBIT 4.8: PREFERRED SALMON PRODUCTS IN GROCERY/SUPERMARKET SEGMENT

WINTER

PRODUCT	Atlantic farmed, Scotland (8lbs)	Coho farmed, US (5lbs)	Coho farmed, Canada
Preference Score	126	119.7	106
Price/Lb	\$5.00	\$4.00	\$4.50

SUMMER

PRODUCT	Atlantic farmed, Scotland (8lbs)	Coho farmed, US (5lbs)	Coho farmed, Canada (8lbs)	Coho troll-caught US (8lbs)	Coho troll-caught US (8lbs)	Coho troll-caught US (8lbs)
Preference Score	126	119.7	106	113.7	111.9	108.2
Price/Lb	\$5.00	\$4.00	\$4.50	\$3.50	\$3.00	\$3.50

5.0 PROJECTED SUPPLIES OF FARMED SALMON IN NORTH AMERICA

This section estimates the production for B.C. and competing regions during the next five years. The expected overall supply/demand balance and the expected impact on prices are also discussed.

Worldwide farmed salmon production is increasing rapidly. As shown in Exhibit 5.1, farmed salmon production increased by 94% from 1983 to 1986. The distribution of U.S. imports by country of origin and port of entry for 1985 and 1986 is shown in Exhibit 5.2.

EXHIBIT 5.1: FARMED SALMON PRODUCTION 1983-1986 (TONNES)

	1983	1984	1985	1986
Atlantic Salmon				
Norway	17,016	22,196	28,656	38,000
Scotland	2,536	3,912	6,921	9,700
Ireland	256	340	700	1,500
Faroes	160	300	500	1,200
Other European	190	250	400	1,100
North American	<u>180</u>	<u>250</u>	<u>300</u>	<u>1,000</u>
	20,338	27,248	37,477	52,500
Pacific Salmon				
B.C.	125	107	120	1,000
Chile	250	530	870	1,000
New Zealand	10	20	500	500
U.S.	833	1,176	1,257	1,500
Japan	2,760	5,049	6,990	7,200
France	<u>80</u>	<u>100</u>	<u>100</u>	<u>-</u>
	4,058	6,982	9,837	11,300
Total	24,396	34,230	47,314	63,800

Sources: Norwegian Fish Farmers' Association, Irish Sea Fisheries Board, B.C. Ministry of Agriculture and Fisheries, Canadian Embassy in Tokyo, and others.

EXHIBIT 5.2: U.S. IMPORTS OF FRESH WILD AND FARMED SALMON^a, BY PORT OF ENTRY, 1985

		<u>Canada</u>	<u>Norway</u>	<u>United Kingdom</u>	<u>Ireland</u>	<u>Chile</u>	<u>New Zealand</u>	<u>Other Countries</u>	<u>TOTAL</u>
Boston	M.T.	2.33	1,422.98	189.98	3.82	-	-	20.22	1,639.23
	% of Total	0.15	22.74	48.26	25.69	-	-	5.50	18.76
New York City	M.T.	2.74	3,157.98	13.95	3.42	47.04	-	81.26	3,306.39
	% of Total	0.19	50.47	3.54	23.00	32.53	-	22.09	37.84
Los Angeles	M.T.	16.68	731.80	1.94	3.74	42.89	57.39	82.08	936.52
	% of Total	1.14	11.70	0.49	25.15	29.66	58.64	22.32	10.72
San Francisco	M.T.	1.92	554.12	4.69	-	-	13.91	11.59	586.23
	% of Total	0.13	8.86	1.19	-	-	14.21	3.15	6.71
Seattle	M.T.	1,329.50	94.77	2.43	-	47.72	26.57	10.80	1,511.79
	% of Total	90.97	1.51	0.62	-	33.00	27.15	2.94	17.30
Washington, D.C.	M.T.	-	130.25	81.01	-	-	-	0.69	211.95
	% of Total	-	2.08	20.58	-	-	-	0.19	2.43
Chicago	M.T.	-	24.94	4.03	2.84	-	-	25.56	57.37
	% of Total	-	0.40	1.02	19.10	-	-	6.95	0.66
Miami	M.T.	-	51.83	2.28	-	3.02	-	0.10	57.23
	% of Total	-	0.83	0.58	-	2.09	-	0.03	0.66
Other Ports	M.T.	108.40	88.49	93.32	1.05	3.92	-	135.51	430.69
	% of Total	7.42	1.41	23.71	7.06	2.71	-	36.84	4.93
TOTAL	M.T.	1,461.47	6,257.16	393.63	14.87	144.59	97.87	367.81	8,737.40
	% of Total	16.73	71.61	4.51	0.17	1.65	1.12	4.21	100.00

^a Excludes fresh fish fillets

Source: U.S. Department of Commerce, Washington, D.C.

British Columbia

The B.C. Salmon Farmers Association forecasts production of about 10,000 tonnes in 1988/89. Based on the proportion of eggs by species distributed to the industry in 1986 and interviews with producers, a breakdown of the estimated production by species and size was derived and is shown in Exhibit 5.3.

EXHIBIT 5.3: ESTIMATED BC FARMED SALMON PRODUCTION IN 1988/89¹
(TONNES)

Size (lbs)	Coho	Chinook	Atlantic	Trout	Total Production	% of Total
Pan size	500	-	-	-	500	4%
2-4	1,500	500	-	500	2,500	22%
4-6	1,750	1,250	250	500	3,750	33%
6-9	1,750	1,750	250	-	3,750	32%
9+	-	1,000	-	-	1,000	9%
Total	5,500	4,500	500	1,000	11,500	100%
% of Total Production	48%	34%	4%	9%	100%	

¹ Production is shown in live weight equivalents.

Source: The DPA Group Inc.

As indicated, nearly one-half of total production is likely to be coho. Chinook should comprise nearly 40% of the industry's production based on a declared surplus availability of chinook eggs from DFO hatcheries in 1986.

Norway

Norway has the world's largest farmed salmon industry, producing nearly 80% of all farmed Atlantic salmon. Production has increased from 100 tonnes in 1971 to 38,000 tonnes in 1986. In 1985, nearly 600 licensed fish farms were in operation. Production is forecast to increase to 80,000 tonnes by 1990. The industry is dominated by small independent farms because of government restrictions on size and ownership. A strong producers association has, among

EXHIBIT 5.2a: U.S. IMPORTS OF FRESH WILD AND FARMED SALMON^a, BY PORT OF ENTRY, 1986

		<u>Canada</u>	<u>Norway</u>	<u>United Kingdom</u>	<u>Ireland</u>	<u>Chile</u>	<u>New Zealand</u>	<u>Other Countries</u>	<u>TOTAL</u>
Boston	M.T.	4.39	2,196.50	169.89	9.41	8.79	1.64	34.35	2,424.97
	% of Total	0.18	24.81	46.33	45.39	1.29	1.02	9.59	18.77
New York City	M.T.	0.39	4,462.73	41.46	0.31	179.30	5.16	108.87	4,798.22
	% of Total	-	50.41	11.31	1.50	26.39	3.21	30.39	37.14
Los Angeles	M.T.	22.37	900.49	12.12	0.26	265.03	86.76	95.45	1,382.48
	% of Total	0.90	10.17	3.31	1.25	39.01	53.96	26.65	10.70
San Francisco	M.T.	8.74	464.80	3.68	-	42.28	16.78	38.07	574.35
	% of Total	0.35	5.25	1.00	-	6.22	10.44	10.63	4.45
Seattle	M.T.	2,244.66	94.45	2.13	-	104.94	50.46	7.58	2,504.22
	% of Total	90.52	1.07	0.58	-	15.45	31.38	2.12	19.39
Washington, D.C.	M.T.	-	219.42	43.57	-	-	-	2.71	265.70
	% of Total	-	2.48	11.88	-	-	-	0.76	2.06
Chicago	M.T.	-	104.69	0.62	4.16	16.04	-	43.08	168.59
	% of Total	-	1.18	0.17	20.07	2.36	-	12.03	1.31
Miami	M.T.	1.01	151.74	-	-	60.93	-	4.17	217.85
	% of Total	-	1.71	-	-	8.97	-	1.16	1.69
Other Ports	M.T.	198.19	257.96	93.19	6.59	2.09	-	23.92	581.88
	% of Total	7.99	2.91	75.42	31.79	0.31	-	6.68	4.50
TOTAL	M.T.	2,479.75	8,852.78	366.66	20.73	679.40	160.80	358.20	12,918.26
	% of Total	19.20	68.53	2.84	0.16	5.25	1.24	2.77	100.00

^a Excludes fresh fish fillets

Source: U.S. Department of Commerce, Washington, D.C.

other things, established quality control and grading standards, set minimum prices for farmers, licensed exporters, and promoted sales.

The proportion of production in 1985 in various size categories are shown in Exhibit 5.4. As indicated in the exhibit, the highest proportion is in the 2-3 kilogram size class.

EXHIBIT 5.4: PROPORTION OF NORWEGIAN PRODUCTION IN 1985 IN VARIOUS SIZE CATEGORIES

<u>Size range</u> Kg	<u>Proportion</u> %
0-1	8
1-2	20
2-3	32
3-4	20
4-5	10
5-6	4
6+	6
	<u>100%</u>

Source: Norwegian Fish Farmers Sales Organization

In 1985, about 90% of farmed salmon production was exported from Norway. Most exports were to France and other European countries. Approximately 24% of export sales were to the U.S. Markets in Europe are expected to remain the largest during the next five years, followed by the U.S. and Japan.

In order to sell the substantial increase in production forecast to 1990, Norway will have to develop an aggressive marketing strategy with traditional customers and in new market areas. This will probably include more marketing directed at retail outlets, improved packaging and advertising, and added-value processing. Increased concentration will probably occur at the exporter level and more influence over foreign distribution will be sought. In addition, Norwegians hope to maintain a technological edge over other producing regions.

Several constraints may limit this growth potential. The limit on the size of farms may actually result in farms producing at sub-optimal levels from a cost minimization perspective. This could put them at a disadvantage in the long term.

Increased exports to the U.S. will result in increased vulnerability to currency fluctuations. As a non-member of the EEC, Norway could also face high tariff rates for exports to Europe. Pollution from aquaculture is becoming more of a problem in Norway and may result in increased disease problems. Lack of capacity in commercial airlines serving the U.S. and Japan may require planes to be chartered. This would result in increased transportation costs, which already average between \$1.75 and \$2.00 per kilogram to Boston or New York. Maximum current capacity on commercial airlines from Norway is 15,000 tonnes to the U.S. and 6,000 tonnes to Japan.

United Kingdom

Farmed Atlantic salmon production in the U.K. is concentrated in Scotland. Although the industry began at about the same time as Norway's, production has not grown as quickly, rising from 600 tonnes in 1980 to nearly 9,700 tonnes in 1986. Projected production in 1990 is 25,000 tonnes. Fifty-seven companies reported production in 1984, but five companies produced 66% of total production in 1984. The larger companies are either part of conglomerate multi-national companies or have Norwegian investment. Combined hatchery and grow-out sites are the predominant form of vertical integration. Salmon farming companies are not heavily involved in downstream fish processing. Most members in the industry belong to the Scottish Salmon Growers Association. The association has developed voluntary quality control and grading standards and is active in the promotion of Scottish farmed salmon.

Most production is consumed within the U.K. About 25% is exported. At present, major export markets are continental Europe and the U.S. These markets are expected to increase in importance during the next five years. The Scottish industry is more advanced than other areas in packaging farmed salmon in consumer-sized packages. As a result, it may possibly have more success than other competitors in penetrating the grocery supermarket segments in the U.S.

Chile

Production of farmed salmon in Chile has been mostly coho, and is concentrated near Puerto Montt in the southern third of Chile. Production in 1986 from nine sites was nearly 1,000 tonnes, a four-fold increase over 1983 production. Eleven companies operate nine hatcheries and 15 cage sites. Companies are mostly large and four are owned by commercial fish processors. Nichigo, a large Japanese fish processing company, has an interest in one farm. Another farm, producing Atlantic salmon, has Norwegian backing. Ocean ranching of coho has also begun in Chile. Projected production in 1990 from pen reared and ocean ranching operations is 3,500 tonnes.

Almost all production will probably be sold in the U.S. At present there is no producers association or joint marketing efforts, but both will probably be established in the near future. Growing conditions in Chile are similar to B.C.'s, if not slightly better. However, the industry is less capital intensive. Operating costs are also considerably lower than in B.C., particularly labour. In addition, the value of the peso relative to the Canadian and other currencies has decreased considerably in recent years. As a result of these factors, the Chileans will probably be able to underprice other competition.

The constraints the industry faces are transportation disadvantages from Puerto Montt, reliance on egg supplies from Oregon and Washington, and a short selling season.

New Zealand

Chinook salmon farming has recently been introduced in New Zealand. Eight farms produced about 500 tonnes in 1986. Ocean ranching has also begun. Projected production by 1990 is 3,000 tonnes.

Producers recently formed an association which has developed quality control and grading standards. Sales to date have been mostly to the U.S. and Japan.

The main disadvantage the industry faces is high transportation costs due to its remote location. However, its ocean ranching activities may result in lower production costs than B.C.'s farming industry because there is no high seas interception of its releases. Ocean ranching is essentially a wild fishery. Production from it will therefore be mostly inflexible from a timing perspective.

New Brunswick

Atlantic salmon production in New Brunswick was 180 tonnes in 1985. Ten companies operate in the St. Andrews area in the Bay of Fundy, including a joint venture between Sea Farm and Canada Packers. Connor Brothers, a major commercial fish processor, has recently constructed a grow-out site, in addition to a hatchery and fish feed plant. The company is reportedly entering contract farming arrangements with some smaller firms. Projected production in 1990 is estimated at over 4,000 tonnes.

A producers' association does not exist, but is yet to be involved in marketing. Six companies have formed a marketing co-operative under the name Atlantic Silver. Target markets to date have been Central Canada and the U.S. Eastern Seaboard.

One production constraint is the risk of lethal water temperatures in winter, particularly outside of the Bay of Fundy. As a result, future production in the Maritimes will probably be restricted to the Fundy area.

United States

On the west coast, production is dominated by one large Washington producer of pan-sized coho, Domsea Farms Inc., which is owned by the Campbell Soup Co. This company annually produces in excess of 1,000 tonnes. A few, small, pan-sized coho producers also operate in Washington. Atlantic salmon is also being raised by a Norwegian backed firm in the San Juan Islands. Projected production in 1990 is 2,000 tonnes.

On the East Coast there were seven active farms in the early part of 1987. The most established of these was Ocean Products Inc. (OPI) near Eastport, Maine. OPI production from sea pens in 1986 was approximately 100 tonnes, which represented about 90% of total production. Active farms include two recently constructed land-based systems located in Maine. These facilities will produce mostly Atlantic salmon with some coho production. An ocean ranching operation is also reportedly underway. Two major processors have invested in farms and two other farms have minority interests from Norway. Projected production from the region in 1990 is estimated to be 2,000 tonnes.

All U.S. production will probably be sold in domestic markets. Co-operative marketing is not likely. Production on both coasts is restricted because of availability of suitable sites and conflicts with recreational and other users.

Ireland

Ireland's fish farming industry has been producing since 1977. Production has increased from 21 tonnes in 1980 to 722 tonnes in 1985 from 12 farms. Forecasted output by 1990 is 10,000 tonnes. The structure of the industry is similar to Scotland's. Norwegian investment in the industry has occurred. For example, Mowi AS has an interest in the largest fish farm, Fanad Sea Fisheries Ltd.

The Irish industry is represented by the Irish Sea Fisheries Board. Quality control and grading standards have yet to be adopted by the industry. Only limited generic promotion activities have been undertaken, although Ireland is moving toward programs similar to Scotland's.

Ireland exported about 15 tonnes of salmon to the U.S. in 1985. Exports are expected to increase considerably during the next five years.

Summary of World Production and Supply to the U.S. Market

Projected production of farmed salmon in 1990, shown in Exhibit 5.5, is expected to increase to over 185,000 tonnes in 1990, more than double the 1986 estimate. Norway is expected to remain the dominant producer, but significant production is forecast for other regions, particularly Scotland, B.C. and Chile. Production of Pacific farmed salmon is projected to increase from 14% of world farmed salmon production in 1985 to 27% in 1990.

The production forecasts indicate that farmed salmon will increasingly dominate the fresh salmon market worldwide.

Farmed salmon production in 1985 was approximately 5% of total salmon production. Since the wild salmon fishery is not expected to increase significantly, farmed salmon production could by 1990 represent about 15% of worldwide

output. Salmon farming is also likely feasible in other areas such as South-east Alaska. Therefore farmed salmon production may even exceed the estimates shown above.

EXHIBIT 5.5: PROJECTIONS FOR FARMED SALMON PRODUCTION 1987-1990 (TONNES)

	1987	1988	1989	1990
Atlantic Salmon				
Norway	50,000	65,000	75,000	100,000
Scotland	14,000	20,000	22,000	25,000
Ireland	2,200	4,500	6,600	10,000
Faroes	2,000	4,000	5,000	6,000
Other European	500	2,000	3,000	4,000
North American	<u>2,000</u>	<u>3,000</u>	<u>4,000</u>	<u>5,000</u>
	70,700	98,000	115,000	150,000
Pacific Salmon				
B.C.	2,500	10,000	13,000	16,000
Chile	1,500	2,500	3,000	3,500
New Zealand	1,500	2,000	2,500	3,000
U.S.	2,000	2,500	3,500	4,000
Japan	<u>6,000</u>	<u>7,000</u>	<u>8,000</u>	<u>9,000</u>
	13,500	24,000	30,000	35,500
Total	84,200	122,500	145,600	185,500

Sources: Norwegian Fish Farmers' Association, Irish Sea Fisheries Board, B.C. Ministry of Agriculture and Fisheries, Canadian Embassy in Tokyo, and others.

Of particular importance to the B.C. industry is that the U.S. will probably become the most competitive market for fresh salmon within a short period. By 1990, the supply of farmed salmon in the U.S. is projected to be approximately 49,400 tonnes, as shown in Exhibit 5.6.

Supply/Demand Balance and Impact on Prices

The total supply of fresh/frozen salmon in the U.S. to 1990 is projected in Exhibit 5.7. No increases over 1985 levels for wild catches and no shift in product mix are assumed. This was considered realistic since 1985 catch levels were high and are not likely to be exceeded by any significant degree during the next five years.

Total supply of fresh/frozen salmon in the U.S. is projected to be about 109,000 tonnes which is similar to our estimate of existing and unfulfilled demand developed in Section 3.0.

EXHIBIT 5.6: PROJECTED SUPPLIES OF FARMED SALMON TO THE U.S. MARKET

Producing Area	Exports to the U.S. (tonnes)				% of Production
	1987	1988	1989	1990	
Norway	10,000	13,000	15,000	20,000	20%
B.C.	2,300	7,500	9,800	12,000	75%
U.S.	2,000	2,500	3,500	4,000	100%
Chile	1,400	2,300	2,600	3,100	90%
Scotland	2,100	3,000	3,300	3,800	15%
Ireland	300	700	1,000	1,500	15%
New Zealand	1,000	1,300	1,700	2,000	66%
Atlantic Canada	1,000	1,300	1,700	2,000	66%
Others	<u>400</u>	<u>600</u>	<u>800</u>	<u>1,000</u>	N/A
Total	20,500	32,200	39,400	49,400	

Source: The DPA Group Inc.

EXHIBIT 5.7: PROJECTED SUPPLY OF FRESH/FROZEN SALMON 1987-1990 IN THE U.S. (tonnes)

	Farmed	Wild	Total Supply
1987	20,500	60,000	80,500
1988	32,200	60,000	92,200
1989	39,400	60,000	99,400
1990	49,400	60,000	109,400

Source: The DPA Group Inc.

This result suggests that the forecasted supply of salmon to the U.S. market until 1990 could be absorbed by the market at current prices, provided no supply and distribution constraints existed. (Our estimate of potential demand assumes salmon supplies were 'perfectly' available, i.e., a supply of quality salmon was continuously available to existing consumers throughout North America.)

In reality, average real prices for farmed salmon likely will continue to decline until 1990 but not greater than 25-30% below current prices.

There are a number of factors which are creating downward pressure on farmed salmon prices. Production efficiencies in regions like Norway and Chile are improving, and increasing competition is forcing producers to reduce the fairly healthy profit margins they have enjoyed to date. For example, average prices dropped approximately 15% in Europe between 1985 and 1986.

There will be inevitable lags in the growth of distribution capabilities and consumption as marketers in North America work to open up new market segments and territories for farmed salmon. Price declines will intensify if all production is directed at existing market segments for farmed salmon in large, urban centres. Already, evidence of saturation in some markets (e.g. expensive seafood restaurants in the mid-Atlantic region) is occurring at certain times of the year.

Finally, the increase in the available sources of supply could increase the market "power" of major U.S. distributors. Brokers and wholesalers will be able to buy farmed salmon from as many as ten regions. The position of the Norwegians as price setters will be more tenuous as a result. Increasingly, distributors will play one source of supply against another in order to bid down prices.

In the face of these downward pressures, there are a number of factors which could counter the extent of expected price declines, and create a strong floor price for fresh salmon. The principal factor is the continued forecasted shortages of most other wild fish species that are potential substitutes for fresh salmon.

Fresh swordfish, halibut, flounder, and tuna are currently forecasted to remain in short supply. This has led to a significant upsurge in prices for these species over the last 18 months. All of these species currently sell for over eight dollars per pound at the retail level in the Eastern U.S., for example. Fresh cod fillets have even attained prices of close to five dollars per pound in fish shops. Continued supply shortages of these substitutes in the face of rising overall demand for seafood will help to maintain a high floor price for fresh farmed salmon.

Some industry observers point to continuity of supply advantages of farmed salmon as another factor which will both open up new retail markets and help to maintain price levels. Once the industry is capable of continuously supplying large weekly volumes of fish, new retail chain markets will open up which will help absorb the large forecasted increases in supply to the U.S.

In summary, current prices in the U.S. for farmed salmon will likely constitute the ceiling for expected prices until 1990. Some continued decline in prices can be expected, but the prices of other fresh fish substitutes should create a strong floor because farmed salmon currently sells for higher prices than most other species.

6.0 KEY MARKETING ISSUES AND PROBLEMS

A host of issues and problems are associated with marketing fresh seafood in North America, farmed salmon in particular. An understanding of these constraints is important in designing an effective marketing strategy for B.C. farmed salmon. For purposes of discussion, we have divided the issues into the following categories:

- . demand-related issues
- . market structure and coordination issues
- . supply-related issues.

These issues are summarized in Exhibit 6.1 and discussed in detail below.

6.1 Demand-related Issues

Low Level of Domestic (North American) Consumption of Seafood

Historically, North American consumption of fish and shellfish at the consumer level has been low compared to consumption of other meat products and with consumption in other countries.

In North America, Canada's per capita consumption is only slightly higher than that of the US. Major causes of this relatively low consumption, as determined from recent US National Marine Fisheries Service studies, include the following:

- . quality has been unreliable and inconsistent;
- . seafood is viewed as extremely perishable;
- . consumers are concerned about the possibility of food poisoning and think that fish has to be eaten the same day it is purchased;
- . consumers lack a general familiarity and competence in selecting, preparing, and cooking seafood;
- . many consumers have a negative association with fish

EXHIBIT 6.1: MARKETING ISSUES AND PROBLEMS FACING FARMED SALMON

Demand-Related Issues	Supply-Related Issues
. Low level of domestic (North American) consumption of seafood . Limited export opportunities for farmed salmon. . Few feasible product opportunities other than fresh sales.	. Existing structure of B.C. farming industry. . Variations in B.C. farmed salmon supply. . Lack of consistent production, harvest and post-harvest techniques. . Impact of increased imports from other supply areas.
Market Structure & Coordination Issues	
. Complex distribution channels. . Lack of adequate price/quantity information. . Traditionally weak price quality link in seafood marketplace. . Lack of uniform product standards and descriptions.	

because they were traditionally forced to eat fish during Lent and on Fridays.

Other reasons for the historically low consumption of seafood have been its lack of availability and the widespread availability of other sources of protein, such as meat and poultry. Compared to poultry, increases in per capita consumption of seafood have been sluggish. From 1976 to 1985, per capita consumption of all seafood has increased 12.4% (Exhibit 6.2). Meanwhile, the poultry industry has realized a 32.7% increase in per capita consumption in the same period (USDA, 1986). Red meat (beef, veal, pork, lamb, and mutton) and dairy product consumption have decreased in this nine-year period 6% and 15.7%, respectively (USDA, 1986).

TABLE 6.2: US ANNUAL PER CAPITA CONSUMPTION OF COMMERCIAL FISH AND SHELLFISH 1965-85 (LBS)

Year	Civilian Resident Population July 1 (Million Persons)	Per Capita Consumption			
		Fresh/ Frozen	Canned	Cured	Total
		 Pounds, edible meat			
1965	191.6	6.0	4.3	.5	10.8
1966	193.4	6.1	4.3	.5	10.9
1967	195.3	5.8	4.3	.5	10.6
1968	197.1	6.2	4.3	.5	11.0
1969	199.1	6.6	4.2	.4	11.2
1970	201.9	6.9	4.5	.4	11.8
1971	204.9	6.7	4.3	.5	11.5
1972	207.5	7.1	4.9	.5	12.5
1973	209.6	7.4	5.0	.4	12.8
1974	211.6	6.9	4.7	.5	12.1
1975	213.8	7.5	4.3	.4	12.2
1976	215.9	8.2	4.2	.5	12.9
1977	218.1	7.7	4.6	.4	12.7
1978	220.5	8.1	5.0	.3	13.4
1979	223.0	7.8	4.8	.4	13.0
1980	225.6	8.0	4.5	.3	12.8
1981	227.7	7.8	4.8	.3	12.9
1982	229.9	7.7	4.3	.3	12.3
1983	232.0	8.0	4.8	.3	13.1
1984	234.8	8.5	4.9	.3	13.7
1985	237.0	9.0	5.2	.3	14.5

Source: USDA, 1986.

Exhibit 6.3 presents consumer price indices for meat, poultry, dairy, and fish products for the period 1965 to 1985: fish prices increased 450%, poultry prices increased about 200%, meat prices 300%, and dairy product prices 300%.

EXHIBIT 6.3: CONSUMER PRICE INDICES FOR MEAT, POULTRY, DAIRY, AND FISH PRODUCTS, 1965-1985

Year	Meat	Poultry 1967=100	Dairy	Fish
1965	93.9	101.2	90.0	90.8
1966	102.6	106.7	95.8	96.7
1967	100.0	100.0	100.0	100.0
1968	102.3	103.1	103.1	101.6
1969	111.4	109.0	106.7	107.2
1970	117.6	108.4	111.8	118.0
1971	116.7	109.0	115.3	130.2
1972	129.2	110.4	117.1	141.9
1973	161.1	154.8	127.9	162.8
1974	164.1	146.9	151.9	187.7
1975	177.9	162.4	156.6	203.3
1976	178.2	155.7	169.3	227.3
1977	174.2	156.7	173.9	251.6
1978	206.8	172.9	185.6	276.4
1979	241.9	181.5	207.1	302.3
1980	248.8	190.8	227.4	330.2
1981	257.8	198.6	243.6	357.7
1982	270.3	195.1	247.0	370.6
1983	267.2	197.5	250.0	374.9
1984	268.1	218.5	253.2	386.8
1985	261.2	216.4	258.0	407.9

Source: USDA.

Despite the problems associated with lack of consumer knowledge about seafood and the relatively high increases in prices, demand for seafood is increasing. Some market analysts argue that the fact that real prices for seafood have been steadily rising indicates that demand for seafood is strong. Insufficient supply of quality product explains both higher prices and low consumption levels. As shown in Exhibit 6.2, record consumption of fresh/frozen seafood was achieved in 1985. Nearly all of the growth in seafood consumption has been in a fresh/frozen form. This has

important significance for the B.C. salmon farming industry since an increase in consumption of one salmon meal per year per person would result in increased consumption of nearly 57,000 tonnes.

Much of the decline in red meat consumption and increases in poultry and seafood consumption is attributed to the American consumer's increased awareness of diet and health and to the recent medical research linking the high levels of fat and cholesterol found in red meat to heart disease, the number one cause of death in North America. According to recent studies published in the New England Journal of Medicine, fish and shellfish, unlike red meats and poultry, contain substances called Omega-3 polyunsaturated fatty acids. These fatty acids appear to reduce the risk of contracting coronary heart disease, and act to remove the conditions which cause the disease.

The increase in consumption of seafood can also be isolated by demographic group. The most recent NMFS survey revealed the following:

- . Income is positively correlated with fresh finfish consumption, and income and education have become important variables in determining seafood consumption. The top income group consumes seven times more fresh finfish than the lowest income group.
- . 80% of seafood consumers are aged 24 to 64 years.
- . About one-half of all finfish is consumed by people in cities with populations greater than 1 million.
- . Most away-from-home consumption occurs in urban areas of the east coast, west coast, and Great Lakes regions.

These demographic findings indicate that large untapped markets exist within lower income groups, under 25 and over 65 age groups, in nonurban areas, and in the central US. However, the groups most likely to increase their consumption are those groups that in 1981 were already consuming relatively large amounts of seafood.

The key to increasing fish consumption lies in effective promotion to, and education of, the consuming public. This will be one of the critical marketing challenges facing the fresh seafood industry. However, promotion must also be backed up by availability.

Limited Export Opportunities for Farmed Salmon

As previously indicated, Japan and Europe represent the largest markets for salmon. However, because of increased supplies of farmed salmon in Europe, primarily from Norway and Scotland, and transportation disadvantages vis a vis European producers, B.C. farmed salmon is unlikely to penetrate these markets profitably during the next three to five years.

Japan does offer some limited potential for B.C. producers:

- . Established trading links for salmon between B.C. and Japan already exist.
- . Coho is being successfully farmed in Japan and the demand for fresh farmed coho is expanding.

To identify a window of opportunity for B.C. farmed salmon in Japan, we reviewed previous studies on the farmed coho industry in Japan and conducted interviews with major Japanese trading companies in Vancouver. Our findings are described below.

Japanese coho farming began in 1976 and produced almost 7,000 tonnes in 1985. The farming area is confined to the fjord type beach area of Miyagi prep, which accounts for more than 95% of production. Approximately 250 farmers are engaged in marine farming operations and approximately 90 farmers in freshwater (hatcheries and seeds) operations. Eyed eggs are imported from Washington and Oregon. The industry is highly vertically integrated and is controlled by three companies: Nichiro Fisheries, Targo Fisheries, and Nichimo Co. Ltd. (the largest fishing gear company in Japan). These three companies account for more than 90% of the coho farming

industry from production (including financing farmers) to final marketing.

Future growth in the industry will be constrained by the following factors:

- . A limited area of coastline in Japan is suitable for salmon farming; production is confined almost entirely to an area near the northeastern tip of Honshu.
- . The egg supply is uncertain. Currently, eggs are obtained from hatcheries in Washington and Oregon.
- . Warm summer temperatures necessitate harvesting within a short period and restrict availability. This also has resulted in wide fluctuations in pricing and has made brood stock development difficult.

As a result of these factors, Japanese farmed coho production may not increase beyond 15,000-20,000 tonnes annually.

The short season and limited production domestic capability may mean an opportunity for significant sales of B.C. farmed salmon to Japan. Our findings from interviews with the Japanese trading companies are summarized below.

- . Japanese consumers are very quality and price conscious. They prefer sockeye because of the deep red flesh colour. Consumers generally only switch to coho when the price of sockeye is very high. For example, a shortage of sockeye in 1986 resulted in strong sales of frozen wild coho from B.C.
- . The demand for fresh salmon in Japan is increasing only gradually. This partially explains the limited penetration obtained by the Norwegians in Japan.

- . One major trading house has sent samples of B.C. farmed coho and chinook to Japan. The products were considered equal or superior to Japanese farmed coho. However, there is still considerable experimentation being undertaken with the products such as smoking and in ~~sushi~~ sushi. Sampling is likely to continue.
- . The Japanese trading companies still view the B.C. salmon farming industry with skepticism. Until quality and consistency of supply can be assured, they are not likely to be willing to purchase substantial quantities.

In summary, relatively few opportunities exist to export significant quantities of B.C. farmed salmon out of North America in the short term. In addition, export sales to Japan are likely to be restricted during the winter months, when supplies of Japanese farmed coho are unavailable. In contrast to North America, the challenge in Japan is to induce consumers to switch to farmed coho and chinook from other salmon species and other seafoods.

Few Feasible Product Opportunities Other than Fresh Sales

There appear to be few feasible market opportunities for B.C. farmed salmon other than in fresh form. At current costs of production, expected prices for farmed product as a frozen, canned, smoked, or further processed product would not yield sufficient net returns to be a viable option over the long run.

Much of the value inherent in farmed fish is lost if it is sold in any product form other than fresh. As a frozen or canned product, it is unlikely to receive prices better than those prevailing for wild product.

Less-than-top-quality farmed product can be sold in a fresh, frozen, or higher value-added processed form (e.g., smoked,