British Columbia Packers Limited Annual Report 1981



British Columbia Packers Limited, operating in the Pacific Rim, is engaged in the catching, processing and marketing of a wide range of fish and seafood products for both domestic and export consumption.

Cover picture: a herring seiner crew at work. For a background on the remarkable life of British Columbia herring, see pages 17-20.

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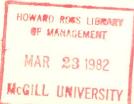
Five Year Review

(in thousands of dollars)

SALES AND EARNINGS	1981	1980	1979	1978	1977
Sales	\$301,038	\$242,113	\$265,626	\$248,532	\$213,293
Depreciation	5,477	5,249	3,909	2,971	2,722
Interest	18,310	12,156	6,563	4,061	3,840
Taxes on income	(2,358)	(5,625)	2,169	8,572	5,489
Earnings (loss) before					
extraordinary items	1,306	(2,854)	6,494	11,711	8,037
per issued share	2.20	(4.80)	10.92	19.69	13.52
Extraordinary items	_	3,000	_	825	259
Net earnings	1,306	146	6,494	12,536	8,296
per issued share	2.20	.25	10.92	21.08	13.95
DIVIDENDS	226	1,473	2,060	1,325	1,178
Class 'A' shares	.75	.75	.75	.75	.75
Class 'B' shares	.375	2.50	3.50	2.25	2.00
FINANCIAL POSITION					
Current assets	119,512	116,801	109,866	94,617	82,156
Current liabilities	86,872	76,147	72,493	53,002	46,105
Working capital	32,640	40,654	37,373	41,615	36,051
Fixed assets — net	58,080	55,711	35,472	27,728	24,199
Long-term debt	33,550	34,038	5,177	7,989	10,897
Shareholders' equity	61,512	60,432	61,759	57,325	46,114
Total assets	182,542	174,830	148,269	124,242	107,735



Herring seiner and power skiff making a set



In 1981 salmon landings in British Columbia and Alaska were the highest in recent years, but adverse currency values in export markets and high interest rates combined to depress earnings below what might have been expected.

Report to Shareholders

It was, nevertheless, a year of progress.

Company sales reached the record high level of \$301 million, an increase of 24% level of \$3.4 million. After gains on the operating loss was reduced to \$3.4 million.

over 1980, and the operating loss was reduced to \$3.4 million. After gains on disposals of assets and anticipated recoveries of future income taxes, net earnings of \$1.3 million were reported for the year.

Worldwide demand for seafood in 1981 was generally weak as a consequence of sluggish economies, reduced personal incomes, and low relative prices of poultry and meat. Because of the large industry supply, prices received for canned salmon in export markets expressed in Canadian dollars were generally lower than in 1980. But because of changes in exchange rates, buyers in export markets faced substantially higher costs expressed in their own currencies, which costs were reflected in higher retail prices. The result has been a slower movement of product, particularly canned pink salmon — slower than that necessary if the industry is to dispose of inventories before the next production season.

Although the Company's salmon production was also substantially higher in 1981 than in 1980, aggressive selling efforts resulted in year-end inventory levels approximately the same as in 1980. In the Canadian Market, heavy promoting of *Clover Leaf* and *Paramount* brands resulted in a satisfactory movement of product.

Sales by product and market are shown in the accompanying graphs. The pattern shows little change from 1980, except that sales to Japan increased

Artist's conception of Prince Rupert Plant Consolidation



from 4% to 11% of total sales, still substantially lower than the 23% share recorded in 1979.

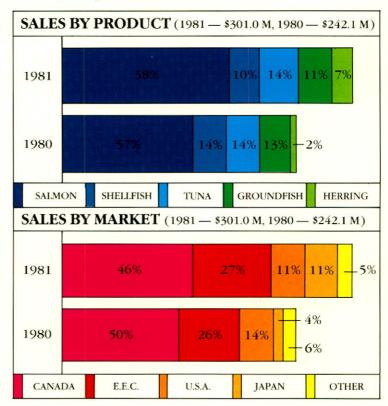
Capital expenditures were \$9.4 million, compared with \$28.5 million in

1980, and comprised mainly work on the Prince Rupert plant consolidation and a new reduction plant in Steveston.

1981 interest expense was \$18.3 million, a 50% increase over 1980. The sensitivity of earnings to interest expense is illustrated by the table at lower right.

During the year the Company paid more than 4000 fishermen \$87 million for fish, and 4400 employees \$63 million in wages, salaries and benefits. Because of the necessity of conserving funds, dividends paid to shareholders were reduced from the very low level of \$1,473,000 in 1980 to \$226,000 in 1981. This is a grossly inadequate return considering the magnitude of the investment and the risky nature of the business.

Funds generated by operations during the last two years have been insufficient to maintain activities in their historic pattern. Additional debt cannot be sustained; indeed, existing debt must be reduced if the Company is to continue as a viable enterprise. Consequently, it has become necessary to reduce the scope of commitments to certain functions such as the ownership of fishing vessels and the provision of fishermen's services in order to finance essential improvements in



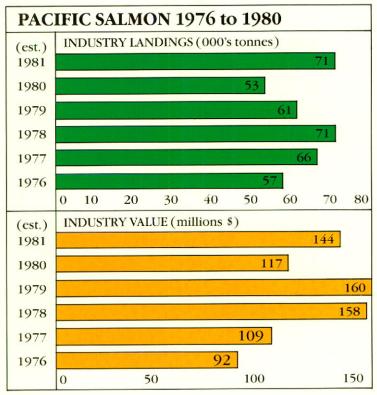
OPERATING RESULTS — in \$ x 1 million				
	Operating Income Before Interest	Interest Expense	Operating Income (loss) Before Taxes	
1977	16.8	3.8	13.0	
1978	22.3	4.1	18.2	
1979	12.2	6.6	5.6	
1980	0.1	12.2	(12.1)	
1981	14.9	18.3	(3.4)	

processing operations and greatly increased values of accounts receivable and inventories.

The processing plant at Port Edward was permanently closed and the fishermen's servicing facility at St. Mungo, on the south shore of the Fraser River, was sold. Prolonged negotiations with Native interests on the sale of the northern rental gillnet fleet appeared to have failed in December, but they subsequently provided the basis for an agreement in principle for sale to individual fishermen or to a Native Corporation in 1982. Proceeds from this disposal will be reinvested in the consolidation of operations in Prince Rupert.

Details of the Company's various operations follow:

Salmon 1981 Sales — \$175 million: North American canned production totalled 6.2 million 48-one pound case equivalents (Canada: 1.9 million; U.S.A.: 4.3 million). While canned production was in surplus supply, frozen salmon production was below sales requirements. Responding to a



reviving demand, sockeye was again frozen for sale in Japan.

Industry landings in British Columbia totalled 71,000 tonnes, compared with 54,000 tonnes in 1980 and an annual average of 63,000 tonnes for the period 1971-1980. The proportion of each species in the catch was unusual. Pinks accounted for almost half the total, and sockeye approximately 30%, while the landed weights of both were well above average. Landings of chinooks, cohoes and chums, however, for reasons not understood, were much below average.

Because of the preponderance of canning species in the catch, the proportion of the Company's production that was frozen declined from 35% in 1980 to 22%.

The industry catch in Bristol

Bay, Alaska was the largest recorded and Nelbro Packing Company, the Company's subsidiary operating in the area, also achieved a record high production.

Herring 1981 Sales — \$21 million: Industry landings in British Columbia reached their pre-season target of 32,000 tonnes of roe herring and 10,000 tonnes of food herring. Consumption of roe in Japan during the 1980 selling season was disappointing and inventories were carried over. As a consequence, prices negotiated with nervous Japanese buyers were substantially less than that received during the last operating season in 1979, and also substantially lower than had been anticipated. Because of rising costs and these market factors, the Company's roe operation, although making a contribution to fixed expenses, was not profitable.

The Fisheries Service implemented a generally successful system of area licensing for this fishery, which resulted in a more rational, safe and economic harvesting of the resource.

Landings of roe herring in Bristol Bay were 16,000 tonnes, somewhat lower than in 1980. Nelbro Packing Company participates in this fishery to a minor extent as a supplement to its salmon operations.

A food herring fishery carried out in British Columbia in the fall was financially unsuccessful, and substantiated the opinion that these fish could be better utilized for roe purposes.

A special section on the remarkable life of herring will be found on page 17 of this report.

Tuna 1981 Sales — \$42 million: The Company is engaged in the purchase and production of canned tuna for sale in the Canadian and export markets. In recent years requirements have been purchased from other producers in Canada, Japan and Fiji.

In 1981, supplies began to flow from Mar Fishing Company, Inc. which operates a tuna plant at Zamboanga, Republic of the Philippines. British Columbia Packers Limited holds a 30% interest in Mar Fishing, which is a registered Philippine corporation. As the new plant increases production, a substantial share of Canadian requirements will be obtained from this source.

Groundfish 1981 Sales — \$33 million: The Company produces groundfish products (cod, sole, perch, halibut) at operations in British Columbia and Los Angeles, California.

In British Columbia, where the Company purchases fish directly from independent fishermen, industry landings of 27,000 tonnes were slightly below recent levels. Although a significant proportion of landings have been directed to the higher-valued fresh market in the Western United States, rising costs and continuing depressed market conditions make the future of this operation uncertain.

In California, a subsidiary, Certi-Fresh Foods, Inc., purchases bulk frozen seafoods in world markets, processes them and sells them in the Western United States under its well-known *Certi-Fresh* label. Like other producers, the Company has suffered from depressed market conditions, but is in position to benefit when conditions improve.

Shellfish 1981 Sales — \$30 million: The Company purchases canned and frozen shellfish in world markets for sale in Canada and the United States. Shortages of supplies and consumer resistance to high prices resulted in a decline in dollar sales of these products in 1981.

Through its subsidiary, Coast Oyster Company, British Columbia Packers Limited has been a substantial producer of oysters in California and Washington States. Its operations are not in the mainstream of Company activities, however, and negotiations for its sale are currently underway.

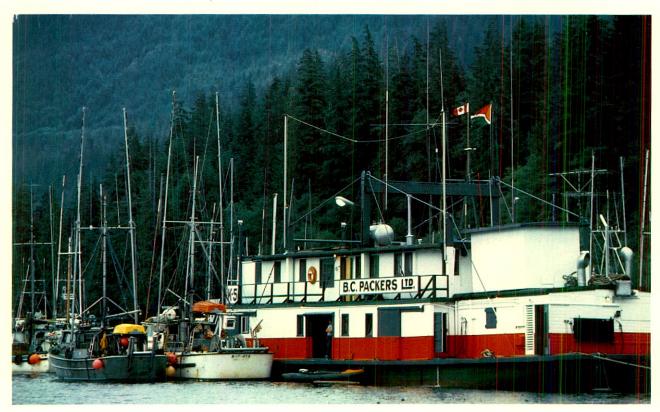
Fisheries Management A preliminary report of the Commission on Pacific Fisheries Policy was presented to the Federal Government and to the public in November 1981. While outlining options for policy in many areas, the report concentrates on specific proposals for controlling the salmon, herring, halibut and abalone fisheries. The report calls for the creation of a Crown Corporation to manage a major salmon and roe herring vessel "buy-back" program, and a royalty system to help finance both the buy-back and the Salmonid Enhancement Program. Although many of the proposals require further study, the Company supports the general direction of the Commission's report. Its final report will be presented in the spring of 1982.

Organization In recognition of their growing responsibilities, Richard P. Gregory and Paterson A. Todd were appointed Senior Vice-Presidents of the Company.

Mr. J.N. Spitz, formerly President of the Fisheries Association of British Columbia, joined the Company in the position of Assistant to the President.

In order to pursue personal interests, Norman K. Nelson resigned as a Vice-President, but continues as a member of the Board of Directors.

The floating camp, 'K-5'', buys salmon from fishermen





Outlook for 1982 While a better than average sockeye catch is predicted for British Columbia in 1982, total landings of all salmon in British Columbia are anticipated to be slightly below average. Large landings of sockeye in Bristol Bay, Alaska and record landings of pink salmon in other parts of Alaska could have a negative impact on prices, particularly if existing inventories of 1981 production do not move into

J. Bruce Buchanan, President (left); Richard I. Nelson, Chairman



the market before the start of the 1982 season.

Although the Company's inventory at the end of 1981 was normal, the balance of industry and the export markets are carrying over abnormal quantities of canned salmon. Under these conditions, continuing high interest rates and weak foreign currency values would depress margins on 1982 production and perhaps offset the anticipated operating savings to be derived from cost-reduction and productivity programs that are being implemented.

Minimum prices for net-caught herring and salmon, and wage rates must be negotiated before these seasons commence. No serious interruption to operations is foreseen

at this time, providing that the realities of costs and markets are recognized and expectations are restrained.

The Board of Directors wishes to thank all those who worked with the Company in 1981. Because of the unusually high degree of uncertainty surrounding the many factors that will determine the financial outcome of 1982, an accurate forecast cannot be made with any confidence. It is expected that 1982 will be another difficult year, and that operating results will likely be similar to those recorded in 1981.

R. I. Nelson

Richard I. Nelson Chairman of the Board and Chief Executive Officer

Richmond, B.C. February 15, 1982 BBuchan an

J. Bruce Buchanan President and Chief Operating Officer

Auditors' Report

To the Shareholders of British Columbia Packers Limited

We have examined the consolidated balance sheet of British Columbia Packers Limited as at January 3, 1982 and the consolidated statements of earnings, retained earnings and changes in financial position for the 53 weeks then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of the company as at January 3, 1982 and the results of its operations and the changes in its financial position for the period then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding period.

Chartered Accountants

Thorne Riddell

Vancouver, Canada February 15, 1982

Consolidated Balance Sheet

As at January 3, 1982 and December 28, 1980

ASSETS		
(in thousands of dollars)	1981	1980
CURRENT ASSETS		
Cash	\$ 104	s 126
Accounts receivable and advances to fishermen	41,074	36,086
Income taxes recoverable	_	1,073
Inventories		
Product	67,351	67,380
Materials and supplies	10,250	11,417
Prepaid expenses	733	719
	119,512	116,801
INVESTMENTS AND LONG-TERM		
RECEIVABLES (note 3)	4,950	2,318
FIXED ASSETS, at cost		
Land	10,145	7,168
Buildings, machinery and equipment	95,747	93,137
	105,892	100,305
Accumulated depreciation	48,246	44,977
	57,646	55,328
Equipment under capital leases,		
less amortization	434	383
	58,080	55,711

Approved by the Board

R. I. Welson

R.I. Nelson, Director

\$182,542 \$174,830

F.L. Jones, Director

LIABILITIES		
(in thousands of dollars)	1981	1980
CURRENT LIABILITIES		
Bank indebtedness	\$ 46,691	\$ 23,092
Notes payable	6,196	21,149
Accounts payable and accrued liabilities	29,903	30,201
Income taxes payable	1,166	_
Deferred income taxes	1,928	805
Current portion of long-term debt (note 4)	873	788
Current obligations under capital leases	115	112
	86,872	76,147
LONG-TERM DEBT (note 4)	33,550	34,038
OBLIGATIONS UNDER CAPITAL LEASES	327	302
DEFERRED INCOME TAXES	197	3,826
MINORITY INTEREST IN SUBSIDIARIES	84	85

SHAREHOLDERS' EQUITY

CAPITAL STOCK

Authorized

506,592 convertible non-voting non-redeemable class 'A' shares without par value, entitled to annual cumulative dividends of \$.75 per share

781,988 class 'B' shares without par value

Class 'A'	Class 'B'		
7,312	587,304		
(150)	150		
7,162	<u>587,454</u>	4,143	4,143
	_	57,369	56,289
	_	61,512	60,432
	_	\$182,542	\$174,830
	7,312 (150)	7,312 587,304 (150) 150	7,312 587,304 (150) 150 7,162 587,454 4,143 57,369 61,512

Commitments and contingent liabilities (note 5)

Gonsolidated Statements of Earnings and Retained Earnings

53 weeks ended January 3, 1982 and 52 weeks ended December 28, 1980

CONSOLIDATED STATEMENT OF EARNINGS		
(in thousands of dollars)	1981	1980
SALES	\$301,038	\$242,113
EXPENSES		-
Cost of sales	250,905	211,427
Selling and administrative	29,711	25,338
Depreciation	5,477	5,249
Interest	4.003	2 717
Long-term debt	4,883	2,717
Other	13,427	9,439
	304,403	254,170
OPERATING LOSS	(3,365)	(12,057)
Gain on disposal of properties and fixed assets	2,314	2,162
	(1,051)	(9,895)
INCOME TAXES		
Current	149	437
Deferred	(2,507)	(6,062)
	(2,358)	(5,625)
EARNINGS (LOSS) BEFORE THE UNDERNOTED	1,307	(4,270)
Minority interest	(1)	(2)
Share of earnings of partly owned companies		1,418
	(1)	1,416
EARNINGS (LOSS) BEFORE		
EXTRAORDINARY ITEM	1,306	(2,854)
Extraordinary item		
Gain on sale of investment in United Oilseed		
Products Ltd.		3,000
NET EARNINGS FOR THE PERIOD	\$ 1,306	\$ 146
Earnings (loss) per issued 'A' and 'B' share		
Earnings (loss) before extraordinary item	\$2.20	\$(4.80)
Net earnings for the period	\$2.20	\$.25
CONSOLIDATED STATEMENT OF RETAINED EA	PNINGS	
	duings	
RETAINED EARNINGS AT BEGINNING OF PERIOD	¢ 56 200	6 57 (16
(Note 2)	\$ 56,289 1,306	\$ 57,616 146
Net earnings for the period		
	57,595	57,762
Deduct dividends	6	(
Class 'A' shares at \$.75 per share	6	6
Class 'B' shares at \$.37½ (1980 — \$2.50) per share	220	1,467
(1700 — \$2.70) per snare	226	1,473
DETAINED EADNINGS AT END OF DEDICED		
RETAINED EARNINGS AT END OF PERIOD	\$ 57,369	\$ 56,289

Consolidated Statement of Changes in Financial Position

53 weeks ended January 3, 1982 and 52 weeks ended December 28, 1980

(in thousands of dollars)	1981	1980
SOURCE OF WORKING CAPITAL		
Operations	\$ 789	\$ (6,439)
Proceeds on disposal of fixed assets	3,924	4,498
Proceeds on disposal of investment in U.O.P.L.	_	8,000
Long-term debt incurred	565	33,650
Reduction of investments and		
long-term receivables	31	434
	5,309	40,143
APPLICATION OF WORKING CAPITAL		
Additions to investments and		
long-term receivables	2,663	2,134
Additions to fixed assets	9,406	28,476
Reduction of long-term debt	1,028	4,779
Dividends	226	1,473
	13,323	36,862
INCREASE (DECREASE) IN WORKING CAPITAL	(8,014)	3,281
Working capital at beginning of period	40,654	37,373
WORKING CAPITAL AT END OF PERIOD	\$ 32,640	\$ 40,654

Notes to Consolidated Financial Statements

1. SIGNIFICANT ACCOUNTING POLICIES

(a) Basis of presentation

The financial statements consolidate the accounts of British Columbia Packers Limited and all its subsidiary companies.

(b) Advances to fishermen

As is the practice in the industry the company makes advances to fishermen to assist them in the financing of their operations, boats and gear, the repayment of which is dependent, in large measure, upon the catch of fish in future seasons. In the absence of fixed repayment terms it is impracticable to segregate these advances into current and long-term portions.

(c) Inventories

Inventories of product are valued at the lower of cost and net realizable value; inventories of materials and supplies are valued at the lower of cost and replacement cost.

(d) Investments

Investments in partly owned companies are accounted for by the equity method. Other investments are accounted for by the cost method.

(e) Translation of foreign currencies

All U.S. balances have been translated at a rate approximating the current rate at each year end. The net deferral on the translation of the company's equity in U.S. subsidiaries and long-term debt payable in U.S. funds is included in fixed assets in the balance sheet. The net deferral at the end of 1979 and any subsequent net deferral due to a change in year-end rate is amortized to earnings on a straight-line basis over ten years.

(f) Depreciation

Depreciation is computed on the straight-line basis at rates varying from $2\frac{1}{2}$ % to 25%.

(g) Leases

Leases entered into after December 31, 1978 which transfer substantially all of the benefits and risks incident to ownership of property have been accounted for as the acquisition of an asset and the incurrence of an obligation by the company. Under this method of accounting for leases, the asset is amortized on a straight-line basis and the obligation, including interest thereon, is liquidated over the life of the lease. Rents on non-capital leases and all leases entered into before December 31, 1978 are expensed as incurred. Had the policy been applied to leases in effect prior to December 31, 1978, fixed assets would have been increased by \$540,000, and obligations under capital leases by \$627,000. The effect on net earnings for the period would not have been material.

2. CHANGE IN ACCOUNTING POLICY

Effective January 1, 1981 the company accrued for the cost of vacations when earned by employees; previously, these costs were charged to expense when paid. As a result of adopting this accounting policy on a retroactive basis, consolidated retained earnings has been restated. Since the amount applicable to 1980 is not material, the entire adjustment of \$338,000 has been made to consolidated retained earnings at January 1, 1980 and consolidated working capital at that date has been adjusted by the same amount.

3. INVESTMENTS AND LONG-TERM RECEIVABLES

	1981 (in thousand	1980
Mar Fishing Company, Inc. (30% owned)	(iii tilousane	is of dollars)
Shares, at cost	\$3,442	\$2,327
Less company's share of operating results	253	253
Other items	\$3,189 1,761	\$2,074 244
	\$4,950	\$2,318

4. LONG-TERM DEBT

	1981	1980
	(in thousands of dolla	
Term Bank Loan due 1988, bearing interest at 113/8% through to June 1982, after which time interest will be at bank's prime rate. Annual principal repayments to commence in 1983	\$15,000	\$15,000
Term Bank Loan due 1990 bearing interest at bank's prime rate. Fixed interest rate for two years to be determined in 1982. Annual principal repayments to commence in 1985	15,000	15,000
Term Bank Loan due 1983, bearing interest at 3/4% above bank's prime rate — secured	3,250	3,250
First mortgage bonds		
Series 'B' and 'C' 6½% sinking fund bonds due 1982 (U.S. \$500)	588	1,176
Other long term debt — secured	585	400
Less current portion	\$34,423 873	\$34,826 788
	\$33,550	\$34,038

Principal instalments payable in the next five years are:

1982	\$ 873,000
1983	4,800,000
1984	1,550,000
1985	3,050,000
1986	3,050,000
	\$13,323,000

The first mortgage bonds are secured by a specific mortgage on the company's Imperial Plant/Head Office complex located in Steveston, B.C.

The provisions of the Deeds of Trust and Mortgage contain certain restrictions including the prohibition of dividends if consolidated net working capital (as defined) is less than \$14,000,000 immediately after declaration or payment.

5. COMMITMENTS AND CONTINGENT LIABILITIES

(a) Future lease commitments, including obligations under capital leases, are:

For the year	1982	\$	665,000
2.7	1983		484,000
	1984		311,000
	1985		224,000
	1986		97,000
Thereafter to	2002		961,000
		\$2	2,742,000
		-	

- (b) Commitments and contingent liabilities relating mainly to bills under discount, amount to \$17,567,800.
- (c) The present value of the unfunded past service pension liability is estimated to be \$2,891,000 at January 3, 1982, which sum will be funded by company contributions during future years.
- (d) A U.S. subsidiary was named as a defendant in five related law suits, alleging that it, together with other commercial packers in the Bristol Bay area of Alaska, violated the U.S. Anti-Trust Laws during the 1970-1978 seasons. Three of the law suits were settled and dismissed; one suit was tried before a Jury resulting in a verdict and judgement in favour of all the defendants. The remaining suit has been under a "stay" order pending the trial of the earlier cases. The subsidiary is vigorously defending against all unresolved claims and legal counsel advise that the successful defence of the tried cases substantially reduces the likelihood of plaintiffs prevailing.

The company is of the opinion that any liabilities which might arise in the remaining action will not affect the consolidated financial position as at January 3, 1982.

6. RELATED PARTY TRANSACTIONS

The company is one of the subsidiaries of George Weston Limited and in the normal course of business, sales are made to and purchases are made from related companies. The company participates in a central cash management system, which has the effect of reducing financing costs.

	1981	1980
	(in thousands of dollars)	
Sales	\$24,851	\$22,688
Purchase of goods & services	1,093	877
Interest on short-term borrowings	1,728	1,806
Dividends	189	1,259
Account balances at year-end		
Receivables	850	925
Payables	801	540

7. SEGMENTED INFORMATION

	1981				
	Canadian Operations	U.S. Operations	Eliminations	Consolidated	
	(in thousands of dollars)				
Sales to customers outside the company	\$263,285	\$37,905	\$ (152)	\$301,038	
Inter-segment sales	1,753	2,078	(3,831)		
Total sales	\$265,038	\$39,983	\$ (3,983)	\$301,038	
Segment operating profit (loss) Gain on disposal of properties	\$ (3,831)	\$ 466		\$ (3,365)	
and fixed assets				2,314	
Income taxes recoverable				2,358	
Minority interest				$\underline{\hspace{1cm}}$ (1)	
Net earnings				\$ 1,306	
Identifiable assets	\$163,739	\$18,829	\$ (26)	\$182,542	

Canadian operations include export sales of \$126 million.

	1980				
	Canadian Operations	U.S. Operations	Eliminations	Consolidated	
	(in thousands of dollars)				
Sales to customers outside the company	\$203,126	\$39,058	\$ (71)	\$242,113	
Inter-segment sales	2,378	2,684	(5,062)		
Total sales	\$205,504	\$41,742	\$ (5,133)	\$242,113	
Segment operating profit (loss) Gain on disposal of properties	\$(13,889)	\$ 1,832		\$(12,057)	
and fixed assets				2,162	
Income taxes recoverable				5,625	
Minority interest				(2)	
Share of earnings of				1,418	
partly owned companies Extraordinary item				3,000	
The state of the s				\$ 146	
Net earnings					
Identifiable assets	<u>\$151,813</u>	\$23,046	<u>\$ (29)</u>	<u>\$174,830</u>	

Canadian operations include export sales of \$76 million.



After salmon, herring is the most valuable species fished in British Columbia, providing important supplemental earnings for many fishermen and additional employment for thousands of shoreworkers. In recent years, the landed

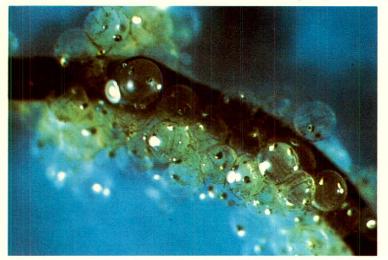
British Columbia Herring value of herring has averaged by mately 30% of the landed value of salmon. Although its life history is perspectate a remarkable story of

survival against almost impossible odds.

Distribution and Abundance: Pacific herring (Clupea barengus pallasi) are found on the continental shelf and in coastal waters from Mexico around the North Pacific rim to Korea. British Columbia is at the centre of abundance on the eastern side of the Pacific and has an average standing population of 350,000 tonnes of adult herring, or close to 30 billion individual fish. Of these, two-thirds are concentrated in the southern part of the coast and the remainder in the north.

Life History: Pacific herring eggs are deposited in February and March on vegetation in and immediately below the intertidal zone along most of the coast. As each female herring deposits 20,000 to 40,000 eggs the total number

Underwater photograph showing herring roe on kelp



of eggs spawned along the cost reaches the astronomical figure of 30 quadrillion (30,000,000,000,000). Of the large number of eggs from each spawning female, only two, on the average, survive to spawn. The eggs hatch in about two weeks at the usual cool spring temperatures. The larvae emerging from the eggs bear little resemblance to the adult fish — they are fragile, transparent creatures that swim awkwardly, are highly vulnerable to predators, wave and current action, and local food shortages. Thirteen weeks after

hatching, the small fish have learned to swim and maneouvre and to feed on small plankton, and their bodies have taken on the appearance of miniature adults.

By the end of the first year of life young herring are clearly recognizable — bony, with a deeply forked tail, no teeth and a protruding lower jaw. The back is blue-green shading away to silvery-white on the sides. At this stage the fish are about 35 mm in length and weigh 5 g. During the summer they move to feeding grounds off the mouth of Juan de Fuca Strait and in Hecate Strait. Mortality from predators continues high.

Most herring spawn for the first time at three years of age. By then they have attained an average length of 185 mm and a weight of 90 g. (The largest herring officially recorded in British Columbia was 310 mm long, weighed 340 g and was 15 years old.) Between October and December herring gather in large schools and begin their annual migration to inshore feeding grounds. Upon reaching the general vicinity of their spawning grounds, the fish stop feeding and remain in the deeper channels and bays during the final stages of maturation. Although mortalities have been high, the reduction in numbers has been more than offset by the increase in weight of the survivors, so that the total weight of a "year class" of herring is greatest just at the time of first spawning.

When maturation is complete, the herring move into the shallows and

onto the spawning grounds. There, a variety of stimuli, such as storms or crowding, will initiate spawning in the presence of such suitable spawning substrate as red algae, sea grasses, rock weed or kelp. Each female usually lays less than 100 eggs in a single spawning act, and carries out several hundred spawning acts before the supply of eggs is exhausted. While the eggs are deposited the male milt is dissipated as milky clouds throughout the water column. A large spawning can extend over several days, spread out for miles, and involve over 300 million fish.

includes fish of different ages.



Herring roe on beach; Inset: Herring at Maturity

After spawning is completed, the spent fish feed voraciously as they migrate back to their offshore feeding grounds, again running a gauntlet of predators. As herring can spawn more than once, the offshore population

Mortality from "natural" causes for adult fish averages 30% annually, and total mortality, including catches of the commercial fishery, 50%. As shown in the graph, herring catches and values have fluctuated widely depending on market demand and stock strength. The peak catch of 260,000 tonnes was taken in 1963.

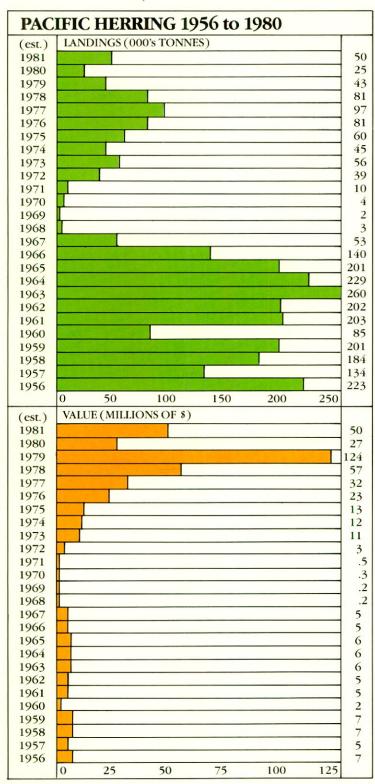
Interaction with Salmon: It is commonly believed that because salmon feed on herring, herring fishing should be constrained. Researchers, however, have found no clear evidence that herring play a unique role as food for other commercially valuable species. Salmon may prefer to feed on herring, but other small fishes, squid and small shrimp provide equally adequate food.

Moreover, there is no indication that the collapse of the herring stocks in the late 1960s affected salmon adversely in size or weight, or that the recovery of the herring stocks in the 1970s increased the numbers or size of salmon. There is, however, some evidence that juvenile salmon and herring compete for plankton, and that adult herring may eat juvenile salmon.

Management of the Herring Resource: In British Columbia, herring stocks are now managed on the "best use" principle, maximizing the value of the catch, as opposed to the historic principle of maximizing the sustainable yield.

Thirty-four discrete stocks have been identified, and their status is assessed annually on three different bases: daily catches, sampling, and extent of

spawn deposition. These data, when fed into a computer model, produce a forecast of abundance by stock. Knowing the spawning requirements for each stock, an estimate of allowable catch for each stock can be established for the



next fishing season. During the season catches are adjusted according to actual abundance as determined by test fishing or electronic surveys.

The approach to herring management in recent years has been cautious and has run little risk of depletion through overfishing. Continuing research on population biology, stock assessment procedures, and early life history stages will improve the reliability of management and regulation.

Future Prospects: Research indicates that herring stocks for most of the coast (except for the north) are at or near optimum levels, and that they are being fished conservatively. Average annual catches of herring could be as high as 160,000 tonnes for the whole coast, though with significant year-to-year variations. As this catch would be substantially higher than average catches in recent years, the outlook could be for improved fishermen's earnings and shoreworkers' employment in the future.

Sources:

Herring on Canada's Pacific Coast, A.S. Hourston and K.W. Haegele, 1980; Conflict and Opportunity, Peter H. Pearse, 1981.

Corporate Information

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United States:

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Humboldt Oyster Co.
Nelbro Holding Company
Nelbro Packing Company
Rupert's Certi-Fresh Foods, Inc.
Rupert's International Sales Corporation
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ANNUAL GENERAL MEETING

Tuesday, April 20, 1982 at 09:30 a.m. Nonsuch Room Delta's River Inn 3500 Cessna Drive Richmond, B.C.

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