

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

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 the SARA listing of these two sockeye populations.

Sakinaw Lake and Cultus Lake sockeye are both relatively small populations that, in recent years, represent an insignificant part of the overall harvest of salmon in southern British Columbia. However, since these two sockeye populations are at very low levels, significant conservation measures have been introduced to protect them. As a consequence, fishing opportunities on (and catch of) abundant co-migrating sockeye populations have been constrained, thereby resulting in foregone income and employment.

Three salmon harvest scenarios are analyzed based on the allowable exploitation rate (ER) for the two sockeye populations¹.

- Recent Historical Levels- 20-25% ER on Cultus and Sakinaw. This ER is reflective of recent history - late 1990s to 2003.
- 2004 Target of 10-12% ER. This exploitation rate reflects significant restrictions put in place for the 2004 year to protect both Sakinaw and Cultus.
- Less than 5% ER. This exploitation rate reflects a more restrictive situation that may occur if stocks continue to decline or if the population is legally listed.

Comparisons are made between three options:

1. List only Sakinaw²;
2. List only Cultus²; and
3. List both Sakinaw and Cultus.

Under each option, comparisons are made between:

- Recent Historical rates (20-25% ER) and the 2004 Target (10-12% ER); and
- 2004 measures (10–12% ER) and a less than 5% exploitation rate.

METHODOLOGY

The estimated impacts presented in this assessment were determined through the use of the Fraser 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.

¹ Appendix 3 and 4 provides detail on how and where management regimes change under each harvest scenario for both Sakinaw and Cultus Lake sockeye.

² Assumes a 10-12% ER on the non-listed Cultus/Sakinaw population. It is unlikely that under a 'no listing' situation a higher ER would be applied.

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).

The harvest scenarios were selected assuming:

- Scenario one was based on recent historical ER from the late 1990’s to 2003 (of 20-25%) where:
 - Cultus Lake ERs were in the range of 15 – 25% (primarily to protect late run sockeye³),
 - Sakinaw Lake ERs were in the range of 22 – 24%.
- Scenario two was based on ERs currently in place for the 2004 fishery;
- 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.

Appendix 2 provides detail on how management regimes change under each harvest scenario for both Sakinaw and Cultus Lake sockeye.

ASSUMPTIONS and LIMITATIONS

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.

1. Uncertainty in Run Size

There is a lot of uncertainty about forecasting returns. Run size forecasts are very dependent on marine survival rates. 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 huge. 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.

Run sizes vary dramatically and are driven by marine survival rates. The selection of run size drives the results.

³ Excludes Birkenhead.

2. 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. Protection of Other Stocks

Thompson coho have been protected for several years. Because of 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.

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

5. Management Flexibility

Management flexibility in designing fishing plans for First Nations and 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.

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.

RESULTS

The following analysis provides some comparisons of gross value⁴ of sockeye harvests to illustrate the potential impact of ongoing conservation measures. Comparisons are made between recent historical levels and 2004 Exploitation Rate targets, and the 2004 ERs and a more restrictive scenario.

1. A Comparison of Recent History (20-25%) VS 2004 Target Exploitation Rates (10%-12%)

Assuming recent historical exploitation rates for Sakinaw and Cultus of 20-25%, a gross value was estimated for the catch of Fraser River sockeye over a four-year cycle (2004-2007) at about \$268 million. This estimate includes the very small contribution of both Sakinaw and Cultus lake sockeye populations.

In 2004 conservation measures were introduced to protect both Sakinaw and Cultus. As a consequence of implementing those conservation measures - which were designed to reduce the exploitation rate down to the 10-12% range - fishing opportunities on (and catch of) abundant co-migrating populations were constrained, thus reducing income and employment.

Conservation measures such as those introduced in 2004 (10-12% ER) to protect either only Sakinaw, only Cultus or both Sakinaw and Cultus are estimated to reduce the gross value of the Fraser River sockeye from \$268 million (2004-2007) to \$192.5 million over the same time period.

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 unlikely that the ER would return to the more recent historical level of 20-25%. This assumption about the ER for the non-listed population, coupled with conservation measures already in place to protect Early Summer Fraser sockeye (which Sakinaw migrate with), results in all three options shifting from recent history to the 2004 Target ER of 10-12% producing the same outcome. Even if early summers rebound, harvest restrictions would continue because of the conservation measures necessary to protect Sakinaw and would hence result in an increased foregone gross value due to Sakinaw.

2. A Comparison of 2004 (10-12%) Verses Less Than 5%

In spite of extensive conservation measures introduced in 2004 to protect Sakinaw and Cultus, it may be necessary to further restrict harvest opportunities. Should the populations continue to decline or if they are legally listed, it may be necessary to further constrain harvest opportunities (i.e. to less than 5% ER).

Sakinaw Lake Sockeye Only

Achieving an exploitation rate of less than 5% for only Sakinaw (i.e. not Cultus) further reduces fishing opportunities on (and catch of) the co-migrating stocks which is projected to reduce the gross value from the \$192.5 million (2004-2007) to \$139.1 million over a four-year cycle (2004-2007).

⁴ The values presented are calculated for the commercial fishery, processing sector, recreational fishing and First Nations food, social and ceremonial components and summed together (see appendix 1 for methodology, and appendix 2 for projected values for each sector).

Assumptions and Impacts (at the less than 5% ER):

- No commercial fishery in Queen Charlotte Strait, Johnstone Strait and upper Strait of Georgia, creating major distributional impacts for commercial harvesters;
- Commercial fishery will be allowed in other areas where and when Sakinaw not present such as Lower Georgia, Fraser River, Mouth of the Fraser River and Juan de Fuca;
- Harvest estimates for fisheries in these areas reflect concerns for a) International issues — increased seine fisheries in Juan de Fuca will exacerbate US complaints that US seiners are unable to harvest their share of Fraser River TAC under the Pacific Salmon Treaty; b) domestic issues - can only fish Area E gillnet fleet a maximum of 2 days per week; c) concerns for migrating interior coho during July and August when they are present in Juan de Fuca and September and October in the Fraser River.
- FSC allowed in Johnstone Strait during the last week of July and later. FSC also have access to FR sockeye in other areas where Sakinaw are not present;
- Recreational non-retention fisheries in marine waters of Queen Charlotte Strait, Johnstone Strait and upper Strait of Georgia. Retention of sockeye in other south coast marine areas and downstream and in non-tidal waters of Fraser River.
- Future impacts may be greater if the Early Summer Fraser sockeye populations return at levels considerably larger than forecast or the populations increase in abundance in the future. Under such a scenario ER would continue to be restricted at the less than 5% level to protect Sakinaw sockeye. This means that the additional potential harvest from the rebounded co-migrating population would be foregone.

Cultus Lake Sockeye Only

Achieving an exploitation rate of less than 5% for only Cultus, reduces fishing opportunities on (and catch of) the co-migrating stocks which are projected to reduce the gross value from \$192.5 million to \$69.4 million over a four year cycle (2004-2007).

Assumptions and Impacts (at the less than 5% ER):

- No marine commercial fishery on southern Fraser River sockeye would occur, with the exception of 2006. In 2006 a larger return of Early Summer and Late run sockeye is expected, but with an ER of 5% or less, only a small commercial harvest of about 950,000 would potentially occur.
- FSC fisheries will continue to receive priority access but restrictions will be in place. It assumes that reductions from 950,000 to a range from 550,000 to 850,000 will occur in all years except 2006.
- Recreational non retention fisheries in all marine waters and downstream of the Fraser-Vedder junction. Retention of sockeye above the Fraser-Vedder junction will be permitted upstream of the Fraser-Vedder junction.

Impacts:

- Under this scenario there will be no commercial harvest of Fraser River sockeye in three of the four years. In 2006, a small harvest will be available. Industry cannot survive under such conditions.
- Calculated impacts may be greater if the currently weak co-migrating late run populations ever rebound to historical levels. Under such a scenario ER would continue to be restricted at the less than 5% level to protect Cultus sockeye. This means that the additional potential harvest from the rebounded co-migrating population would be foregone.

Sakinaw & Cultus Lake Sockeye

In shifting from a 10-12% ER to less than 5% to protect both Sakinaw & Cultus additional measures will be required. These additional measures will reduce fishing opportunities on (and catch of) the co-migrating stocks which are projected to reduce the gross value from \$192.5 million to \$67.8 million over a four year cycle (2004-2007).

Assumptions and Impacts (at the less than 5% ER):

- No commercial fishery on Southern Fraser River sockeye will occur with the exception of 2006. In 2006 a larger return is expected, but with an ER of 5% or less, only a small commercial harvest of about 950,000 will be permitted. Industry cannot survive under such conditions
- FSC fisheries will continue to receive priority access but restrictions will be in place. It assumes that reductions from 950,000 to from 550,000 to 850,000 will occur in all years except 2006.
- Recreational marine activity will be restricted to catch and release in the southern marine areas. In river recreational fishing will be permitted upstream of the Fraser-Vedder junction.

Table 1: Gross Value⁵ of Fraser River Sockeye (2004-2007) To the Southern Fishing Industry – Under Three Exploitation Scenarios

Options	Recent History (20-25% ER) Gross Value (\$ Millions)	2004 Target (10-12% ER) Gross Value (\$ Millions)	More Restrictive (Less than 5% ER) Gross Value (\$ Millions) ⁶
Restrictions to Protect Sakinaw	N/A	\$192.5	\$139.1
Restrictions to Protect Cultus	N/A	\$192.5	\$69.4
Restrictions to Protect both Sakinaw & Cultus	\$268.0	\$192.5	\$67.8

INTERPRETING THE RESULTS

The results show that in listing both Sakinaw and Cultus it is expected that the gross value will decline from \$268 million (at 20-25% ER) to \$192.5 million (at 10-12%ER) to \$67.8 million (at less than 5%ER). This translates into a forgone value due to shifting from 2004 ER (10-12%) to a more restrictive ER (less than 5%) of \$125 million over four years (2004-2007). This number is based on conservative estimates and likely underestimates the magnitude of impacts. However, the estimate is indicative of the overall trend and provides a reasonable estimate of the impacts.

It is much more complex and difficult to estimate the impacts associated with listing only Cultus or only Sakinaw. Given the assumptions in this analysis concerning run size, run timing, survival rates, diversion rate etc, the impacts associated with listing only Cultus drive the analysis and account for most of the impacts in shifting from current 2004 levels to less than 5% ER. Based on these assumptions, the analysis shows that, once protective measures are in place for Cultus (reduction in gross value to 69.4 M) adding Sakinaw

⁵ These values are values for the entire fishing industry which consists of: First Nations FSC fisheries, Commercial landed-value, recreational expenditure value, and processing value-added. Tables 2, 3, & 4 in appendix 2 provide projected total impacts over the same 4 year cycle (2004-2007) for each sector.

⁶ There is an overlap in run timing between the two populations (i.e. 1st week of August), which results in overlapping conservation measures (i.e. between options 1 & 2 in the Queen Charlotte Strait, Johnstone Strait, and Strait of Georgia – See appendix 3 and 4 for details). Therefore, the total sum of the impact of listing each individually results in double counting the area and time closures associated with the overlap.

further reduces the gross value by marginal amount of \$1.6 million (to \$67.8 M). However if those same assumptions were changed, the impacts associated with listing Sakinaw could drive the analysis. Then the distribution of impacts could be quite different and even reversed.

There is also much uncertainty associated with analyzing the impacts to the fisheries. There is uncertainty about biological and economic factors such as run timing, run size, survival rates, diversion rates, harvest rates, harvests, prices, methodologies etc. In most cases informed judgement must be used in deciding on the inputs. All these judgements can influence the outcomes. The model is very useful in providing good general trend information but less accurate as the results are broken out into smaller units.

CONCLUSIONS

The analysis above uses available data to illustrate the comparisons. However, several factors should be considered in interpreting the results.

First, the results are all stated in terms of gross value. Harvesting and processing costs are not available. Second, the analysis considers incremental impacts over a four-year period, but the reality is the impacts should be considered for at least four cycles, or 16 years. And third, mitigative options have not been explored or developed. Potential policy options and adjustment mechanisms may be possible over the mid term. Examples include the possibility of changing fleet allocation targets and shifting traditional fishing patterns; opportunities could exist for new in-river fisheries subject to finding areas that would continue to provide the required protections for stocks of concern and finding markets for this much lower quality product. It should be noted that the potential for major conflicts among harvesters exists when considering changes to traditional fishing arrangements or allocations. Any consideration of harvest in more terminal areas would have to consider distributional issues related to treaties with First Nations and the recommendations of the recent Pearse-McRae Joint Task Group. Given these factors and that this analysis only covers the period from 2004-2007, it is unlikely that new arrangements could be put in place in the short term.

The overall impact of these limitations is difficult to quantify. Using gross rather than net values does not allow an assessment of impacts on industry. Using a shorter time line in estimating costs (4 years rather than 16 years) under-estimates the costs of change and the absence of possible mitigative activities may result in overstated costs. Finally, throughout the overall analysis conservative estimates have been applied, therefore, these reductions are likely low but do represent the upper bound of reductions in gross value.

A recent report by Gislason⁷ described the processing sector as very fragile economically. The report concludes that a poor sockeye catch forecast for 2004 will result in the 10th consecutive year the salmon processors returns are negative or inadequate. Further, the report states the commercial sector is characterized by poor fleet economics – a result of a large fleet with high fixed costs.

Overall the impact of introducing more stringent protective measures - whether measured in gross or net value terms - will tend to magnify what is an already a difficult situation for the industry. If both Cultus and Sakinaw were to be listed with an exploitation rate restricted to the less than 5% level, the southern fishing industry could not survive, processing sector infrastructure would be affected, FN would be impacted through harvesting impacts, their role as crew on vessels and through reductions in FSC; and finally communities would be disrupted.

⁷ 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.

Appendix 1: Estimated Changes to Gross Value for Fishing Industry Sectors:

Table 1: List Sakinaw Only

Options	Recent History 20-25% Gross Value (\$ Millions)	2004 Target 10-12% Gross Value (\$ Millions)	Less Than 5% Gross Value (\$ Millions)
First Nations – FSC	\$32.3	\$32.3	\$32.3
Commercial Harvest	\$116.3	\$72.6	\$41.5
Processing Sector	\$83.3	\$52.0	\$29.7
Recreational	\$36.1	\$35.6	\$35.6
Total	\$268.0	\$192.5	\$139.1

Table 2: List Cultus Only

Options	Recent History 20-25% Gross Value (\$ Millions)	2004 Target 10-12% Gross Value (\$ Millions)	Less Than 5% Gross Value (\$ Millions)
First Nations – FSC	\$32.3	\$32.3	\$23.7
Commercial Harvest	\$116.3	\$72.6	\$10.4
Processing Sector	\$83.3	\$52.0	\$7.5
Recreational	\$36.1	\$35.6	\$27.8
Total	\$268.0	\$192.5	\$69.4

Table 3: List Both Sakinaw and Cultus

Options	Recent History 20-25% Gross Value (\$ Millions)	2004 Target 10-12% Gross Value (\$ Millions)	Less Than 5% Gross Value (\$ Millions)
First Nations – FSC	\$32.3	\$32.3	\$22.2
Commercial Harvest	\$116.3	\$72.6	\$10.4
Processing Sector	\$83.3	\$52.0	\$7.5
Recreational	\$36.1	\$35.6	\$27.8
Total	\$268.0	\$192.5	\$67.8

Methodology Used to Calculate Gross Values:

- The food value of the First Nations FSC fishery is based on the average weight of 2.7kg per fish and in-river fish value of \$2.90 per kg. and a marine fish value of \$3.85 per kg. These values are assigned for comparative purposes only. FSC fish are not eligible for sale.
- Commercial catch is based on 2003 average landed value prices adjusted for bonuses.
- Processing sector values are based on value-added that are the difference between market value and landed value.
- Recreational sector values were based on expenditure of \$200 per tidal angler day or \$400 per tidal sockeye caught and on in-river expenditures of \$100 per fresh water angler day or \$100 per freshwater sockeye caught).

Appendix 2: Management Regimes Under Each Level of Exploitation Rate

Tables 1 & 2 below describe the management regimes required to protect Sakinaw and Cultus at each of the three levels of exploitation.

Table 1: Management regimes in order to provide protection to Sakinaw sockeye at three levels of exploitation rate (ER):

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

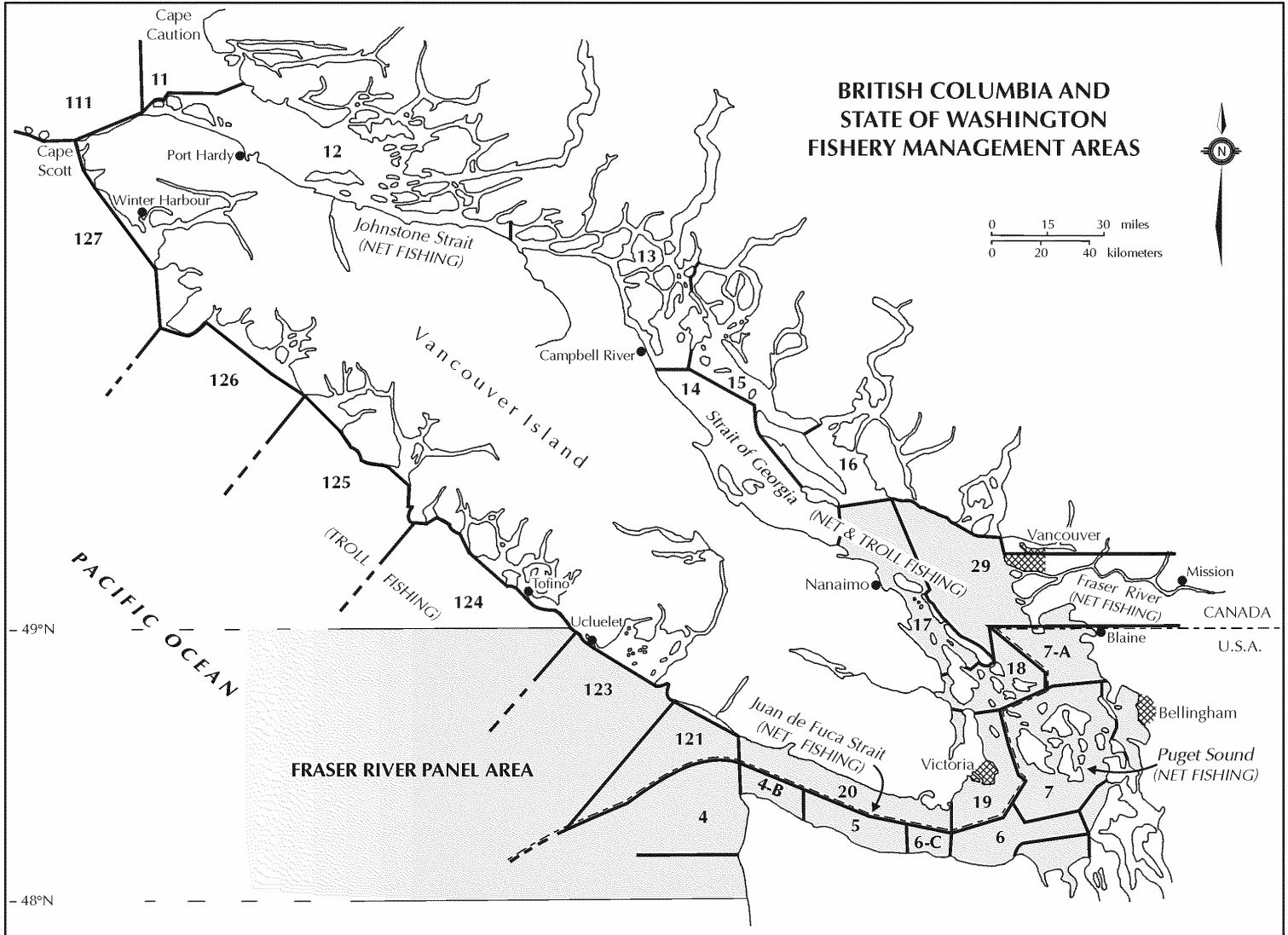
Table 2: Management regimes in order to provide protection to Cultus sockeye at three levels of exploitation rate (ER):

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
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

Appendix 3: Map of The South Coast Fishery Management Area Map, British Columbia⁸

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



⁸ Map provided by the Pacific Salmon Commission