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The Economics of British Columbia's Crab Fishery: Socio-Economic Profile, Viability, and Market Trends

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The Economics of British Columbia's Crab Fishery: Socio-Economic Profile, Viability, and Market Trends

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ABSTRACT

The purpose of this document is to provide the socio-economic context of the crab fishery in British Columbia. It is intended to provide the readers with a common understanding of the economics of the fishery, and to inform discussions around potential fisheries management changes and reforms. In doing so it supports the goals and vision of the Oceans to Plate approach. This document is complementary to the Fisheries Integrated Management Plan (IFMP) which deals with the specifics of the fishery's management framework. It aims to construct a socio-economic profile of the three main sectors directly involved in the crab harvest: the commercial, recreational, and First Nation's sectors, as well as provide economic information on the crab processing sector and export markets.

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1. Introduction

In 2007, the Minister of Fisheries and Oceans announced the Oceans to Plate (OTP), approach which introduces a strong economic focus to departmental activities. The OTP aims for an economically viable and internationally competitive industry that can:

- adapt to changing resource and market conditions;
- extract optimal value from world markets;
- provide attractive incomes to industry participants;
- provide an economic driver for communities in coastal regions; and
- attract and retain skilled workers.

This vision can be supported through a more direct integration of economic analysis into departmental decision making, as well as the design and evaluation of policies and programs.

The purpose of this document is to provide the socio-economic context of the crab fishery in British Columbia. It is intended to provide the readers with a common understanding of the economics of the fishery, and to inform discussions around the new management reform of the crab fishery. In doing so it supports the goals and vision of the OTP. This document is complementary to the Fisheries Integrated Management Plan (IFMP) which deals with the specifics of the fishery's management framework.

The following pages provide a socio-economic profile of the three main sectors directly involved in the crab fishery: the commercial, recreational, and First Nation's sectors. The level of detail provided for each sector varies significantly due to data availability and limitations. In addition, information is provided on the crab processing sector and the crab export market.

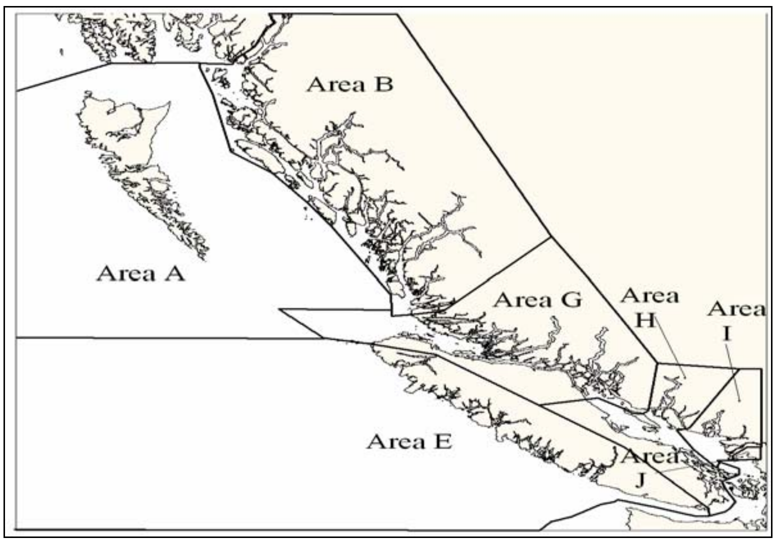
The document concludes by providing a summary of the sections of this economic analysis.

2. Commercial Crab Fishery

2.1. Commercial Fishery's Background and Current Management Status

The commercial crab fishery in B.C. is a competitive fishery operated under a precautionary management regime. Management tools include a minimum harvestable size limit, limited commercial licensing, trap limits, soak days limits, sex restrictions, soft shell restrictions, and gear restrictions. The coast is divided into seven areas (A, B, E, G, H, I, J), and each licence can operate in only one fishing area (Figure 1). As licence stacking is not permitted and boats are limited to a single licence, boats are able to fish in only a single area. Area re-selection is allowed periodically which allows boats to move to new fishing areas.

Figure 1: Crab Fishing Areas



Source: DFO. 2009 Dungeness Crab Integrated Management Plan.

Table 1: Maximum vessel trap limits and total trap limit by Crab Licence Area

2010-2012 Selection			**Crab Trap Maximums**		
	Number of <u>Licences</u>	<u>Traps</u>	<u>Vessel</u>	<u>Area</u>	
<u>**Area A**</u>	<u>**53**</u>		_	35,000	
< 42.5	34	525	600		
42.5 - 46	6	700	800		
46 - 52	4	875	1,000		
> 52	9	1,050	1,200		
Area B	**13**	400	400	7,600	
<u>Area E</u>	<u>**27**</u>	350	350	19,500	
Area G	**20**	280	400	5,600	
Area H	**39**	300	300	12,900	
Area I	**51**	100	100	8,400	June 15 - August 1
		164	200	8,400	August 1 - November 30
Area J	**18**	200	200	3,800	

Source: DFO. Discussion Paper: Review and Reform of the Dungeness Crab Fishery.

The Hecate Strait fleet (area A) is composed of about 23% of the total crab fleet and is predominant in terms of landings. It is characterised by large vessels and higher trap limits (up to 1200 on vessels larger than 52'). Other crab fishing areas operate mainly with smaller size vessels with trap limits varying from 200 to 400 (Table 1).

The Dungeness crab fishery continues to be one of the most valuable fisheries in the Pacific region. However, some recent challenges, such as reduced catches, reduced prices, and increased costs (e.g., increased fuel and monitoring costs), have put strain on the economic viability of the fishery.

The Department of Fisheries and Oceans Canada (DFO), in consultation with all parties of interest, is currently undergoing a complete review and reform of the Dungeness crab fishery. DFO's goal of the Crab Reform process is to develop a management framework where all sectors feel that their objectives for the fishery are being considered[1].

2.2. Landings and Landed Value

Crab accounts for approximately 34% of the total wild shellfish landed value in B.C., and for 12% of the total landed value of all of B.C.'s wild fish species[2]. Landings in all crab

[1] DFO. Crab Reform Working Group.
[2] B.C. Ministry of Environment. 2007 British Columbia Seafood Year in Review.

areas generally fluctuate with the cyclical nature of crab stocks[3]. Table 2 provides a time series for the Dungeness crab landings in all areas for the years 2004 through 2008. The change in the total crab landings in B.C. seem to be driven largely by fluctuations in crab area 'A' landings. In the past 5 years, crab area A contributed 76% to 32% of total crab landing coast wide.

Table 2: Total Dungeness Crab Landings in Tonnes by Fishing Area

Year	Area A	Area B	Area E	Area G	Area H	Area I	Area J	Total
2004	7207.1	205.8	568.4	127.4	538.8	516.1	265.6	**9429.4**
2005	3434.9	186.1	347.9	146.3	521.8	520.9	244.5	**5402.4**
2006	1255.4	240.2	249.3	203.4	442.8	1158.5	317.1	**3866.7**
2007	3693.7	181.4	265	256.5	487.8	1046.6	224.1	**6155.1**
2008	4627.6	227.5	699.3	351.1	811.1	671.6	234.9	**7623.1**

Source: DFO. Crab Sale Slip Data.

Landed value has also varied significantly over the last 5 years. This variation in total landed value is a result of both a changes in total landings and prices. Table 3 presents a time series of the average price for all crab areas and the total landed value of Dungeness crab for the years 2000 through 2008. Despite weakening economic conditions, and a stronger Canadian dollar, the average landed price of crabs was relatively steady over the past 5 years.

Table 3: Average Dungeness Crab Price and Total Landed Value

Year	Average Nominal Landed Price (Kg)	Total Nominal Landed Value all Areas	Average Real* Landed Price (Kg)	Total Real* landed Value
2004	$4.99	$47,082,573	$5.43	$51,200,556
2005	$5.18	$27,960,591	$5.50	$29,713,200
2006	$5.50	$21,285,226	$5.78	$22,349,526
2007	$5.53	$34,031,855	$5.67	$34,899,417
2008	$5.69	$43,380,116	$5.69	$43,380,116

* Base Year is 2008, calculated using Bank of Canada Inflation Calculator.
Source: DFO. Crab Sale Slip Data.

2.3. Licences

Commercial crab licences are designated "R" and are vessel and area based. First Nation's commercial communal licences are designed "FR." Recreational harvesters require tidal water sport fishing licences to harvest crab; these licences are issued by DFO and are discussed in the recreational section below.

[3] DFO. Discussion Paper: Review and Reform of the Dungeness Crab Fishery

In 1990, 494 crab licences were issued, a number that put considerable pressure on the crab stock. As a result, the number of licences issued was adjusted downward to reduce the risk of over-exploiting the stock and to allow the economics of the fishery to improve. Since 2000, the total number of crab fishing licences has been set at 222 licences, including both R and FR licences (Table 4). Crab areas A and H have each accounted for an average of 22% of the licences since 2000.

Commercial harvesters have been allowed to reselect their fishing area every 3 years, which has resulted in some redistribution of licences between areas. The 2009 area selection was for a single year, as the 2010 reselection which took place in the summer of 2009.

Table 4: Crab Licence Distribution by Fishing Area (2000-2009)

Year	Area A	Area B	Area E	Area G	Area H	Area I	Area J	Total
2000	48	19	39	14	47	36	19	**222**
2001	48	19	39	13	48	36	19	**222**
2002	48	19	39	13	48	36	19	**222**
2003	41	17	42	13	55	36	18	**222**
2004	41	17	42	13	55	36	18	**222**
2005	41	17	42	13	55	36	18	**222**
2006	56	11	35	14	43	41	22	**222**
2007	56	12	35	14	42	41	22	**222**
2008	56	12	26	19	45	42	21	**222**
2009	52	17	26	19	45	42	21	**222**

Source: DFO. Discussion Paper: Review and Reform of the Dungeness Crab Fishery.

2.4. Licence Distribution by Community

Crab licence holders are located in at least 13 communities in British Columbia. Almost 37% of total licence holders reside in the Greater Vancouver regional district. Other concentrations include about 15% of licences in the Skeena-Queen Charlotte region and almost 12% in the Capital region. The residence of over 14% of the licence holders is unknown.

Table 5: Licence Distribution by Regional District (2008)

Regional Area Key	Number of Licences
Greater Vancouver	81
Skeena-Queen Charlotte	33
Capital	26
Nanaimo	18
Comox-Strathcona	10
Alberni-Clayoquot	7
Mount Waddington	5
Areas with less than 4 licences:	10

Kitimat-Stikine	
Fraser-Cheam	
North Okanagan	
Powell River	
Sunshine Coast	
Cowichan Valley	
Unknown	32
Total	**222**

Source: DFO. Catch Statistics Unit.

2.5. Crew Members

The average crab vessel has 2 crew members on board including the captain. There are a variety of settlement arrangements in the crab fishery; however, a recent study suggested approximate crew shares of 45% of the vessel's net revenue in area A, and 25% of vessel's net revenue in areas B-J[4]. Net revenue is defined as:

Net Revenue = Gross revenue – Total Fisheries Specific Expenses[5].

To provide an estimate of crew payments the fleet was divided into two area segments (area A and areas B-J) and three performance tiers (top, middle, and bottom). As shown in Table 6, the returns for crew in area A are substantially higher than those for the others areas as a result of a higher crew share percentage and higher net revenues. It is important to note that these values are generalised approximations for the fleet.

Table 6: Estimated Annual Total Crew Share per Vessel by Crab Area and Vessel Performance Category for the Crab Fleet, 2007

Area	Top Tier	Middle Tier	Bottom Tier	Fleet Average
A	$198,072	$66,335	$29,097	$97,835
B-J	$44,000	$19,250	$8,938	$24,063

Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

2.6. Fleet Diversification

Fleet diversification is measured by how much a certain fleet is involved in other fisheries. One measure of diversification is the number of the different licence categories a fleet also holds. The crab fleet is considered amongst the least diversified fishing fleets in British Columbia[6]. In 2007, all of the 206 R licences (FR licences are excluded) were

[4] Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.
[5] Fisheries Specific Expenses = Fuel cost + At sea monitoring + Offload monitors + Licence fees + Bait + Gear maintenance.
[6] Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

fished[7]. Those 206 crab vessels held only 52 non-crab licences. Table 7 compares the licence categories held by the crab fleet to those held by one of the most diversified fishing fleets in B.C., the groundfish trawl fleet. Approximately 80% of the licences held by the crab fleet are crab licences, while only about 41% of the licences held by the groundfish trawl fleet are trawl licences.

Table 7: Fleet Licence Diversification Comparison: Crab vs. Groundfish Trawl

Crab Fleet		Groundfish Trawl Fleet	
Licence Category	**# of Licences**	**Licence Category**	**# of Licences**
Crab 'R'	**206**	**Trawl 'T'**	**141**
Prawn	18	**Roe Herring Seine**	53
Halibut	11	**Shrimp**	43
ZN	8	**Salmon Seine**	26
Troll Salmon	4	**Halibut**	21
Gillnet Salmon	3	**Tuna**	16
Shrimp	3	**Sablefish**	11
Other	5	**Other**	37
Total non 'R' Licences	**52**	**Total non 'T' Licences**	**207**

Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

As shown in Table 8 below, the number of crab vessels with non-crab licences in 2007 was low. The majority of the commercial vessels (80%) operate with only one R licence and no other licences. The remaining 20% of the vessels have at least one other licence in addition to their R licence.

Table 8: Number of Licences per Vessel in Crab Fleet in 2007

Licence/Vessel	# Vessels	% Vessels
R Only	165	80%
R + One Lic.	32	16%
R + Two Lic	7	3%
R + Three Lic	2	1%
Total R Vessels	206	100%

Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

There are several possible reasons for this relatively low level of diversification in the crab fleet. First is limited opportunity. Vessels are often built specifically for crab fishing and the crab fishery extends over several months limiting opportunities to participate in other fisheries. Second, the crab fishery may provide sufficient income to licence holders to allow them to carry on their operations and sustain their vessels for the

[7] Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

entire year. Lastly, revenue data suggests some fishermen in the bottom and possibly middle tier are part-time; these fishermen may not be interested in diversification.

2.7. Commercial Fleet Financial Profile

Some crab areas can be seen as more financially rewarding than others. Because of this, licence holders are generally allowed to reselect which area they want to fish every three years. This has provided a measure of flexibility, but it can result in substantial shifts in effort after reselection. For example, area A had a 15% decrease in the number of licences in 2003, followed by a 37% increase in 2006 (Table 4). This could make long-term planning more difficult.

Area A differs substantially from the other areas (B-J) and so is discussed separately. Area A is the predominant area in terms of landings, vessels tend to be larger than those in other areas, and the area has higher trap limits. All the other areas (B-J) are aggregated when evaluating their performance as they share characteristics such as lower landings, smaller vessel size, and lower trap limits.

To better present the financial performance of the crab fleet, each fleet area segment is further divided into 3 performance tiers: top, middle and lower (Table 9). Area A, which has about 25% of crab vessels, was responsible for almost 60% of the total harvest. For both segments of the fleet (A, B-J) the overall distribution of landings is uneven between tiers. The landing profile for the lower tiers suggests that some vessels may be part-time participants in the fishery.

Table 9: Landing Profiles of the Crab Fleet for 2007

Area A	**# Vessels**	**Total Catch (Kg)**	**Catch/Vessel**	**% Catch**
Top 1/3	17	2,187,906	128,700	59%
Middle 1/3	17	1,025,869	60,345	28%
Bottom 1/3	17	499,897	29,406	13%
	51	**3,724,451**	**73,028**	**100%**
Areas B-J	**# Vessels**	**Total Catch (Kg)**	**Catch/Vessel**	**% Catch**
Top 1/3	52	1,501,053	28,866	61%
Middle 1/3	52	639,793	12,304	26%
Bottom 1/3	51	311,226	6,152	13%
	155	**2,460,742**	**15,876**	**100%**

Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

An estimate of profitability for the crab fleet in 2007 (Table 10) shows that while area A generated over 55% of gross revenues it accounted for approximately 42% of fleet earnings. The measure of profitability used is earnings, which are Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA). EBITDA includes revenues and expenses directly related to fishing, but excludes non-cash items such as

depreciation, interest and principal payments[8]. For the fleet as a whole, earnings average 24% of gross revenues. There are substantial differences in this value between the two area segments. Area A fleet earnings were 18% of gross revenues and while the value was 32% for the area B-J fleet.
Fuel prices have been increasing and the trend is anticipated to continue in the next year. On average, 22% of the crab fleets total operating expenses are fuel related, and this value is even higher for vessels in crab fishing area A[9]. As the fuel prices move upwards, the cost of operating a crab fishing vessel will also increase. In contrast crab prices have been relatively steady. The combined effect is the potential for a reduction in the profit margin for crab vessels, especially in area A.

Table 10: Crab Fleet's Aggregated Vessel Profiles

Number of Vessels:	**51**	**155**	**206**
Crab Fleet Totals	**Area A**	**Areas B-J**	**Total**
Landings (Kg)	3,724,451	2,460,742	6,185,193
Vessel Price (per Kg)	$4.96	$6.10	$5.40
Gross Revenue (Gross Stock)	**$ 18,474,750**	**$ 14,918,750**	**$ 33,393,500**
Less: Fishery Specific Expenses			
Fuel	3,718,750	1,872,000	5,590,750
At sea monitoring			
Offload Monitor	238,000	390,500	628,000
Licence / Co-management Fees	30,090	92,040	122,130
Licence/ Quota Lease	-	-	-
Bait	2,677,500	676,000	3,353,500
Gear maintenance/replacement	722,500	520,000	1,242,500
Total Fishery Specific Expenses	**7,386,840**	**3,550,040**	**10,936,880**
Net Revenue (Net Stock)	***11,087,910***	***11,464,960***	***22,552,870***
Less:			
Crew and Captain Shares	4,989,560	3,753,750	8,743,310
Fishery Contribution	***6,098,351***	***7,711,210***	***13,809,561***
Vessel Fixed Expenses			
Insurance	425,000	780,000	1,205,000

[8] These financial profiles were constructed using a combination of available data (e.g. DFO catch statistics) and industry interviews. This methodology limited the ability to include capital charges, as this is an area of sensitivity and there area substantial differences in financial arrangements between fishermen.
[9] Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

Repairs & Maintenance	2,040,000	1,560,000	3,600,000
Moorage	88,400	187,200	275,600
Miscellaneous	178,500	390,000	568,500
Total Vessel Expenses	**2,731,900**	**2,917,200**	**5,649,100**
Earnings (EBITDA)	**$3,366,451**	**$4,794,010**	**$8,160,461**

Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

Despite the higher cost structure in area A, the average earnings per vessel are substantially higher in area A ($66,009) than in areas B-J ($30,731). However, there are significant differences between performance tiers within in each group. For vessel level financial profiles by performance tier for areas A and B-J, please refer to Annex II.

3. Recreational Crab Fishery

Recreational harvesters require a tidal water sport fishing licence to harvest crab, which is issued by DFO. This licence however, is for all tidal water species as well as crab. Between 1999 and 2008 an average of over 318,000 tidal water recreational fishing licences were issued every fishing year in B.C., although this number has been declining in the last few years[10].

Crab catch is not reported as part of the annual creel surveys in British Columbia tidal waters. The only estimate of recreational crab harvest comes from the national Survey of Recreational Fishing in Canada[11], which is conducted every five years. In 2000, the survey's total estimated crab catch by recreational fishers was approximately 330 tonnes (about 10% of the total crab harvest). The estimate was around 368 tonnes in 2005 (about 7% of the total crab harvest).

The national recreational survey relies on self-reported days fished for fish and shellfish by fishing region, as well as overall expenditures on recreational fishing. All recreational fishers in Canada spent a total of $2.5 billion in direct recreational fishing expenditures[12] in 2005, including $487 million in expenses on package deals[13]. For B.C. tidal waters the values are $365 million and $139 million, respectively. Transportation, food, and lodging were the principal expenditure items.

Less than 1% of the days fished during packaged trips were attributable to recreational crab fishing, suggesting that crab fishing was probably an ancillary activity on these trips.

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[10] DFO. Recreational Licensing Statistics.
[11] DFO. National Recreational Fishing Survey in Canada 2005.
[12] **Direct Expenditures**: expenditures on goods and services (food, camping, accommodation, transportation, supplies, etc.) incurred during fishing trips or excursions.
[13] **Package Deal:** monies paid to a lodge or outfitter for a complete range of services such as lodging, food, transportation, use of fishing equipment, etc. (for self-organized trips, this includes all expenditures). Types of package deals include: fly-in camps, lodge, charter boats, outfitters, etc.

In terms of non-packaged fishing activity, almost 11% of the recreational fishing effort in B.C. tidal waters was attributed to crab fishing with B.C. residents responsible for almost 83% of this effort.

4. Aboriginal Crab Fishery

Crabs play a significant role in the fisheries of First Nation's coastal communities, and they are harvested for Food Social Ceremonial purposes (FSC).

For many years Aboriginal people have been under-represented in the commercial fishery. Yet commercial fishing is often the greatest economic opportunity for remote coastal Aboriginal communities. To provide economic opportunities for First Nation communities, it is the policy of Fisheries and Oceans to improve Aboriginal communal participation and integration with coastal commercial fisheries.

The Pacific Integrated Commercial Fishery Initiative (PICFI) and the Allocation Transfer Program (ATP) are examples of departmental programs and initiatives geared towards improving First Nations access to fisheries. In 2007/2008, two commercial crab licences were transferred to Aboriginal owned businesses through PICFI, and in 2009 one crab licence was transferred to an aboriginal group through ATP.

Table 11 shows the percentage distribution of First Nation's commercial communal (FR) licences in the crab fishery. Since 2000 the number of FR licences has been gradually growing; however it is still a small share of the fleet.

Table 11: Percentage of FR Licences in the Crab Fleet

Year	Total # Licences	# of FR Licences	% of Total
2000	222	6	2.7
2001	222	n/a	n/a
2002	222	9	4.0
2003	222	9	4.0
2004	222	10	4.5
2005	222	13	6.0
2006	222	16	7.2
2007	222	16	7.2
2008	222	17	7.6

Source: DFO. Commercial Fishing Licence, Quota, and Vessel Valuation 2000-2008 Reports

In 2008 there were 17 crab communal licences. Generally speaking, the distribution of these licences amongst the regions in B.C. follows the same pattern like the commercial licences. Almost 30% of the communal licences are in the Greater Vancouver region, and about 20% in the Skeena – Queen Charlotte regional district.

First Nations' access to crab for Food Social Ceremonial (FSC) purposes is recognized as a priority after conservation; therefore, the ongoing crab reform discussion aims to improve First Nations access to the crab fishery.

5. Processing

In general, processing operations are located near a reliable source of product. The presence of processing operations in a region indicates a higher level of regional involvement and dependence on the associated fishery.

There appears to be a high degree of entry and exit in the crab processing sector. From 2000 to 2008 a total of 115 processing companies reported the sale of crab on the annual fisheries production schedules at least once; however, in 2008, 40 companies reported the sale of crab[14]. Almost 40% of the 2008 processors were located within the greater Vancouver region, while the Capital region and Skeena-Queen Charlotte regions each had 15%[15]. See annex (III) for a complete list of companies.

On average (2003-2006), the Greater Vancouver region processed 52% of the total Dungeness crab landed across B.C., while the Skeena-Queen Charlotte regional district processed about 45% and the Capital region processed approximately 1%[16]. The difference in distribution between processing volume and the number of processors suggests differences in plant size between regions.

Processed crab in B.C. can be found in many different forms such as cooked, fresh in shell, fresh meat, frozen in shell, frozen meat, life, and other products. Table 12 illustrates the amounts of crab processed B.C.-wide with their wholesale value by product mix. On average, live crab accounts for 94% volume of crab processed in B.C and approximately 90% of the total value. These numbers are not exclusive to Dungeness crab and in some cases include small amounts of crab imported from other countries.

Table 12: B.C. Processed Crab Product Mix and Wholesale Value (2006-2008)

	2005		2006		2007		2008	
Product	Processed Quantity* (tonnes)	Wholesale Value ($'000)	Processed Quantity* (tonnes)	Wholesale Value ($'000)	Processed Quantity* (tonnes)	Wholesale Value ($'000)	Processed Quantity* (tonnes)	Wholesale Value ($'000)
Canned	-	$0	-	$0	-	$0	-	$0
Cooked	60	$467	98	$857	454	$4,154	74	$720
Fresh in Shell	165	$1,351	35	$346	38	$335	188	$1,341
Fresh Meat	41	$1,483	53	$2,127	72	$3,008	42	$1,779

[14] B.C. Ministry of Environment. Unpublished data.
[15] DFO. Licensing Unit Data.
[16] Fraser and Associates. Linkages between the Primary Fish Production and Fish Processing Sectors in BC

Frozen in Shell	72	$502	15	$168	5	$47	4	$36
Frozen Meat	4	$104	4	$76	3	$114	3	$113
Live	8,183	$51,448	5,023	$39,498	5,989	$45,107	6,843	$52,090
Other	22	$218	3	$22	39	$471	22	$277
Grand Total	**8,546**	**$55,572**	**5,231**	**$43,095**	**6,599**	**$53,237**	**7,176**	**$56,356**

Source: B.C. Ministry of Environment. Unpublished data.
* May contain crab imported from abroad and processed in BC.

Approximately 66,000 person-months (5,739 FTE) of employment were generated by the processing of all types of fish in B.C. in 2005 (Table 13). Of this, wild shellfish contributed almost 13% of the total, an equivalent of 8,580 person-months (746 FTE).

Table 13: Estimated Employment Distribution in the Fish Processing Industry between Species and Species Groupings (Year 2005)

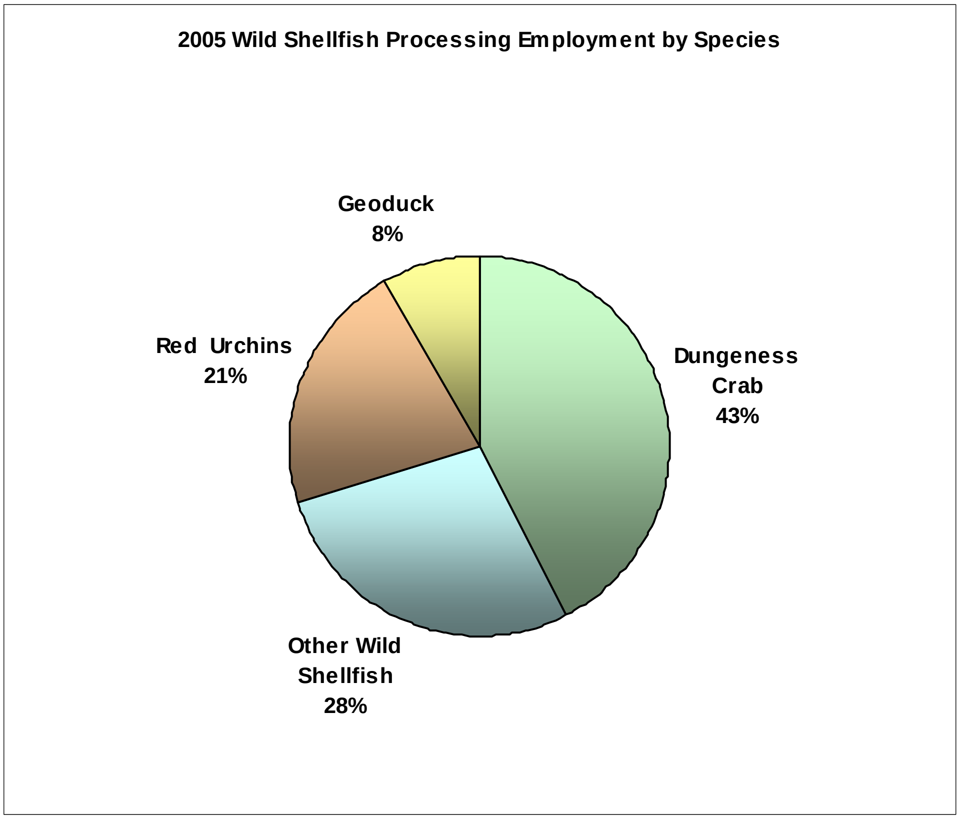
Species and Species Groupings	Estimated Employment Person/Month	Full Time Equivalent[17] FTE	Share of Total Sector Employment
Wild Salmon*	17,820	1,550	27%
Cultured Salmon	8,580	746	13%
Halibut	2,640	230	4%
Herring	7,260	631	11%
Groundfish	17,820	1,550	27%
Wild Shellfish	**8,580**	**746**	**13%**
Cultured Shellfish	3,300	287	5%
Totals	66,002	5740	100%

* Total includes salmon imported and processed in B.C
Sources: B.C. Ministry of Environment. British Columbia Seafood Processing Employment Survey 2005.

Of the 746 person-years of employment generated by wild shellfish processing in 2005, 43% are estimated to be directly involved in processing Dungeness crab (Figure 2). Other crab species contribute to the generation of employment, but the amount is insignificant (< 0.5%).

[17] 1 F.T.E = 11.5 person-month

Figure 2: Processing Employment by Species: Shellfish 2005



Source: Fraser and Associates. Linkages between the Primary Fish Production and Fish Processing Sectors in BC

6. Market Trends

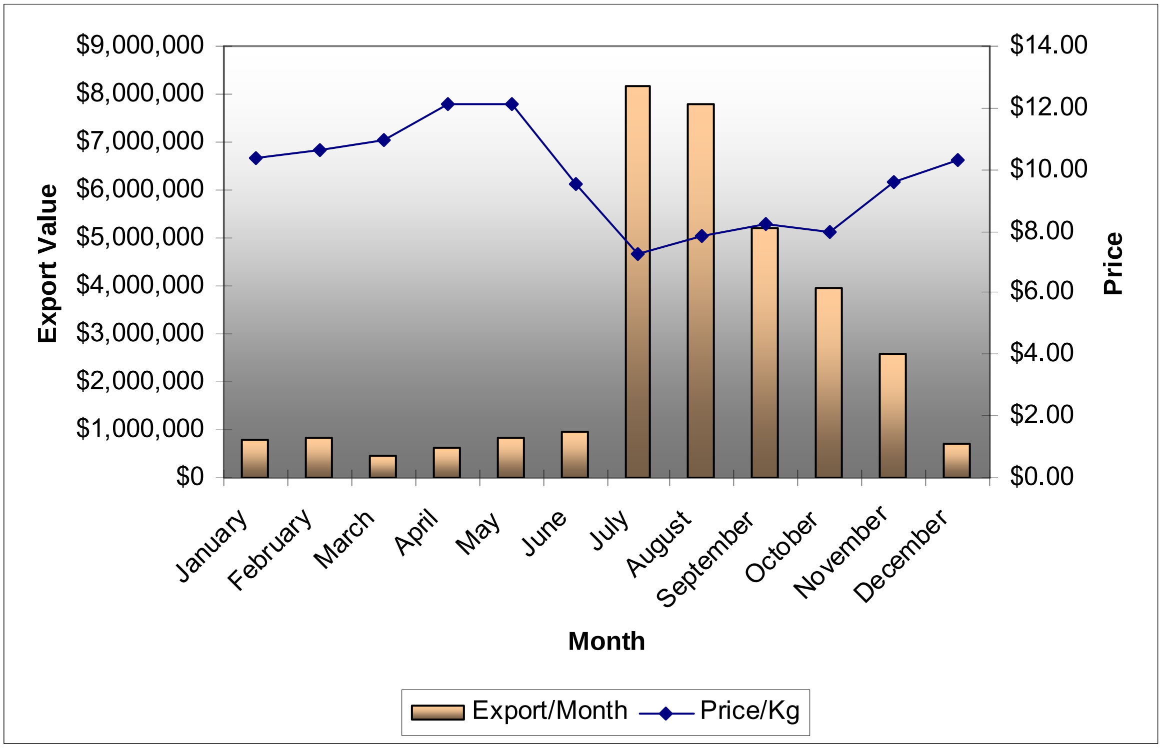
The nature of crab landings is cyclical, and catch varies from year to year. In general, more than half of total crab landings occur in July through October. The reasons behind this concentration of landings during these months are:

1. Some crab fishing areas including area A, which contributes the majority of landed crab, are usually closed for commercial fishing until June or July for conservation reasons (soft-shell crab).

2. The crab fleet in B.C. avoids operating during the same months as the United States (U.S) Dungeness crab fishery in Washington and Oregon. The U.S. season is typically December 1 to August/September. The intent is to avoid flooding the market with crabs, which could have a negative impact on the prices.

There are both domestic and export markets for Dungeness crab. However, the fishery generally relies on international markets to sell its product. The U.S. is the principal market for B.C. Dungeness crab exports, with an average of 64% of export value from the U.S., between 2004 and 2008.

Figure 3: Crab Export to the U.S. by Month: Total Values and Average Price



Source: Industry Canada.

Figure 3 shows the monthly export value of Dungeness crab to the U.S. in 2008. The U.S. imports more of B.C.'s Dungeness crab during the months of July through October, when their fishery is not fully operating. More than 75% of the export value to the U.S. is generated during these months. In 2008, the U.S. paid an average $9.75 per kilogram for the Dungeness crab; however, the average was only $7.83 per kilogram during the peak months (July-October).

Table 14 shows export values for the top importing countries. The total export value may include value for crab imported from outside of Canada and processed in B.C., although this is a small part of the total. China and Hong Kong are becoming increasingly important international markets for B.C.'s Dungeness crab. For example, China's imports of B.C.'s Dungeness crab in 2008 contributed for almost 33% of total crab export value, a substantial increase from 12% in 2004.

Table 14: B.C Exports of Dungeness Crab to the World (A) in Canadian $ and (B) as Percent of Total

	2004	2005	2006	2007	2008
(A) In Canadian $					
United States	51,575,422	27,640,181	17,485,290	32,604,645	32,877,491
China	7,324,398	9,581,831	14,010,661	16,208,750	19,771,490
Hong Kong	3,084,413	2,565,072	3,532,462	3,870,067	6,201,183
Japan	34,852	6,790	16,297	1,873,372	1,219,239
Taiwan	99,130	160,967	178,975	118,789	224,354
United Kingdom	44,392	67,912	191,270	187,215	219,495
Korea, South	13,032	68,551	312,576	13,189	108,814
Singapore	346,319	15,372	29,565	60,462	106,340
All Other	34,537	166,525	37,442	34,195	24,732
TOTAL	62,556,495	40,273,201	35,794,538	54,970,684	60,753,138
(B) % of total value					
United States	82%	69%	49%	59%	54%
China	12%	24%	39%	29%	33%
Hong Kong	5%	6%	10%	7%	10%
All Other	1%	1%	2%	4%	3%
TOTAL	100%	100%	100%	100%	100%

Source**:** Industry Canada.

Live crab dominants the export sales of crab, with an average of 87% of total export volume in live crab (Table 15). Prices for live crab in the international market have been relatively steady for the past 5 years, with an average price of $7.60 per kilogram. Frozen, boiled crab account for an average of 13% of the total exported volume with an average price of $8.76 per kilogram.

Table 15: B.C. Dungeness Crab Exports by Product Category

	2004	2005	2006	2007	2008	Average
Volume (kg)						
Live	4,855,567	2,641,155	2,796,130	5,000,107	4,720,802	4,002,752
Frozen	1,282,312	803,969	67,080	735,636	423,775	662,554
Total	6,137,879	3,445,124	2,863,210	5,735,743	5,144,577	4,665,307
Price ($/kg)						
Live	$6.94	$7.31	$8.50	$7.47	$7.86	$7.60
Frozen	$6.16	$6.49	$12.22	$8.47	$10.47	$8.76

Source: Global Trade Information Services.

Due to the high exposure the fishery has to the export market, the fishery could potentially face some challenges, many of which are macroeconomic in nature. These include fluctuation in export price due to change in world supply, exchange rates, and in the long run, the growing emphasis on eco-certification for fishery products might pose a challenge for the crab fishery in B.C.

- Export Price and Supply: BC crab export prices are very sensitive to supply shocks. Historically, there has been a significantly negative correlation between the value of exports and the world volume of crab that is shipped to major BC target markets. Therefore, there is a risk of exposure to declining export prices for the BC crab industry if the market were to be oversupplied[18].

- Exchange rate fluctuations: The Canadian dollar has been reaching record high exchange rates against the U.S. dollar recently. The soaring Canadian dollar might result in downward pressure on export prices, especially to the U.S. This impact could be lessened or offset by the appreciation of Chinese currency against Canadian dollar, which might boost the level of Chinese imports of the Canadian product.

- Eco-certification: Access to world markets for B.C. crab might be impacted due to the increase demand for eco-certified fish products. This risk is not high as the principal export markets are the U.S. and China, where demand for eco-labelled seafood products is moderate[19]. Should the demand for eco-certified products increase in current markets, or if attempts are made to expand crab exports in markets where eco-certification is high, then the level of risk might become higher.

[18] DFO. Draft – Export Price and Supply: Market Risk Analysis for Canadian Seafood Exports.
[19] DFO. Draft - Eco-certification: Market Risk Analysis for Canadian Seafood Exports.

7. Summary

In 2008, the commercial crab fishery in B.C. consisted of 222 licensed vessels, including 17 First Nations licences. Fifty percent of the licences were concentrated in two regions, Greater Vancouver (37%) and Skeena-Queen Charlotte (15%). Of the seven crab fishing areas, area A was the most important in terms of landings (61%) and landed value (61%), but only accounted for 25% of the licences. This translates into higher average earnings per vessel in area A compared to the other areas (B-J), although there are also substantial differences in vessel earnings within an area. Only a small number of crab vessels hold other fishing licences. This lack of diversification, coupled with the low earnings per vessel for lower performing vessels suggests many of the vessel owners may only crab fish part-time.

The only source of recreational data for the crab fishery is the national Survey of Recreational Fishing in Canada. In 2005 the results indicate about 11% of recreational fishing effort in B.C. tidal waters was directed toward crab fishing. This yielded approximately 368 tonnes of crab.

Participation of First Nations within the crab fishery has been slowly growing. Communal commercial licences now account for almost 8% (17) of all licences, up from less than 3% (6) in 2000. The Allocation Transfer Program and Pacific Integrated Commercial Fishery Initiative continue to work to increase communal licences.

Processed live crab is the dominant product for the processing sector and for export. In 2008 there were 40 plants that processed crab in B.C., mostly concentrated in the Greater Vancouver region. A substantial portion of the B.C. crab harvest is exported, with the United States the dominant importer; however, there has been growth in both the Chinese and Hong Kong markets.

From an economic perspective the crab fishery as a whole appears fairly healthy. However, only a single year estimate is available for vessel earnings and there is no information available on processing plant earnings. The fishery does face some challenges, many of which are macroeconomic in nature, due to the high exposure the fishery has to the export market. These include exposure to fluctuations in export prices due to world supply, exchange rates, and growing emphasis on eco-certification for fishery products. In addition, the fishery faces pressures on earnings from a combination of rising fuel prices and stable prices.

This document provides a snapshot of the B.C. crab fishery, using available information and data. Development of this report illustrated the limited economic data available for key sectors, including the processing sector, and the recreational and aboriginal fisheries. As more information on these aspects of the fishery become available, it is anticipated that future versions of this report will be able to provide additional insights into the economic situation of all aspects of the crab fishery in British Columbia.

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ANNEX I: LANDINGS AND LANDED VALUE BY LICENCE AREA

Landings by Crab Management Area in Kg (2000-2008)

Year	Area A	Area B	Area E	Area G	Area H	Area I	Area J	Total
2000	954.5	186.8	460.2	160	605.5	419.8	174.1	**2960.9**
2001	3327.5	188.9	640.1	214.3	631.6	544.2	171.5	**5718.1**
2002	1792.4	235.2	510.8	193.2	721.2	444.2	213.4	**4110.4**
2003	4670.4	254	718.7	179.6	650.6	390.4	232.7	**7096.4**
2004	7207.1	205.8	568.4	127.4	538.8	516.1	265.6	**9429.2**
2005	3434.9	186.1	347.9	146.3	521.8	520.9	244.5	**5402.4**
2006	1255.4	240.2	249.3	203.4	442.8	1158.5	317.1	**3866.7**
2007	3693.7	181.4	265	256.5	487.8	1046.6	224.1	**6155.1**
2008	4627.6	227.5	699.3	351.1	811.1	671.6	234.9	**7623.1**

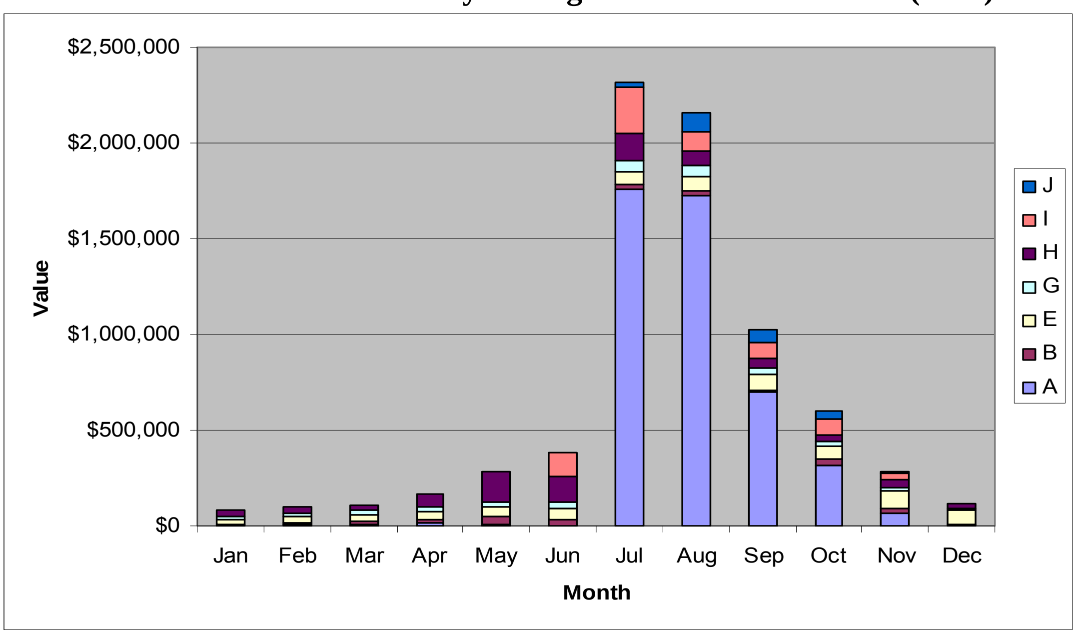
Source: DFO. Catch Statistics Unit.

Total Landed Value by Crab management Area in Canadian $ (2000-2008)

Year	Area A	Area B	Area E	Area G	Area H	Area I	Area J	Total
2000	$7,181,628	$1,405,811	$3,462,312	$1,204,071	$4,555,791	$3,158,628	$1,309,666	**$22,277,907**
2001	$21,123,331	$1,207,480	$4,092,439	$1,369,818	$4,038,271	$3,479,423	$1,096,141	**$36,406,903**
2002	$12,198,091	$1,600,851	$3,476,317	$1,314,563	$4,908,327	$3,023,257	$1,452,198	**$27,973,604**
2003	$25,394,643	$1,381,139	$3,907,628	$976,440	$3,537,424	$2,122,639	$1,265,034	**$38,584,947**
2004	$35,986,905	$1,027,787	$2,838,201	$636,077	$2,690,274	$2,577,257	$1,326,072	**$47,082,573**
2005	$17,777,624	$963,177	$1,800,587	$757,188	$2,700,621	$2,695,963	$1,265,431	**$27,960,591**
2006	$6,910,725	$1,322,124	$1,372,192	$1,119,913	$2,437,465	$6,377,430	$1,745,377	**$21,285,226**
2007	$20,422,909	$1,002,875	$1,465,230	$1,418,161	$2,696,867	$5,786,915	$1,238,898	**$34,031,855**
2008	$26,331,235	$1,294,227	$3,978,771	$1,997,794	$4,619,991	$3,821,515	$1,336,583	**$43,380,116**

Source: DFO. Catch Statistics Unit.

Total Crab Landed Value by Management Area and Month (2008)



Source: DFO Catch Statistics Unit.

ANNEX II: FLEET FINANCIAL PROFILE BY FLEET SEGMENT AND PERFORMANCE TIER

Individual Vessel Profile: Crab Area A

Area A Crab Individual Vessels	Top 1/3	Middle 1/3	Bottom 1/3	Fleet Average
Landings (Kg)	129,274	60,328	29,484	73,029
Vessel Price (per Kg)	$4.96	$4.96	$4.96	$4.96
Gross Revenue (Gross Stock)	**$ 641,250**	**$ 299,250**	**$ 146,250**	**$ 362,250**
Less: Fishery Specific Expenses				
Fuel	105,000	78,750	35,000	72,917
At sea monitoring Offload Monitor	5,500	5,000	3,500	4,667
Licence / Co-management Fees	590	590	590	590
Licence/ Quota Lease	-	-	-	-
Bait	70,000	52,500	35,000	52,500
Gear maintenance/replacement	20,000	15,000	7,500	14,167
Total Fishery Specific Expenses	201,090	151,840	81,590	144,840
Net Revenue (Net Stock)	**440,160**	**147,410**	**64,660**	**217,410**
Less:				
Crew and Captain Shares	198,072	66,335	29,097	97,835
Fishery Contribution	**242,088**	**81,076**	**35,563**	**119,576**
Vessel Fixed Expenses				
Insurance	10,000	10,000	5,000	8,333
Repairs & Maintenance	50,000	50,000	20,000	40,000
Moorage	2,000	2,000	1,200	1,733
Miscellaneous	5,000	3,000	2,500	3,500
Total Vessel Expenses	**67,000**	**65,000**	**28,700**	**53,567**
Earnings (EBITDA)	**$175,088**	**$16,076**	**$6,863**	**$66,009**

* Some totals might not add up right due to rounding.
Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

Individual Vessel Profile: Crab Areas B-J

Areas B-J Crab Individual Vessels	Top 1/3	Middle 1/3	Bottom 1/3	Fleet Average
Landings (Kg)	29,030	12,701	5,897	15,876
Vessel Price (per Kg)	$6.10	$6.10	$6.10	$6.10
Gross Revenue (Gross Stock)	**$ 176,000**	**$ 77,000**	**$ 35,750**	**$ 96,250**
Less: Fishery Specific Expenses				
Fuel	14,000	14,000	8,000	12,000
At sea monitoring Offload Monitor	2,500	2,500	2,500	2,500
Licence / Co-management Fees	590	590	590	590
Licence/ Quota Lease	-	-	-	-
Bait	5,000	5,000	3,000	4,333
Gear maintenance/replacement	4,000	4,000	2,000	3,333
Total Fishery Specific Expenses	26,090	26,090	16,090	22,757
Net Revenue (Net Stock)	**149,910**	**50,910**	**19,660**	**73,493**
Less:				
Crew and Captain Shares	44,000	19,250	8,938	24,063
Fishery Contribution	**105,910**	**31,660**	**10,723**	**49,431**
Vessel Fixed Expenses				
Insurance	5,000	5,000	5,000	5,000
Repairs & Maintenance	10,000	10,000	10,000	10,000
Moorage	1,200	1,200	1,200	1,200
Miscellaneous	2,500	2,500	2,500	2,500
Total Vessel Expenses	**18,700**	**18,700**	**18,700**	**18,700**
Earnings (EBITDA)	**$87,210**	**$12,960**	**-$7,978**	**$30,731**

*Some totals might not add up right due to rounding.
Source: Nelson Bros Fisheries Ltd. Pacific Commercial Fishing Fleet: Financial Profiles Report 2007.

ANNEX III: COMPANIES IN B.C. THAT BOUGHT CRAB IN 2008 BY REGION

Greater Vancouver Regional District	**Nanaimo Regional District**
NORTHWEST SEAFOOD LTD	SEA DRIFT FISH CO LTD
PACIFIC RIM SHELLFISH 2003 COR	SEAFOOD4LIFE PRODUCTS INC
ADANAC SEAFOODS INC	**Alberni – Clayoquot Regional District**
ALBION FISH CO	TRILOGY FISH CO LTD
DOLLARTON CRAB SHOP (93) LTD	WEIGH WEST MARINE RESORT
SEA TREASURE MARINE PRODUCTS LTD	FANNY BAY OYSTERS LTD
SEA WORLD FISHERIES LTD	**Comox – Strathcona Regional District**
HING LEE SEAFOOD LTD	PORTUGESE JOE FISH MARKET
CLEAR BAY FISHERIES INC	HEIDI'S SEAFOODS LTD
TRI-STAR SEAFOOD SUPPLY LTD	**Mount Waddington Regional District**
MOON ENTERPRISE INC	HARDY BUOYS SMOKED FISH INC
BORNSTEIN SEAFOODS CANADA LTD	SCARLET POINT SEAFOODS LTD
SEA WORLD TRADING LTD	**Skeena-Queen Charlotte Regional District**
BEST HONOUR SEAFOOD LTD	PORCHER SEAFOODS
RONNIE TRADING	TAKEDA CANADA TRADING ENT
LIONS GATE FISHERIES LTD	S & S SEAFOOD
Capital Regional District	C.B. ISLAND FISHERIES LTD
628375BC INC	AERO TRADING CO LTD
NORTH DOUGLAS SYSCO	ALBION FISH CO
THE FISH STORE	**Unknown**
ALBION FISHERIES VICTORIA	PUBLIC SALE
F A S WHOLESALE SEAFOOD PRODUCTS LTD	CRABBY BOB'S SEAFOOD
SATELLITE FISH CO LTD	

Source: DFO. Catch Statistics Unit.