

Draft
Financial Considerations Associated with Potential SARA Listing of
Sakinaw and Cultus Lake Sockeye

Copies made
available at
Nanaimo mty.

Policy Branch,
Pacific Region
Department of Fisheries and Oceans
November 9, 2004

Table of Contents

1. INTRODUCTION.....	2
2. SOCKEYE HARVEST SCENARIOS	2
3. METHODOLOGY, LIMITATIONS, AND ASSUMPTIONS	4
3.1. Fraser River Sockeye Catch Projections	4
3.2. Limitations and Assumptions.....	4
3.2.1. Uncertainty in Run Size	4
3.2.2. Uncertainty in Diversion Rate.....	5
3.2.3. Protection of Other Stocks	5
3.2.4. ER for Non-Listed Population	5
3.2.5. Management Flexibility	5
3.2.6. International Obligations.....	5
4. HARVESTING SECTORS	6
4.1. First Nation Food Social and Ceremonial Harvest Fraser River Sockeye.....	6
4.2. Commercial Harvest of Fraser River Sockeye.....	7
4.2.1. Historical Overview of the Commercial Harvest Industry	7
4.2.2. Commercial Harvest Fraser River Sockeye Projected Gross Landed Values.....	9
4.3. Processing Sector	11
4.4. Recreational Harvest Fraser River Sockeye.....	14
5. COMMUNITIES & DEMOGRAPHIC TRENDS.....	15
6. GOVERNMENT SECTOR.....	16
7. APPENDIX 1: MAP SOUTH COAST FISHERY MANAGEMENT AREAS	17
8. APPENDIX 2: HARVEST SCENARIOS	18
8.1. First Nations – FSC Fisheries	18
8.2. Commercial Harvest Sector	18
8.3. Recreational Harvest Sector.....	19
8.4. Processing Sector	20
9. APPENDIX 3: ESTIMATED EMPLOYMENT CREW SIZE AND OPPORTUNITY	21

1. INTRODUCTION

The purpose of this report is to present financial considerations associated with alternative harvest levels designed to address conservation concerns for the Sakinaw Lake and Cultus Lake sockeye populations. Specifically, the intent is to highlight the potential financial impacts associated with SARA listing these two sockeye stocks.

Fisheries and Oceans Canada has provided information on the harvesting sectors 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. Due to time limitations, only the 2003 calendar year is used as the basis for determining the number of active licence holders who may be affected.

2. SOCKEYE HARVEST SCENARIOS

Three salmon harvest scenarios are analyzed based on the allowable exploitation rate (ER) for the two sockeye populations:

- Scenario one was based on recent historical ER from the late 1990's to 2003 where:
 - Cultus lake ER's were in the range of 15 – 25% (primarily to protect late summer run), and
 - Sakinaw lake ER's were in the range of 22 – 24%.
- Scenario two was based on ER's currently in place for the 2004 fishery (10-12% ER);
- Scenario three was based on a more restrictive situation that may be required if stocks continue to decline or if a population is legally listed (less than 5% ER).

The harvest scenarios were then grouped into three options to identify the range of impacts:

- List Sakinaw Only;
- List Cultus Only; and
- List Both Cultus and Sakinaw

The exploitation rates described above are for each harvest scenario for Sakinaw or Cultus sockeye populations and are not overall exploitation rates for the Fraser River Sockeye fishery. The overall Fraser River exploitation rates are much higher:

- Recent historical levels (20-25% ER on Sakinaw & Cultus) allows a 50-60% exploitation rate on Fraser River sockeye;
- 2004 (10-12% ER on Sakinaw & Cultus) allows a 30-40% exploitation rate on Fraser River sockeye; and
- Less than 5% on Sakinaw & Cultus allows a 10-20% exploitation rate on Fraser River sockeye.

The key reason for this is that Sakinaw and Cultus Lake sockeye are both relatively small populations with known run times and patterns. As a result, other Fraser River sockeye stocks can be managed at higher exploitation rates when either Sakinaw or Cultus sockeye are not present. Therefore, the overall Fraser River sockeye exploitation rate, which is the total sum of all catch for

the calendar year as a percentage of total run size, can be higher than individual exploitation rates on individual stocks.

Each sockeye harvest scenario varies with each level of exploitation rate. Table 2 & 3 below describe the management regimes required to protect Sakinaw and Cultus at each of the three levels of exploitation (see Appendix 1 for geographic description of south coast fishery management areas).

Table 1: Management Regimes in Order to Provide Protection to Sakinaw Sockeye at Three Levels of Exploitation Rates

Management Regimes	Scenario 1: ER 20-25%	Scenario 2: ER 10-12%	Scenario 3: ER <5%
First Nation FSC	<ul style="list-style-type: none"> Regular access for First nations to harvest FSC in Johnstone/Queen Charlotte Strait and upper Strait of Georgia 	<ul style="list-style-type: none"> Start of fishery may be delayed in Johnstone/Queen Charlotte Strait and upper Strait of Georgia. First fishing opportunity may not occur until late July or early August 	<ul style="list-style-type: none"> Extensive area closures in Johnstone/Queen Charlotte Strait and upper Strait of Georgia from early July to mid August Opportunity to harvest Fraser sockeye in lower Strait of Georgia, Mouth Fraser, Juan de Fuca Strait and West Coast Vancouver Island.
Commercial	<ul style="list-style-type: none"> Area closures in Johnstone/Queen Charlotte Strait and upper Strait of Georgia during until mid to late July for all commercial gear (seine, gill net & troll) May need to limit amount of fishing gear allowed to participate in early opportunities. 	<ul style="list-style-type: none"> Extensive area closures in Johnstone/Queen Charlotte Strait and upper Strait of Georgia. First fishing opportunity may not occur until late July or early August Will need to limit amount of fishing gear allowed to participate in early opportunities (e.g. purse seines). 	<ul style="list-style-type: none"> Extensive area closures in Johnstone/Queen Charlotte Strait and upper Strait of Georgia from early July until to late August for all commercial gear (seine, gill net & troll) Opportunity to harvest Fraser sockeye in lower Strait of Georgia, Mouth Fraser, Juan de Fuca Strait and West Coast Vancouver Island.
Recreational	<ul style="list-style-type: none"> Retention of sockeye in marine waters and in tidal/non-tidal waters of Fraser River 	<ul style="list-style-type: none"> Non-retention of sockeye in marine waters of Johnstone/Queen Charlotte Strait and upper Strait of Georgia prior to late July or early August Retention of sockeye in other south coast marine waters and in tidal/non-tidal waters of Fraser River 	<ul style="list-style-type: none"> Non-retention of sockeye in marine waters of Johnstone/Queen Charlotte Strait and upper Strait of Georgia prior to late July or early August Retention of sockeye in other south coast marine waters and in tidal/non-tidal waters of Fraser River

Table 2: Management Regimes in Order to Provide Protection to Cultus Sockeye at Three Levels of Exploitation Rates

Management Regimes	Scenario 1: ER 20-25%	Scenario 2: ER 10-12%	Scenario 3: ER <5%
First Nation FSC	<ul style="list-style-type: none"> Regular access for First nations to harvest FSC in all areas First Nations would be encouraged to "front-end-load" on available Early Summer and Summer run sockeye. 	<ul style="list-style-type: none"> Extensive area closures in marine waters and downstream of the Vedder River after mid-August Limit the window of fishing opportunity to weeks prior to early to mid- August in marine waters and greater time of access within the Fraser River upstream of the Vedder River 	<ul style="list-style-type: none"> Extensive area closures in marine waters and downstream of Vedder River after early August Opportunity to harvest Fraser sockeye in marine waters prior to area closures timing and greater time of access within the Fraser River upstream of the Vedder River
Commercial	<ul style="list-style-type: none"> Area closures in marine waters and downstream of the Vedder River from mid August for all commercial gear (seine, gill net & troll) window of fishing opportunity 2-3 weeks from late July until early August for gill net and troll and purse seine gear 	<ul style="list-style-type: none"> Extensive area closures in marine waters and downstream of the Vedder River from early August for all commercial gear (seine, gill net & troll) window of fishing opportunity 1-2 weeks from late July until early August for gill net and troll and purse seine gear 	<ul style="list-style-type: none"> Extensive area closures in marine waters and downstream of the Vedder River from early August for all commercial gear (seine, gill net & troll) May be opportunity for very limited openings prior to early August in marine waters and within the Fraser River

Management Regimes	Scenario 1: ER 20-25%	Scenario 2: ER 10-12%	Scenario 3: ER <5%
Recreational	<ul style="list-style-type: none"> Retention of sockeye in marine waters and in tidal/non-tidal waters of Fraser River. Some area closures might be necessary after mid-August. Opportunity within the Fraser River upstream of the Vedder River. 	<ul style="list-style-type: none"> Non-retention of sockeye in marine waters and downstream of the Vedder River after early August Opportunity within the Fraser River upstream of the Vedder River 	<ul style="list-style-type: none"> Non-retention of sockeye in marine waters and downstream of the Vedder River after early August Opportunity within the Fraser River upstream of the Vedder River

3. METHODOLOGY, LIMITATIONS, AND ASSUMPTIONS

3.1. Fraser River Sockeye Catch Projections

The estimated impacts presented in this assessment were determined through the use of the Fraser River Panel pre-season planning model. This model was created to assist the Fraser River Panel in developing pre-season fishing plans for Fraser River sockeye and pink salmon. Although it has primarily been used for pre-season planning, in 2004 it was also utilized in-season to assess the impacts on Cultus Lake, Sakinaw Lake and late- run Fraser sockeye stocks.

The model has been described as a “box-car” type model which simulates the movement of Fraser sockeye and pink salmon through all fishing areas in southern BC, US waters and into the Fraser River. As each stock/stock group passes through a particular fishery it has a harvest rate applied to it that has been calculated from a lengthy history of fishery information associated with that fishery. As such, the total catch, exploitation rate and expected escapement for each stock/stock group can be calculated from summing all fisheries occurring on these stocks.

Information such as forecast return (run size) by stock/stock group, escapement goal, run timing and distribution, diversion rate through Johnstone Strait and other associated management information is incorporated in the model and modified annually as required. A scientific paper reviewing this model was published in the Canadian Journal of Fisheries and Aquatic Sciences (Vol.51).

3.2. Limitations and Assumptions

Understanding the assumptions used in the analysis and the impact they have on the outcome is critical in interpreting the results. This section outlines the key assumptions.

3.2.1. Uncertainty in Run Size

There is a lot of uncertainty in forecasting run size returns as it is driven by marine survival and therefore, tend to vary dramatically. Fraser River sockeye run size predictions used in this analysis are averages consistent with long- term analysis and are based on Ricker Stock Recruit estimates:

- 2004 - 5.0 Million
- 2005 - 11.6 million
- 2006 - 14.8 million
- 2007 - 6.0 million

Two points need to be considered: there are several approaches for forecasting returns, and each one is different. The actual variations in run size ranges, from which the averages are derived, can be large. For example, the range in 2006 was from 3.4 million to 22 million and the range for 2007 was 3 million to 12 million.

3.2.2. Uncertainty in Diversion Rate

Diversion rate refers to the percentage of the Fraser River sockeye population that migrate through Johnstone Strait. For example, a 60% diversion rate means that 60% of the run migrates through the Johnstone Strait (east coast Vancouver Island) and 40% migrates down the west coast of Vancouver Island.

For the purpose of this analysis, the model assumes a Fraser River sockeye diversion rate of 60% which is reflective of recent historical rates (late 1990's to 2003). Variations in diversion rate can affect the outcome of the analysis. At a 60% diversion rate it is generally assumed that there is an adequate supply of sockeye in the Johnstone Strait to meet First Nations food, social and ceremonial (FSC) harvest needs. But a much smaller diversion (about 30%) through Johnstone Strait makes it very difficult to meet FSC requirements. Also, a larger diversion rate increases the impacts associated with protecting Sakinaw sockeye by reducing fishing opportunities and harvest of stocks.

3.2.3. Protection of Other Stocks

Thompson coho have been protected for several years. Because of these protective measures, fishing opportunities in Juan de Fuca and off the mouth of the Fraser River are limited. Given small opportunities, gillnets have some harvesting success off the mouth of the Fraser river but it is difficult for seine fleet to harvest in that area. Additional opportunity exists for the gillnet fleet in the Fraser River, but they are restricted to two days a week in order to provide adequate opportunity for First Nations FSC fisheries.

3.2.4. ER for Non-Listed Population

In protecting only Sakinaw or only Cultus, a judgement had to be made about the ER rate that would be applied to the non-listed population. This analysis assumes that the ER for the non-listed population will be 10-12% because it is believed that it is unlikely that the ER would return to the more recent historical level of 20-25% from where it is today. Therefore for the purposes of this analysis it is assumed that:

- Under the list 'Only Cultus' (i.e. not Sakinaw) the ER for the non-listed population (i.e. Sakinaw) would be 10-12%; and
- Under the list 'Only Sakinaw' (i.e. not Cultus) the ER for the non-listed population (i.e. Cultus) would be 10-12%.

3.2.5. Management Flexibility

Management flexibility in designing fishing plans for First Nations FSC, recreational and commercial harvesters to protect stocks of concern is advised by the *Allocation Policy for Pacific Salmon*. This policy confirms conservation as the primary objective, provides priority access to First Nations for FSC and treaty rights, followed by a priority to recreational sector for chinook and coho, and establishes target allocations by gear subject to conservation requirements.

3.2.6. International Obligations

Under the Pacific Salmon Treaty, the United States is annually entitled to harvest 16.5% of Fraser River sockeye through to the end of the current annex arrangements in 2010. When applied to the current agreed-upon ER ceiling of 15% for late run sockeye (excluding Birkenhead), this equates to 2.5 of the 15 ER points for US fisheries. In addition the Fraser River Panel approved test fisheries equate to an ER of 1%. This means that once ER's are adjusted to reflect Canada-US and test fishing commitments, the Canadian ER is lower. For example:

- Recent history (20-25% ER) provides a 16.5-21.5% Canadian ER;

- 2004 (10-12% ER) provides a 6.5-8.5 % Canadian ER; and
- Less than 5% provides a maximum of 1.5% Canadian ER.

4. HARVESTING SECTORS

Three harvesting sectors target Fraser River sockeye:

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

4.1. First Nation Food Social and Ceremonial Harvest Fraser River Sockeye

A number of First Nation bands in Johnstone Strait, the Sechelt Peninsula, and along the Fraser River harvest Fraser River sockeye for Food, Social and Ceremonial (FSC) purposes. Bands belonging to the Kwakwaka'wakw Territorial Fisheries Commission harvest sockeye in Johnstone strait. The Sechelt Band on the Sechelt Peninsula has Sakinaw Lake as part of its traditional territory and targets sockeye in the Sabine Channel. The Soowahlie Band of the Sto:Lo First Nation occupies the land that borders both sides of Sweltzer Creek, the sole access to Cultus Lake. In addition, Musqueam, Matsqui and other Lower Mainland Bands harvest sockeye in the Fraser estuary and downstream of the Vedder River on the Fraser system¹.

First Nations' have a direct interest in targeted sockeye FSC fisheries as they provide an important source of food to aboriginal people as well as harvesting and use for social and cultural benefits. Although these harvests do not generate economic revenue, they do provide non-economic benefits which may even exceed the benefits of subsistence as a food source. As a result it is better to estimate the replacement food costs of subsistence, and appreciate the limitations as a measure of "value", rather than to not value subsistence at all. Therefore, the food value along of the subsistence harvest under the various scenarios is based on 2.7 kg per fish, with an in-river fish valued at \$2.90 per kg, and a marine fish valued at \$3.85 per kg².

Assuming recent historical exploitation rates for Sakinaw and Cultus of 20-25%, the FSC Fraser River sockeye harvest was estimated to have a value of \$32.3 million over a four year cycle (2004-2007). Conservation measures introduced in the 2004 fishing season to protect Sakinaw and Cultus are not expected to reduce this value. Additional management measures to protect Sakinaw and Cultus through a less than 5% exploitation rate are estimated to reduce the value of FSC Fraser River sockeye harvest from \$32.3 million to \$22.2 million.

Table 6 shows how conservation measures applied to Sakinaw only or Cultus only would affect the value of the Fraser River Sockeye FSC harvest.

Table 3: Estimated Value of First Nations FSC Fraser River Sockeye Harvest (2004-2007) – Under Three Exploitation Scenarios

	S C E N A R I O
--	-----------------

¹ GSGislason & Associates Socio-Economic Implications of the Species-at-Risk Act Sakinaw and Cultus Sockeye – prepared for Canada Department of Fisheries & Oceans Vancouver, BC. April 2004.

² GSGislason & Associates Socio-Economic Implications of the Species-at-Risk Act Sakinaw and Cultus Sockeye – prepared for Canada Department of Fisheries & Oceans Vancouver, BC. April 2004.

Conservation Measure	Recent History 20-25% (Value \$ Millions)	2004 Target 10-12% (Value \$ Millions)	Less than 5% (Value \$ Millions)
Restrictions to protect Sakinaw	N/A	\$32.3	\$32.3
Restrictions to protect Cultus	N/A	\$32.3	\$23.7
Restrictions to protect both Sakinaw and Cultus	\$32.3	\$32.3	\$22.2

Note: Table 6 values cannot be added, as each represents the total value of the FSC Fraser River sockeye harvest.

It is important to note that First Nations make up an estimated 25% of the commercial harvest industry (crew) and 30% of the person- years of employment attributed to the processing industry³. Within the south coast of British Columbia, First Nations have a high concentration of the employment opportunities in the processing sector in Northern Vancouver Island. Reductions in commercial catch will result in reductions in aboriginal revenues, wages, net returns and employment.

4.2. Commercial Harvest of Fraser River Sockeye

4.2.1. Historical Overview of the Commercial Harvest Industry

Historically, the total landed value of Fraser River sockeye was much higher and contributed a significant contribution to the coast-wide salmon landed value (i.e. between 8-45%). In 2000 to 2003, the landed value of salmon and Fraser River sockeye were the following:

Table 4: Historical Landed Value of Salmon Vs. Fraser River Sockeye Salmon

Year	Salmon Landed Value (\$000's)	Fraser Sockeye Landed Value (\$000's)	Percentage Total Landed Value
2000	\$52,429	\$12,589	24%
2001	\$37,173	\$2,794	8%
2002	\$57,338	\$25,726	45%
2003	\$48,115	\$11,320	24%

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

Throughout BC there are 8 salmon management areas with 2,221 vessel based licences (3 northern management areas and 5 southern management areas). Because Fraser River sockeye are only harvested in the southern coastal areas of British Columbia, potential area and time closures to protect Sakinaw or Cultus Lake sockeye is anticipated to affect 4 of the 5 southern salmon management⁴ areas (1,012 commercial licences) which fish for Fraser River sockeye in large abundances. See Appendix 1 for a map of the south coast fishery management areas and Appendix 3 for estimated employment crew size and employment distribution by area.

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

³ Michelle James, "Native Participation in BC Commercial Fisheries", prepared for BC Agriculture Food & Fisheries, November, 2003.

⁴ Area G Troll is not anticipated to be an impacted salmon management area, as the primary target species is Chinook.

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.

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

Table 5: Number of Active Licence Holders, for 2003 Calendar Year

Region	# Active Licence Holders, 2003
Queen Charlotte Islands	2
North Coast	23
Central Coast	11
Northern Vancouver Island	48
Mid Vancouver Island	185
Southern Vancouver Island	90
West Coast of Vancouver Island	49
Victoria & Area	38
Sunshine Coast	27
Vancouver & Other	403
Other BC	10
Outside BC/Unknown	20
BC Total	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. Both 2002 and 2003 calendar years have been analyzed to identify dependence according to fishing income in both a high sockeye abundant year (2002) and a low sockeye abundant year (2003).

Table 6: 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

Income	0 %	1-10 %	11-25 %	26-50 %	51-75 %	76-89 %	90-99 %	100 %	Total
\$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
Total :	59	100	54	131	139	81	280	97	941

Table 7: 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
Total :	220	95	99	101	110	66	186	29	906

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 greater than \$30,000.

4.2.2. Commercial Harvest Fraser River Sockeye Projected Gross Landed Values

Although no decision has been made regarding the potential area and time closure to protect the Sakinaw and Cultus, it is anticipated the 906 southern salmon licence holders who participated in the 2003 fishery will be impacted, primarily those identified in the tables 8 & 9 with a greater reliance on Fraser River sockeye for a percentage of their landed value. The impact of 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 licence holders affected by potential Fraser River sockeye area and time closures were 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 licence Area B, D, E, G and H is eliminated once Sakinaw and Cultus Lake sockeye start migrating, 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 northern licence holders); and
- 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.

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.

The total commercial harvesting sector impacts was calculated based on the below commercial allocation among gears and average fish prices over the 4 years:

Table 8: Commercial Allocation and Average Sockeye Prices

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 2003 averages adjusted for bonuses and assuming an average weight 2.7 kg per sockeye.

Assuming recent historical exploitation rates for Sakinaw and Cultus of 20-25%, a gross landed value was estimated for catch of commercial Fraser River sockeye fisheries over a four year cycle (2004-2007) at about \$116.3 million. Conservation measures introduced in the 2004 fishing season to protect Sakinaw and Cultus are estimated to reduce the gross landed value of commercial Fraser River sockeye fisheries from \$116.3 million to \$72.6 million. Additional management measures to protect Sakinaw and Cultus through a less than 5% exploitation rate are estimated to reduce the gross landed value of commercial Fraser River sockeye fisheries from \$72.6 million to \$10.4 million.

Table 10 provides additional detail on how conservation measures applied to either Sakinaw only or Cultus only separately would reduce the value associated with all Fraser River sockeye commercial fisheries.

Table 9: Value Commercial Fraser River Sockeye Fisheries (2004-2007) – Under Three Exploitation Scenarios

Year	Recent History 20-25% (Gross landed Value \$ Millions)	2004 Target 10-12% (Gross Landed Value \$ Millions)	Less than 5% (Gross Landed Value \$ Millions)
Restrictions to Protect Sakinaw	\$116.3	\$72.6	\$41.5
Restrictions to Protect Cultus	\$116.3	\$72.6	\$10.4
Restrictions to Protect Sakinaw and Cultus	\$116.3	\$72.6	\$10.4

Note: Landed values identified in the Sakinaw options and the landed values identified in the Cultus options are not additive as they represent the total landed value of the commercial Fraser River sockeye fishery for each option.

If additional management measures are taken to protect Sakinaw and Cultus through a less than 5% exploitation rate, no commercial harvest will be permitted in low cycle years (i.e. 2004, 2005, and 2007). Limited commercial fishing of around 1.0 million pieces will be permitted in high cycle years (i.e. 2006). The British Columbia salmon fleet is characterized by poor economics due to over capacity and high fixed and therefore will not be economically viable under a 5% ER scenario.

4.3. Processing Sector

An estimated 103 processing plants process wild salmon throughout British Columbia of which, 28 are exclusively wild salmon plants.

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

Table 10: Annual Number of Jobs (PYs) Attributed to Wild Salmon Processing⁵

⁵ Canada Department of Fisheries & Oceans, "2000 Survey of Recreational Fishing in Canada", Economic and Commercial Analysis Report No. 165, March, 2003.

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)
QCI	3	12	32		-	-	-		3	12	32
North Coast	19	253	422		14	46	46		5	208	376
Central Coast	1	*	*		1	*	*		-	-	-
North VI	4	24	91		-	-	-		4	24	91
MidVi	4	*	*		1	*	*		3	37	193
S VI	6	*	*		1	*	*		5	100	167
WCVI	3	5	78		-	-	-		3	5	78
Victoria & Area	7	29	57		-	-	-		7	29	57
Sunshine Coast	1	*	*		-	-	-		1	*	*
Vancouver & Other	55	1,088	2,589		11	91	91		44	997	2,498
BC Total –excluding confidential data	99	1,549	3,629		25	137	137		74	1,412	3,492
BC Total – including confidential data¹	103	*	*		28	143	143		75	*	*

Note: * identifies confidential data - less than three companies reporting. Furthermore, core wild salmon processing plants refers to those which process only wild salmon, whereas, non-core refers to those which process wild salmon as well as other seafood products, including farmed salmon.

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 & 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.

Data on the processing sector was provided 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 were based on the value-added provided to the harvesting industry by gear types:

Table 11: Processing Value-Added by Commercial Gear Type⁶

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

Note: Value-added in this document is the difference between market value and landed value and therefore, is not true economic value-added.

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 in response to harvest restrictions, it is not possible to determine which plants will be most affected.

Assuming recent historical exploitation rates for Sakinaw and Cultus of 20-25%, a value-added was estimated for processing Fraser River sockeye over a four year cycle (2004-2007) at about \$83.3 million. Conservation measures introduced in the 2004 fishing to protect Sakinaw and Cultus are estimated to reduce the value-added of processing Fraser River sockeye from \$83.3 million to \$52.0 million. Additional management measures to protect Sakinaw and Cultus through a less than 5% exploitation rate are estimated to reduce the value-added of processing Fraser River sockeye fisheries from \$52.0 million to \$7.5 million.

Table 13 provides additional detail on how conservation measures applied to either Sakinaw or Cultus separately would reduce the processing value-added associated with all Fraser River sockeye.

Table 12: Value Processing Value-Added Fraser River Sockeye (2004-2007) – Under Three Exploitation Scenarios

Year	Recent History 20-25% (Value-Added \$ Millions)	2004 Target 10-12% (Value-Added \$ Millions)	Less than 5% (Value-Added \$ Millions)
Restrictions to Protect Sakinaw	\$83.3	\$52.0	\$29.7
Restrictions to Protect Cultus	\$83.3	\$52.0	\$7.5
Restrictions to Protect Sakinaw and Cultus	\$83.3	\$52.0	\$7.5

Note: Value-added identified in the Sakinaw options and the value-added identified in the Cultus options are not additive as they represent the total value-added of processing Fraser River sockeye fishery for each option.

⁶ GSGislason & Associates Socio-Economic Implications of the Species-at-Risk Act Sakinaw and Cultus Sockeye – prepared for Canada Department of Fisheries & Oceans Vancouver, BC. April 2004.

If additional management measures are taken to protect Sakinaw and Cultus through a less than 5% exploitation rate, no commercial harvest will be permitted in low cycle years (i.e. 2004, 2005, and 2007) and therefore, no processing of Fraser River sockeye will occur in these years. Limited commercial fishing of around 1.0 million pieces will be permitted in high cycle years (i.e. 2006) which will provide some Fraser River sockeye processing opportunities. Poor sockeye catches in 2004 resulted in the tenth consecutive year that salmon processor's returns were negative or inadequate. Reductions in processor value from \$52.0 million to \$7.5million combined with the fact that the \$7.5million only occurs in 2006 is likely to dramatically impact the ability of the wild salmon processing industry to survive and would result in dramatic changes to the existing processing infrastructure (i.e. through reallocations, closures, new products, etc).

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.

4.4. Recreational Harvest Fraser River Sockeye

There are currently 125 fishing lodges, 500 charters and 330,000 tidal licensed anglers in BC. In 2002 the recreational fishery generated 2.1 million tidal angler days 3,590 person years of employment and approximately \$550 million in sales expenditures⁷. As a result, any potential impacts on the recreational fishery as a result of protecting Sakinaw or Cultus Lake sockeye will be greater than suggested by the amount or expenditure value⁸ of the fish in question.

Recreational sector impacts were 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 species⁹.

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).

Assuming recent historical exploitation rates for Sakinaw and Cultus of 20-25%, an expenditure value was estimated for catch of recreational Fraser River sockeye fisheries over a four year cycle (2004-2007) at about \$36.1 million. Conservation measures introduced in the 2004 fishing to protect

⁷ GSGislason & Associates Ltd, "BC Seafood and Recreational Fishing SWOT", prepared for BC Ministry of Agriculture Food & Fisheries, February, 2004.

⁸ Expenditure value refers to the amount anglers spent on lodges, charters, boats, accommodation, gear, food, etc.

⁹ GSGislason & Associates Socio-Economic Implications of the Species-at-Risk Act Sakinaw and Cultus Sockeye – prepared for Canada Department of Fisheries & Oceans Vancouver, BC. April 2004.

Sakinaw and Cultus are estimated to reduce the expenditure value of recreational Fraser River sockeye fisheries from \$36.1 million to \$35.6 million. Additional management measures to protect Sakinaw and Cultus through a less than 5% exploitation rate are estimated to reduce the expenditure value of recreational Fraser River sockeye fisheries from \$35.6 million to \$27.8 million.

Under a less than 5% ER there will be no retention of southern sockeye in all marine waters (excluding Barkley Sound) and in the Fraser River up to the Fraser-Vedder Junction. Retention of Fraser River sockeye will be permitted above the Fraser River Junction.

Table 11 provides additional detail on how conservation measures applied to either Sakinaw or Cultus separately would reduce the value associated with all Fraser River sockeye commercial fisheries.

Table 13: Value of Recreational Fisheries (2004-2007) – Under Three Exploitation Scenarios

Year	Recent History 20-25% (Expenditure Value \$ Millions)	2004 Target 10-12% (Expenditure Value \$ Millions)	Less than 5% (Expenditure Value \$ Millions)
Restrictions to Protect Sakinaw	\$36.1	\$35.6	\$35.6
Restrictions to Protect Cultus	\$36.1	\$35.6	\$27.8
Restrictions to Protect Sakinaw and Cultus	\$36.1	\$35.6	\$27.8

Note: Values identified in the Sakinaw options and the values identified in the Cultus options are not additive as they represent the total value of the recreational Fraser River sockeye fishery for each option.

5. COMMUNITIES & DEMOGRAPHIC TRENDS

Salmon is important to the people of BC as it forms part of the intrinsic identity to those who live here and those who travel here. To many of us, salmon are a key part of our rich cultural heritage and psyche and provide a constant source of economic generation. Potential and long-term reductions in salmon will have negative repercussions for a wide range of people and communities in southern BC.

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, thus providing strong potential for employment transferability without relocation.

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 income¹⁰) for economic generation. These communities have been identified by BC Stats in their 2001 Economic Dependencies and Impact

¹⁰ Garry Horne, BC Ministry of Management Services (BC Stats), "British Columbia's Heartland at the Dawn of the 21st Century: 2001 Economic Dependencies and Impact Ratios for 63 Local Areas", January, 2004.

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. The forestry industry is beginning to rebound, but is still lower in terms of employment then in previous years (i.e. 1994 to 2000)¹¹;
- 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)¹²) which limits employment transferability;
- More than 40% of fishermen are 45 years of age or older with skippers being even older¹⁸ which decreases the likelihood of affected fishers undergoing retraining to attain employment opportunities in other industry sectors; and
- 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 crew¹⁸.

6. GOVERNMENT SECTOR

Department of Fisheries and Oceans has and will continue to incur significant costs related to SARA and its associated recovery planning process for Sakinaw and Cultus sockeye. DFO is currently spending an estimated \$0.5 million per year on Sakinaw and Cultus Lake sockeye to assist in the recovery process by developing recovery strategies, monitoring the stocks to identify limiting constraints, etc. If either Sakinaw or Cultus Lake sockeye are listed, it is anticipated that costs are expected to increase significantly as further recovery measures will be necessary, such as:

- Fishery management, through increased monitoring of the southern sockeye salmon fishery,
- Enforcement, through increased enforcement efforts to ensure conservation measures are being followed,
- Science and habitat, through broodstock collection, habitat improvement, migration monitoring, development of recovery strategies and action plans (required every five years), etc., and
- Litigation costs, through potential legal challenges from aboriginal, environmental and harvest groups.

The Province of British Columbia also has spent professional time and incurred expenditures related to the SARA process, specifically in regards to Sakinaw and Cultus such as by compiling and providing data on the processing sector for this analysis.

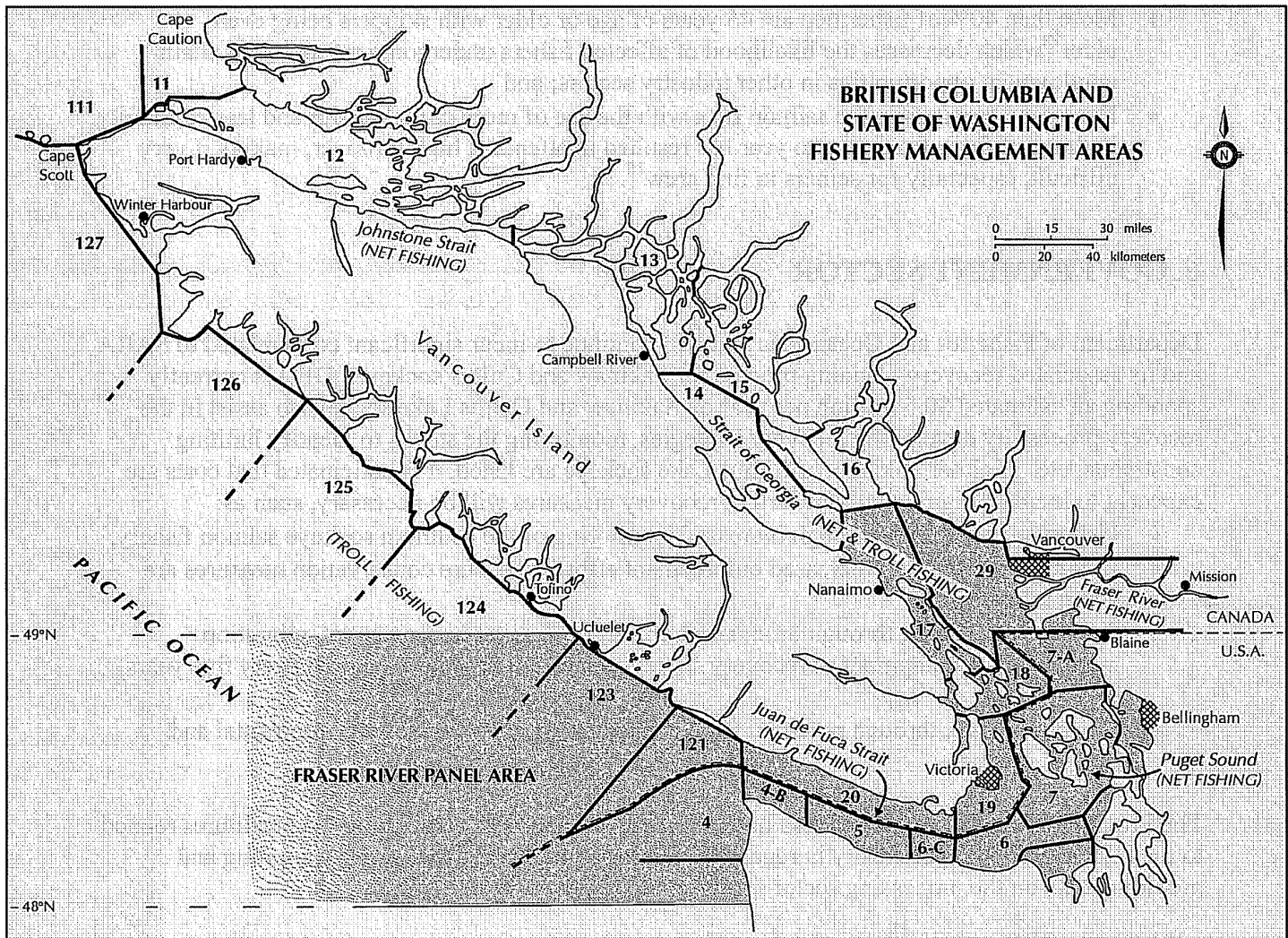
¹¹ Statistics Canada, Labour Force Survey

¹² GSGislason & Associates Ltd, "BC Seafood and Recreational Fishing SWOT", prepared for BC Ministry of Agriculture Food & Fisheries, February, 2004.

7. APPENDIX 1: MAP SOUTH COAST FISHERY MANAGEMENT AREAS¹³

Geographic Breakdown of Commercial Fisheries Management Areas:

- West Coast Vancouver Island (WCVI): Statistical areas 121-127
- Juan de Fuca Strait: Statistical areas 20
- Mouth Fraser River: Statistical areas 17-19 & 29
- Strait of Georgia: Statistical areas 14-16
- Johnstone Strait: Statistical areas 12 – 13
- Queen Charlotte Strait: Statistical areas 111 & 11



¹³ Map provided by the Pacific Salmon Commission.

8. APPENDIX 2: HARVEST SCENARIOS

8.1. First Nations – FSC Fisheries

List Both Sakinaw and Cultus

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)	Option 2, 10-12% Exp. Rate (# Pieces Millions)	Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)
2004	1.0	\$8.1	1.0	\$8.1	.5	\$4.0
2005	1.0	\$8.1	1.0	\$8.1	.8	\$6.0
2006	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
2007	1.0	\$8.1	1.0	\$8.1	.5	\$4.0
Total	3.8	\$32.3	3.8	\$32.3	2.7	\$22.2

List Sakinaw Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)	Option 2, 10-12% Exp. Rate (# Pieces Millions)	Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)
2004	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
2005	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
2006	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
2007	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
Total	3.8	\$32.3	3.8	\$32.3	3.8	\$32.3

List Cultus Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value (\$ Millions)
2004	1.0	\$8.1	1.0	\$8.1	.6	\$4.6
2005	1.0	\$8.1	1.0	\$8.1	.8	\$6.5
2006	1.0	\$8.1	1.0	\$8.1	1.0	\$8.1
2007	1.0	\$8.1	1.0	\$8.1	.6	\$4.6
Total	3.8	\$32.3	3.8	\$32.3	2.9	\$23.7

8.2. Commercial Harvest Sector

List Sakinaw and Cultus

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)
2004	1.2	\$13.5	0.6	\$7.0	0.0	\$-
2005	2.8	\$30.6	1.7	\$18.1	0.0	\$-
2006	4.9	\$53.6	3.4	\$37.2	1.0	\$10.4
2007	1.7	\$18.5	0.9	\$10.3	0.0	\$-
Total	10.6	\$116.3	6.6	\$72.6	1.0	\$10.4

List Sakinaw Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)
2004	1.2	\$13.5	0.6	\$7.0	0.3	\$3.5
2005	2.8	\$30.6	1.7	\$18.1	0.8	\$9.0
2006	4.9	\$53.6	3.4	\$37.2	2.2	\$23.8
2007	1.7	\$18.5	0.9	\$10.3	0.5	\$5.1
Total	10.6	\$116.3	6.6	\$72.6	3.8	\$41.5

List Cultus Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Gross Revenue (\$ Millions)
2004	1.2	\$13.5	0.6	\$7.0	0.0	\$-
2005	2.8	\$30.6	1.7	\$18.1	0.0	\$-
2006	4.9	\$53.6	3.4	\$37.2	1.0	\$10.4
2007	1.7	\$18.5	0.9	\$10.3	0.0	\$-
Total	10.6	\$116.3	6.6	\$72.6	1.0	\$10.4

8.3. Recreational Harvest Sector

List Sakinaw and Cultus

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)
2004	0.1	\$6.1	0.1	\$6.1	0.0	\$2.7
2005	0.1	\$12.3	0.1	\$11.7	0.1	\$10.7
2006	0.1	\$11.7	0.1	\$11.7	0.1	\$11.7
2007	0.1	\$6.1	0.1	\$6.1	0.0	\$2.7
Total	0.3	\$36.1	0.3	\$35.6	0.3	\$27.8

List Sakinaw Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)
2004	0.1	\$6.1	0.1	\$6.1	0.1	\$6.1
2005	0.1	\$12.3	0.1	\$11.7	0.1	\$11.7
2006	0.1	\$11.7	0.1	\$11.7	0.1	\$11.7
2007	0.1	\$6.1	0.1	\$6.1	0.1	\$6.1
Total	0.3	\$36.1	0.3	\$35.6	0.3	\$35.6

List Cultus Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Expenditure Value (\$ Millions)
2004	0.1	\$6.1	0.1	\$6.1	0.0	\$2.7
2005	0.1	\$12.3	0.1	\$11.7	0.1	\$10.7
2006	0.1	\$11.7	0.1	\$11.7	0.1	\$11.7
2007	0.1	\$6.1	0.1	\$6.1	0.0	\$2.7
Total	0.3	\$36.1	0.3	\$35.6	0.3	\$27.8

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

8.4. Processing Sector

List Sakinaw and Cultus

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)
2004	1.2	\$9.7	0.6	\$5.0	0.0	\$-
2005	2.8	\$22.0	1.7	\$12.9	0.0	\$-
2006	4.9	\$38.4	3.4	\$26.7	3.4	\$7.5
2007	1.7	\$13.3	0.9	\$7.4	0.0	\$-
Total	10.6	\$83.3	6.6	\$52.0	3.4	\$7.5

List Sakinaw Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)
2004	1.2	\$9.7	0.6	\$5.0	0.3	\$2.5
2005	2.8	\$22.0	1.7	\$12.9	0.8	\$6.5
2006	4.9	\$38.4	3.4	\$26.7	2.2	\$17.1
2007	1.7	\$13.3	0.9	\$7.4	0.5	\$3.7
Total	10.6	\$83.3	6.6	\$52.0	3.8	\$29.7

List Cultus Only

Year	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 1 20-25% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)	Option 3 Less Than 5% Exploitation Rate (# Pieces Millions)	Value-Added (\$ Millions)
2004	1.2	\$9.7	0.6	\$5.0	0.0	\$-
2005	2.8	\$22.0	1.7	\$12.9	0.0	\$-
2006	4.9	\$38.4	3.4	\$26.7	3.4	\$7.5
2007	1.7	\$13.3	0.9	\$7.4	0.0	\$-
Total	10.6	\$83.3	6.6	\$52.0	3.4	\$7.5

9. APPENDIX 3: ESTIMATED EMPLOYMENT CREW SIZE AND OPPORTUNITY

Licence Area	# Eligible Salmon Vessels	Average Crew Size	Total Maximum Crew Size	Year	20-25% for both		10-12% for both		<5% for both	
					# Days Fished	Total Maximum Crew Days	# Days Fished	Total Maximum Crew Days	# Days Fished	Total Maximum Crew Days
B	137	5.2	712	2004	4	2,850	2	1,425	0	-
				2005	3	2,137	2	1,425	0	-
				2006	5	3,562	4	2,850	1	712
				2007	5	3,562	3	2,137	0	-
				Total	17	12,111	11	7,836	1	712
D	234	1.83	428	2004	3	1,285	2	856	0	-
				2005	2	856	2	856	0	-
				2006	4	1,713	3	1,285	1	428
				2007	3	1,285	2	856	0	-
				Total	12	5,139	9	3,854	1	428
E	383	1.83	701	2004	2.5	1,752	1.5	1,051	0	-
				2005	2.5	1,752	1.5	1,051	0	-
				2006	5	3,504	3	2,103	1	701
				2007	3.5	2,453	2.5	1,752	0	-
				Total	13.5	9,462	8.5	5,958	1	701
G	221	2.1	464	2004	0	-	0	-	0	-
				2005	0	-	0	-	0	-
				2006	0	-	0	-	0	-
				2007	0	-	0	-	0	-
				Total	0	-	0	-	0	-
H	141	2.1	296	2004	12	3,553	8	2,369	0	-
				2005	11	3,257	6	1,777	0	-
				2006	19	5,626	15	4,442	9	2,665
				2007	18	5,330	12	3,553	0	-
				Total	60	17,766	41	12,140	9	2,665
			TOTAL	2004	21.5	9,440	13.5	5,701	0	-
				2005	18.5	8,003	11.5	5,109	0	-
				2006	33	14,405	25	10,678	12	4,506
				2007	29.5	12,630	19.5	8,299	0	-
Total	1116	N/A	N/A		102.5	44,477	69.5	29,788	12	4,506