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*James Neave  
A/RD Policy Branch Pacific Region*

The Economic Importance of Fraser River Sockeye JUL 10 1 2011  
for Commercial & Recreational Harvesters,  
Processors, and Coastal Communities

*Referenced  
by Steve  
Cleb  
earlier draft*

A Report by the  
Policy Branch, Department of Fisheries and Oceans

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## Executive Summary

The purpose of this analysis is to identify the economic importance of the Fraser River sockeye to commercial and recreational harvesters, processors, and coastal communities in the Province of British Columbia and the direct economic impacts of adding Sakinaw and Cultus Lake sockeye salmon to Schedule 1 of the Species at Risk Act (SARA).

In 2003, 6.24 million kg of sockeye were landed coast-wide providing a landed value of \$24.1 million; 2.99 million kg were Fraser River sockeye with a landed value of \$11.82 million prior to any processing added-value.

Of the 2,221 commercial salmon licence entitled to fish for salmon coast-wide in 2003, 1,012 licences fish for Fraser River sockeye in large quantities which are owned by 906 licence holders.

Although no decision has been made regarding the potential area and time closure of a portion of the Fraser River sockeye migration run to protect Sakinaw and Cultus Lake sockeye, projected estimates are provided on the additional potential impact that SARA restrictions could have. The analysis demonstrates the incremental impacts from the current fishing regime to one that may be in place under SARA.

As an allowable harm assessment has yet to be undertaken, three salmon harvest scenarios under SARA (appendix 1) were developed by Fisheries and Oceans Canada's Fisheries Management. These scenarios were used as the basis for an assessment of a range of impacts from a possible listing of the two salmon populations. Given time constraints, this analysis only assesses the impacts from the 'moderate' option, which allows for a 10-12% salmon exploitation rate. Thus, if it is determined that there is no scope for harm, the impact to the commercial and recreational harvesting sector, as well as the processing sector will be greater than what is reflected in this analysis. In addition, the Food, Social and Ceremonial allocations for First Nations could be significantly reduced.

Listing of Sakinaw Lake sockeye salmon is forecasted to result in a direct projected estimated loss of gross revenue of \$81.4 million over a four year salmon cycle (2004-2007) which will be borne by the commercial harvest sector (58%), processing sector (42%), and recreational sector (less than 1%). The estimated loss over this four year salmon cycle will range from \$7.4 million in low cycle abundant years to \$41.1 million in high abundance cycle years. If listed, Sakinaw Lake sockeye would require more than one generation to recover (draft Recovery Strategy estimate of 2017) and therefore, these impacts will continue until the species is either de-listed or reassessed by COSEWIC as being extinct.

Listing of Cultus Lake sockeye salmon is forecasted to result in a direct projected estimated loss of gross revenue of \$28.0 million over a four year salmon cycle (2004-2007) which will be borne by the commercial harvest sector (48%), southern salmon processing sector (35%) and recreational sector (17%). The estimated loss over this four year salmon cycle will range from \$2.3 million in low cycle abundant years to \$14.3 million in high abundance cycle years. If listed, Cultus Lake sockeye would require more than one generation to recover and therefore, these impacts will continue until the species is either de-listed or reassessed by COSEWIC as being extinct.

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The analysis demonstrates that the northern east coast of Vancouver Island has the highest concentration of dependence on Fraser River sockeye. Many of the coastal communities in this area face significant challenges as these communities are among the least economic diverse economies in British Columbia making it difficult to transfer to another industry within the community. Vancouver and the Lower Mainland are anticipated to have a high impact (in terms of potential job and revenue losses) but is forecasted to be minimized as a result of such a diverse economy and lower economic dependency on fishing revenue for household income in comparison to remote coastal communities.

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## 1.0 Introduction

This report provides a common basis on which to discuss the economic importance of Fraser River Sockeye and the potential impacts adding Sakinaw or Cultus Lake sockeye salmon to SARA's legal list.

This analysis provides an overview of the dependence on Fraser River sockeye, and presents estimates of:

- the total number of fishers involved in the commercial salmon fishery;
- the total number licence holders that would potentially be affected by area and time closures to protect Sakinaw or Cultus under SARA;
- the total number and location of wild salmon processing plants, and the total number of person-years (PYs) of employment; and
- the socio-economic profile of potentially affected communities.

Fisheries and Oceans Canada has compiled and contributed information regarding the harvesting sector and the key characteristics of potentially affected communities, while the Province of British Columbia has contributed information on the processing sector.

Data for the calendar years 2004 to 2007 are used throughout most of the report to identify potential impacts where data for the calendar years 2000 to 2003 are used to identify historical value and dependence on Fraser River sockeye.

Additional economic information is available. See Appendix 2 for details.

## 2.0 METHODOLOGY AND LIMITATIONS

### 2.1 Sockeye Harvest Scenarios and Catch Projections

Data on the anticipated sockeye harvest scenarios and catch projections under SARA was compiled by DFO by estimating each year's total run size based on brood year escapements and average escapement goals, accounting for anticipated pre-spawn mortality (assumed to be 10% for Sakinaw and 30% for Cultus), and subtracting 950,000 pieces annual for First Nations for FSC needs prior to commercial and recreational allocation. A DFO Allowable Harm Assessment will officially determine the scope of harm permitted for these stocks and will also identify whether or not scientific and or incidental harm permits may be issued. This analysis is based upon the moderate scenario (refer to appendix 1 for details on the three options), which allows for a 10-12% exploitation rate. However, if the allowable harm assessment determines that there is no scope for harm, a more realistic scenario would be the severe scenario, which permits a less than 5% exploitation rate. The impacts to the commercial, recreational and processing sectors would be greater, as would the impact to First Nation Food, Social and Ceremonial fishing.

Anticipated Fraser River sockeye catch estimates include co-migratory sockeye stocks, such as Sakinaw and Cultus Lake, which are bound for Johnstone Strait and Upper Gulf of Georgia. Cultus and Sakinaw Lake sockeye make up a small portion of the entire Fraser River sockeye population. Therefore, all estimates included in this report are primarily foregone catches of other Fraser River

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sockeye species, as Sakinaw and Cultus could not sustain an economically viable fishery independently.

## 2.2 Commercial Harvest Sector

The group of licence holders which may be affected by potential Fraser River sockeye area and time closures was selected based on the criterion of having landed at least one dollar of southern sockeye salmon and projected to land southern sockeye salmon in 2004. This group was deemed to represent the active salmon licence holders, i.e. those actually fishing sockeye salmon. Due to time constraints, only 2002 and 2003 active licence holders were used in the analysis.

Several assumptions were made in order to estimate the impact that potential area and time closures might have on licence holders. They are:

- Any sockeye income from Area B, D, E, G and H is eliminated once Sakinaw and Cultus Lake sockeye are anticipated to start migrating into each designated area, but other salmon species income is maintained. Sockeye income from unaffected areas is maintained (e.g. sockeye income from area A, C and F is still available to licence northern holders).
- All income is returned to the licence holder's point of contact, irrespective of where the fish was either caught or landed.

Crew multiplier to estimate employment size by gear type and area was devised based on average crew size according to the 1994 Cost and Earnings Survey and applied to each licence accordingly. No information is available on crew rotation, and therefore, it is not possible to identify if a skipper uses multiple crews during a season, or if a crew member works on several vessels during a season. Therefore, crew impacts are estimates.

The total commercial harvesting sector impacts were estimated based two options, a base case (without listing: 30-40% exploitation rate) and a moderate option (with listing: 10-12% exploitation rate) for a full salmon cycle (2004-2007). The total commercial harvesting sector impacts were then calculated based on the below linear allocation among gears and average fish prices over the 4 years:

Gear Type	Area	Allocation	Price \$ Per KG Round
Seine	Area B	40%	\$3.85
Gillnet	Area D	15%	\$3.85
Gillnet	Area E	30%	\$3.63
Troll	Area G	0%	NA
Troll	Area H	15%	\$5.65

Note: The prices are based on the average of those received in 2003 adjusted for bonuses with an average weight of sockeye assumed to be 2.7 kg as sockeye prices and weight are fairly stable.

The overall total estimated impacts were then allocated to each of the species based on their resulting change in exploitation rate, taking into account run timing and management measures already in place to protect other species (i.e. late run sockeye). For example, Fraser River sockeye during the Sakinaw sockeye run timing group would be targeted at an estimated 40% exploitation rate without listing (base case) but would decrease to 12% with listing (moderate option, resulting

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in a decrease of 72% in the overall exploitation rate). Whereas, Fraser River sockeye during the Cultus sockeye run timing group would be targeted at an estimated 20% exploitation rate (base case) but would decrease to 12% with listing (moderate option, resulting in a decrease of 28% in the overall exploitation rate). Cultus Lake sockeye is targeted at a lower exploitation rate because DFO annually implements management measures to protect late run Fraser River sockeye which coincides with the Cultus Lake sockeye run time, thus resulting in lower impacts when compared to Sakinaw Lake sockeye.

### 2.3 Recreational Sector

Recreational sector impacts identified in this report are based on marine sector expenditures of \$200 per tidal angler day or \$400 per tidal sockeye caught, and on in-river expenditures of \$100 per freshwater angler day (also \$100 per freshwater sockeye caught). The tidal expenditures vary only slightly as it assumed that, in the absence of marine sockeye angling opportunities, half of the sockeye effort would be redirected to other marine species.

The daily expenditures are based on the DFO 2000 Survey of Recreational Fishing (2003), Provincial SWOT Assessment by GSGislason & Associates Ltd. (2004), and Socio-Economic Implications of the Species-At-Risk Act: Sakinaw & Cultus Sockeye by GSGislason & Associates Ltd. (2004).

### 2.4 Processing Sector

Data on the processing sector was compiled by the Province of British Columbia, Ministry of Agriculture, Food and Fisheries.

The Province of British Columbia conducted a survey of processing operations in 2002. The total number of licensed fish plants in BC in 2002 was 213, of which 191 participated in the survey. No adjustment has been made to the data to account for the missing forms.

During the survey, plants were asked to report the number of people on the payroll for each month. The monthly numbers were then totalled and divided by 12 to get an annual average job number for each plant. Of the 191 plants surveyed, 179 plants employed staff.

Processing sector impacts identified in this report are based on the value-added they provide to the harvesting industry among gear types:

Gear Type	Area	Value-Added \$ Per KG Round	Price \$ Per KG Round
Seine	Area B	\$3.15	\$7.00
Gillnet	Area D	\$3.15	\$7.00
Gillnet	Area E	\$2.97	\$6.60
Troll	Area G	NA	NA
Troll	Area H	\$1.88	\$7.53

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The value-added and prices are based on Provincial Strengths, Weaknesses, Opportunities, and Threats (SWOT) Assessment by GSGislason & Associates Ltd. (2004), and Socio-Economic Implications Of the Species-At-Risk Act: Sakinaw & Cultus Sockeye by GSGislason & Associates Ltd. (2004) with the average weight of a sockeye assumed to be 2.7kg.

Given data constraints and a lack of information regarding specific amount of salmon that may be removed from individual processing plants should there be a SARA listing, it is not possible to determine which plants in which areas will be most affected by fishing restrictions as a result of SARA.

### 2.5 Limitations

This analysis was constrained by three limitations, time, resource and data constraints, and therefore, there are some restrictions to this analysis.

As the Species at Risk Act is a new process, all departments are in the learning phases of what to provide, to whom it should be provided to, and when it should be provided. As a result, DFO Pacific Region had a two week timeline to research, collect, analyze and produce this report so that decision makers had the appropriate information to assist in the decision making process.

Fisheries can vary significantly in terms of activities, industry participants, and operating costs. As the most recent data DFO has in identifying participation and financial performance of vessel owners is the 1994 Costs and Earning (C&E) survey it is not possible to determine the actual number of fishers that may be significantly impacted or net revenue losses as the data is dated. Furthermore, it is not possible to identify which licence holders are dependent on the affected fisheries for a majority of their income as they may receive income from other non-fishery related industry sectors. DFO recognizes these issues and has initiated a re-launch of the C&E survey across Canada in 2005 for the 2004 fishing year.

As data is not maintained that associates where salmon is caught to where it is processed, it is not possible to determine which specific processing plants and associated jobs would be significantly affected by a decrease in the availability of the resource that may result from a SARA listing. To accurately capture this additional information, special surveys of processing plants would be required. It has been widely held that the processing sector is already suffering from economic losses as a result of the downturn in the salmon fishery. As the supply of wild salmon is altered, plant owners may respond by making business decisions which may include sourcing salmon from other areas, re-tooling to process other species or products, or ceasing operations. This analysis cannot predict what business decisions plant owners may make if these salmon populations are SARA listed.

### 3.0 HARVESTING SECTORS

There are three main harvesting sectors that target Fraser River sockeye:

- First Nations for food, social, and ceremonial purposes;
- Commercial harvesters; and
- Recreational/sport fishing harvesters.

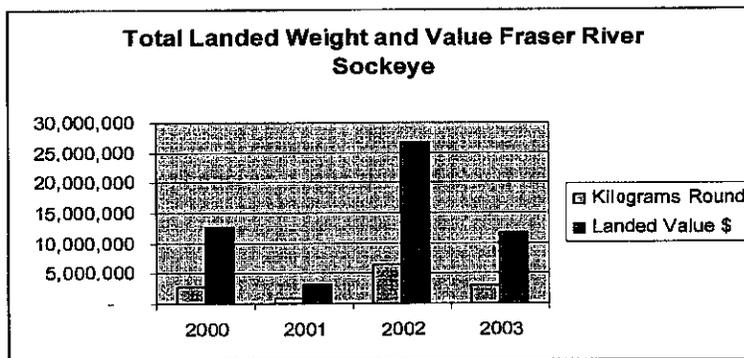
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This report only provides an overview of the last two harvest sectors as it is not anticipated that First Nations' FSC fishery will be reduced as a result of listing either Sakinaw or Cultus Lake sockeye under the moderate scenario, but flexibility to harvest may be limited. However, it is important to note that First Nations make up an estimated 25% of the commercial harvest industry and 30% of the person- years of employment attributed to the processing industry<sup>1</sup>.

Due to time limitations this report uses two options in which to evaluate the potential impacts: a base case (without listing: 30-40% exploitation rate) and a moderate option (with listing: 10-12% exploitation rate) for a full salmon cycle (2004-2007). For illustrative purposes, Appendix 1 of this report evaluates the potential range of management measures and associated impacts on the fishing industry in the 2004 calendar year (low cycle year) by adding two options: a severe option (with listing: less than 5% exploitation rate, if allowable harm permits cannot be issued) and a minimal option (with listing: 15-20% exploitation rate). The purpose of this appendix is to provide a degree of magnitude of the potential impacts listing may have if additional management measures are required to assist in the recovery of either Sakinaw or Cultus Lake sockeye.

### 3.1 Commercial Harvest Fraser River Sockeye

Historically, the total landed kilograms round was much higher. In 2000 to 2003, they were the following:



Note: Fraser River Sockeye have multi-year life histories that result in 4 annual cycles which is apparent in the above chart, with 2002 being the dominant cycle year.

The impact of the potential area and time closures to protect Sakinaw or Cultus Lake sockeye would be greater than suggested by the amount or landed value of the fish in question as it does not include indirect impacts (i.e. loss of revenue to other industries which provide supplies necessary for fishers to commercial fish, such as hooks, food, fuel, etc.).

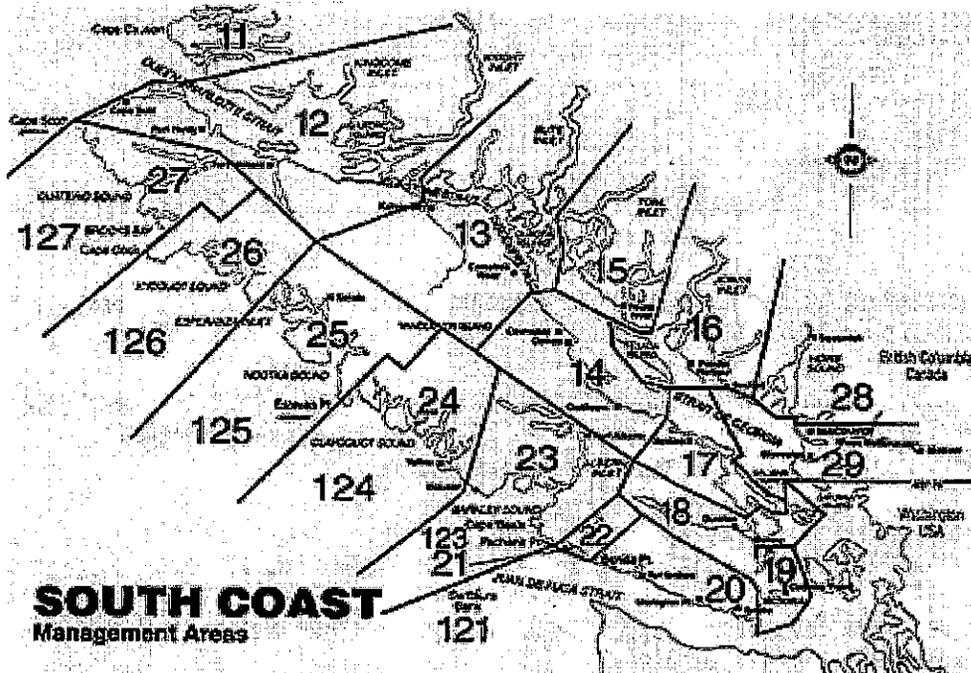
Throughout BC there are 8 salmon management areas with 2,221 vessel based licences (3 northern management areas and 5 southern management areas). The potential area and time closures to protect Sakinaw and Cultus Lake sockeye is anticipated to affect the 4 southern salmon

<sup>1</sup> James, Michelle, " Native Participation in BC Commercial Fisheries - 2003"

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management<sup>2</sup> areas (1,012 commercial licences) which fish for Fraser River sockeye in large abundances:

- Area B Seine: 167 commercial licences with an average crew of 5.2 people, includes statistical areas 11-29 and 121
- Area D Gillnet: 286 commercial licences with an average crew of 1.83 people, includes statistical areas 11-15 and 23-27
- Area E Gillnet: 406 commercial licences with an average crew of 1.83 people, includes statistical areas 16-22, 28, 29 and 121
- Area H Troll: 153 commercial licences with an average crew of 2.1 people, includes statistical areas 12-19, 28 and 29



For the remainder of this report, potential impacted areas are broken out by 12 geographic areas, rather than salmon management areas, to provide an analysis consistent with the geographic areas provided by the Province of B.C. for the processing industry. The 12 geographic areas are: Queen Charlotte Islands, North Coast, Central Coast, North Vancouver Island, Mid Vancouver Island, South Vancouver Island, West Coast Vancouver Island, Victoria and Area, Sunshine Coast, Vancouver and Area, Other Non-Coastal BC, and Unknown/Outside BC.

<sup>2</sup> Area G Troll is not anticipated to be an impacted salmon management area, as the primary target species is Chinook. Area G Troll: 235 commercial licences with an average crew size of 2.1 people, includes statistical areas 11, 20 to 27, 111-121, 123 to 127.

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The 1,012 commercial salmon licences are owned and operated by 906 licence holders in the following geographic areas:

Region	# Active Southern Salmon Licence Holders for 2003 Calendar Year
<b>QCI</b>	2
<b>North Coast</b>	23
<b>Central Coast</b>	11
<b>North VI</b>	48
<b>Mid VI</b>	185
<b>S VI</b>	90
<b>WCVI</b>	49
<b>Victoria &amp; Area</b>	38
<b>Sunshine Coast</b>	27
<b>Vancouver &amp; Other</b>	403
<b>Other BC</b>	10
<b>Outside BC/Unknown</b>	20
<b>BC Total</b>	906

Note: # Active licence holders does not equal the total number salmon licences as fishers may own multiple vessels, each of which may hold multiple salmon licences.

With recent decreases in earnings in the salmon fleet and less continuity in the workforce from year to year, southern salmon fishers are diversifying their fishing portfolios to include a range of vessel and personal licences rather than traditionally relying on one licence.

The table below identifies the licence holders who fished Fraser River sockeye in 2002 and 2003 distributed according to their total fishing income and reliance on Fraser River sockeye.

Table 1: Number of licence holders harvesting a percentage of Fraser River sockeye by landed value income bracket for the 2002 calendar year

Income	0 %	1-10 %	11-25 %	26-50 %	51-75 %	76-89 %	90-99 %	100 %	Total
\$1,000 or less	3		1				1	5	10
\$1,001 - \$3,000	6			1		1	5	7	20
\$3,001 - \$5,000	1	1					5	5	12
\$5,001 - \$10,000	1	1		1	2	3	30	16	54
\$10,001 - \$20,000	8	1	2	7	9	12	101	36	176
\$20,001 - \$30,000	8	2	6	17	25	29	84	19	190
\$30,001 - \$40,000	1		6	15	26	13	28	6	95
\$40,001 - \$50,000		2	2	18	18	7	12	1	60
\$50,001 - \$100,000	9	5	13	47	46	9	9	2	140
\$100,001 - \$200,000	11	5	12	14	8	7	4		61
\$200,000 +	11	83	12	11	5		1		123
<b>Total :</b>	<b>59</b>	<b>100</b>	<b>54</b>	<b>131</b>	<b>139</b>	<b>81</b>	<b>280</b>	<b>97</b>	<b>941</b>

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Table 2: Number of licence holders harvesting a percentage of Fraser River sockeye by landed income bracket for the 2003 calendar year

Income	0 %	1-10 %	11-25 %	26-50 %	51-75 %	76-89 %	90-99 %	100 %	Total
\$1,000 or less	13						7	3	23
\$1,001 - \$3,000	11		1		2	1	29	11	55
\$3,001 - \$5,000	9		1	1	3	11	41	6	72
\$5,001 - \$10,000	11	1	1	6	18	17	52	6	112
\$10,001 - \$20,000	32	2	7	26	25	13	35	3	143
\$20,001 - \$30,000	28	4	23	25	24	13	15		132
\$30,001 - \$40,000	22	5	22	8	18	4	3		82
\$40,001 - \$50,000	8	3	9	6	3	3	2		34
\$50,001 - \$100,000	22	7	13	14	15	3	1		75
\$100,001 - \$200,000	19	9	13	8	2	1	1		53
\$200,000+	45	64	9	7					125
<b>Total :</b>	<b>220</b>	<b>95</b>	<b>99</b>	<b>101</b>	<b>110</b>	<b>66</b>	<b>186</b>	<b>29</b>	<b>906</b>

Note: Income does not reflect earnings from other industries, investment income or from government transfers.

Almost half of the licence holders relied on Fraser River sockeye for less than 25% of their fishing income in 2003. For this group, the majority had a fishing income of \$30,000+.

Although no decision has been made regarding the potential area and time closure to protect the two species, it is anticipated the 906 southern salmon licence holders will be impacted, primarily those identified in the above tables with a greater reliance on Fraser River sockeye for a percentage of their landed value. The impact of the potential area and time closures to protect each species will be greater than suggested by the amount or value of the fish in question as this analysis only takes direct impacts into account. The tables below identify the projected estimated impacts on the commercial harvest sector for each of the potentially listed species under the moderate scenario (specific fisheries management scenarios are detailed in the methodology section and appendix 1):

Table 3: Sakinaw Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Gross Revenue Value (\$ Millions)	Foregone Gross Revenue (\$ Million)
2004	0.8	0.4	\$8.5	\$4.3
2005	2.7	1.4	\$29.9	\$15.4
2006	3.9	2.2	\$42.7	\$23.9
2007	0.6	0.4	\$6.4	\$3.8

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Table 4: Cultus Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Revenue Gross Value (\$ Millions)	Foregone Gross Revenue (\$ Million)
2004	0.2	0.1	\$2.4	\$1.2
2005	0.8	0.4	\$8.4	\$4.3
2006	1.1	0.6	\$12.0	\$6.7
2007	0.2	0.1	\$1.8	\$1.1

### 3.2 Recreational Harvest Fraser River Sockeye

The impact of the potential catch and release sockeye restrictions to protect Sakinaw or Cultus Lake sockeye will be greater than suggested by the amount or value of the fish in question. The below tables identify the estimated impacts on the loss in recreational expenditures for each of the potentially listed species under the moderate scenario:

Table 5: Sakinaw Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Expenditure Value (\$ Millions)	Foregone Expenditure (\$ Million)
2004	0.0	0.0	0.3	0.0
2005	0.0	0.0	0.4	0.1
2006	0.0	0.0	0.7	0.1
2007	0.0	0.0	0.3	0.0

Table 6: Cultus Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Expenditure Value (\$ Millions)	Foregone Expenditure (\$ Million)
2004	0.1	0.0	6.0	0.2
2005	0.1	0.0	7.6	1.6
2006	0.1	0.0	13.4	2.8
2007	0.1	0.0	6.0	0.2

### 4.0 PROCESSING SECTOR

An estimated 103 processing plants process wild salmon throughout British Columbia of which, 28 are exclusively wild salmon plants. An estimated 38.4 million kilograms of wild salmon was processed coast-wide in British Columbia, including 2.99 million kilograms of Fraser River sockeye.

Province of British Columbia 2002 Fish Processing Employment Survey has helped to determine reliance on salmon coast-wide by geographic region.

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Table 7: Annual Number of Jobs (PYs) Attributed to Wild Salmon Processing<sup>3</sup>

Region	Total Wild Salmon Processing Plants			Core Wild Salmon Processing Plants			Non-Core Wild Salmon Processing Plants		
	# of Plants	Salmon Jobs (PYs)	Total Jobs (PYs)	# of Plants	Salmon Jobs (PYs)	Total Jobs (PYs)	# of Plants	Salmon Jobs (PYs)	Total Jobs (PYs)
<b>QCI</b>	3	12	32	-	-	-	3	12	32
<b>North Coast</b>	19	253	422	14	46	46	5	208	376
<b>Central Coast</b>	1	*	*	1	*	*	-	-	-
<b>North VI</b>	4	24	91	-	-	-	4	24	91
<b>MidVI</b>	4	*	*	1	*	*	3	37	193
<b>S VI</b>	6	*	*	1	*	*	5	100	167
<b>WCVI</b>	3	5	78	-	-	-	3	5	78
<b>Victoria &amp; Area</b>	7	29	57	-	-	-	7	29	57
<b>Sunshine Coast</b>	1	*	*	-	-	-	1	*	*
<b>Vancouver &amp; Other</b>	55	1,088	2,589	11	91	91	44	997	2,498
<b>BC Total - excluding confidential data</b>	99	1,549	3,629	25	137	137	74	1,412	3,492
<b>BC Total - including confidential data<sup>1</sup></b>	103	*	*	28	143	143	75	*	*

\* identifies confidential data - less than three companies reporting.

Although, no decision has been made regarding the potential closure of the two species, it is anticipated that processing plants in the following geographic areas may be significantly affected: North Vancouver Island, Mid Vancouver Island, South Vancouver Island, Victoria & Other Area, Sunshine Coast, and Vancouver & Other Area. These 6 geographic areas account for 75% (77 plants) of the entire wild salmon processing plants in B.C., which provide an estimated 1,141 to 1,205 person years of employment. North Coast, Central Coast, and Queen Charlotte Island processing companies are not anticipated to be impacted as Fraser River Sockeye are not believed to be processed in these plants. However, it is not possible to ascertain the direct impact to any specific processing plant.

The impact of the potential area and time closures to protect Sakinaw and/or Cultus Lake sockeye would be greater than suggested by the amount or value of the fish in question. The tables below identify the estimated impacts on the wild salmon processing industry sector for each of the potentially listed species in terms of loss in value-added:

<sup>3</sup> Source: Province of British Columbia 2002 Fish Processing Employment Survey



Table 8: Sakinaw Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Value-Added (\$ Millions)	Foregone Value- Added (\$ Million)
2004	0.8	0.4	6.1	3.1
2005	2.7	1.4	21.4	11.0
2006	3.9	2.2	30.6	17.1
2007	0.6	0.4	4.6	2.8

Table 9: Cultus Lake Sockeye

Year	Base Anticipated Catch Fraser River Sockeye (Millions)	Foregone Anticipated Catch Fraser River Sockeye (Millions)	Value-Added (\$ Millions)	Foregone Value- Added (\$ Million)
2004	0.2	0.1	1.7	0.9
2005	0.8	0.4	6.0	3.1
2006	1.1	0.6	8.6	4.8
2007	0.2	0.1	1.3	0.8

## 5.0 COMMUNITIES & DEMOGRAPHIC TRENDS

Vancouver and the Lower Mainland have the highest concentration on Fraser River sockeye in terms of number of fishers and processing plants. However, Vancouver and other areas economies are very diverse with a low economic dependence on the fishing industry.

The small and remote communities could be affected in different ways as these communities are home to fishers, fishing ports, wild salmon processing plants, fish markets, and other sockeye related services. Communities on the North Coast of Vancouver Island, such as Port Hardy, Port McNeil, and Alert Bay, have a high concentration of fishing industry employment to total population, and a high economic dependence on commercial fishing harvest for all fishery related income (range of 4% to 15% of total basic and non-basic after tax income<sup>4</sup>) for economic generation. These communities have been identified by BC Stats in their 2001 Economic Dependencies and Impact Ratio for 63 Local Areas report as least diversified economies coupled with already significant challenges:

- Significant down turn in the forestry industry as a result of softwood lumber issues. Forestry is often the most important industry in many coastal community economies.
- Those employed in the commercial fishing industry have a relatively low level of educational attainment (i.e. over half of fishermen do not have high school diplomas (Census of Canada)<sup>5</sup>) which limits employment transferability.

<sup>4</sup> BC Stats 2001 Economic Dependencies and Impact Ratios for 63 Local Areas.

<sup>5</sup> BC Seafood and Recreational Fishing SWOT, GSGilson & Associates Ltd.

- More than 40% of fishermen are 45 years of age or older with skippers being even older<sup>4</sup> which decreases the likelihood of affected fishers undergoing retraining to attain employment opportunities in other industry sectors.
- Decreased earnings in the salmon fleet with the use of more casual labour and less continuity in the workforce from year to year has resulted in attendant high turnover, making it very difficult, especially for seiners to find crew<sup>4</sup>.

6.0 APPENDIX 1: 2004 SOCKEYE SALMON HARVEST SENARIOS UNDER SARA

	Base Case 30-40% Exploitation Rate	Options		
		#1 Severe <5% Exploitation Rate	#2 Moderate 10-12% Exploitation Rate	#3 Minimal 15-20% Exploitation Rate
<b>Sockeye Harvest: pieces</b>				
First Nations	950,000	500,000	950,000	950,000
Commercial	1,000,000	150,000	500,000	800,000
Recreational	<u>57,000</u>	<u>55,000</u>	<u>56,000</u>	<u>56,500</u>
All	2,007,000	705,000	1,506,000	1,806,500
<b>Sakinaw Lake Sockeye</b>	<b>Revenue \$000</b>	<b>Foregone Revenue \$000</b>	<b>Foregone Revenue \$000</b>	<b>Foregone Revenue \$000</b>
First Nations	8,080	3,140	0	0
Commercial Harvest	10,946	7,236	4,257	1,703
Processing Value-Added	7,845	5,186	3,051	1,220
Recreational	<u>6,300</u>	<u>20</u>	<u>10</u>	<u>5</u>
All	33,171	15,582	7,318	2,928
<b>Cultus Lake Sockeye</b>	<b>Revenue \$000</b>	<b>Foregone Revenue \$000</b>	<b>Foregone Revenue \$000</b>	<b>Foregone Revenue \$000</b>
First Nations	8,080	897	0	0
Commercial Harvest	10,946	2,068	1,216	486
Processing Value-Added	7,845	1,482	872	349
Recreational	<u>6,300</u>	<u>380</u>	<u>190</u>	<u>22</u>
All	33,171	4,827	2,278	857

7.0 APPENDIX 2: ADDITIONAL INFORMATION

This report intent is to provide the common statistical and analytical support upon which further analysis may be conducted.

Further detail is available upon request:

Contact: Cory Paterson  
Department of Fisheries and Oceans  
401 Burrard Street  
Vancouver, B.C. V6C 3S4  
Tel: (604) 666-7168

Sakinaw/Cultus Sockeye RMC/GIL  
Materials - OHEB - PRHQ