
**Cultus Sockeye Stock Assessment/Fisheries Management Work Group
Review And Comments of:****“Financial Considerations Associated with Potential SARA Listing of Sakinaw & Cultus Lake Sockeye” presentation**

October 7, 2004

The SA/FM workgroup, associated with the Cultus sockeye recovery team, recently had a chance to review the presentation considering socio/economic impacts of potential SARA listing of Sakinaw and Cultus sockeye. While the analysis attempted to address the financial impacts of SARA listing, we feel that there are several key shortcomings in methodology and that certain assumptions and uncertainty may not have been sufficiently investigated. This offers a short overview of those issues. We conclude with a proposal for future work that should be done in the next three weeks to ensure that this briefing fully considers all uncertainty in the form of a risk assessment and thus better informs interested parties of the probabilities associated with management choice.

Below are the contributed input from workgroup members:

General Comments: In general, a number of elements of the analysis are:

- b) overly simplified,
- c) fail to account for uncertainties associated with a large number of input parameters (e.g. run sizes, run timing, diversion, landed value, etc...),
- d) fail to properly account for future changes likely to impact management of Fraser River sockeye (e.g. increasing fishery restrictions to protect all sockeye runs from adverse environmental conditions, rebuild other depressed stocks, increasingly stringent Late run constraints),
- e) Fails to account for the potential to additional resources that would be available under a listing scenario that might expedite the recovery of the listed populations and facilitate more rapid removal of fishery restrictions than if the populations were not listed.
- f) Most importantly, gives little weight to the potential for DFO to mitigate or adapt to the constraints that might result from listing these stocks and, thus does not accurately capture the value for commercial, First Nations and recreational harvesters possible under a listing scenario.

1. **Uneven standards of proof – (public and peer reviewed):** There appears to be a disparity in the standard of proof applied to the review of the socio-economic analysis compared to the biological-scientific analysis. The biological-scientific analysis of the status and recovery of Cultus and Sakinaw sockeye have been extensively peer reviewed (by PSARC and COSEWIC) and made public. In addition, recovery strategy documents have been prepared by DFO and external technical experts and will be reviewed by the public

and recovery objectives will be further reviewed in a PSARC paper prepared by Mike Bradford. The socio-economic implications of the SARA for Sakinaw and Cultus was prepared by Gislason and Associated Ltd. in April 2004, but to my knowledge this information has not been made public and peer review of the analysis in the document has not occurred. Peer review of the analysis is critical given to determine the validity of the numerous assumptions and uncertainties that were considered to arrive at the results.

2. **Failure to account for mitigation measures:** Gislason's analysis fails to account for recovery action planning activities that will likely permit allowable harvests of Cultus sockeye greater than 5% (actual levels to be determined by action planning). For example, improvements to freshwater survival may accrue due to Eurasian milfoil removal from spawning areas and/or removal of pikeminnow predators. Further, for Cultus sockeye the key recovery objective that will affect planning is to achieve population growth on 3 of 4 cycles which will permit significant flexibility for planning fisheries depending on the departments risk tolerance.
3. **Failure to account for uncertainty:** Actual implications (e.g. catches) of alternative harvest regimes depend heavily on the fishing patterns, assumptions and uncertainties in the pre-season model. It is unclear what assumptions were made and how uncertainties about key parameters (e.g. run size, timing, diversion rate, etc...) were handled in the model. If only point estimates were used in the analysis, then the results of the socio-economic analysis will not reflect the range of outcomes possible. Several uncertainties and limitations of the analysis are identified but there does not appear to be any analysis of the implications.
4. **Before vs. After analysis confounds results:** The use of before vs. after analyses confounds the results of the analysis presented. For example, the use of recent history exploitation rates is not valid for comparing the effects of listing vs. not listing populations. Even in the absence of listing, the Department has indicated that relatively severe harvest reductions will be in place to protect Cultus and Sakinaw populations (possibly in the 10-12% range, but could be higher with mitigation). In addition, Late run sockeye exploitation objectives have decreased to the 15% exploitation rate range in the last 2 years. The correct comparison in all instances should be between conditions without listing vs. conditions with listing taking into account trends in management actions, status of other Fraser stocks, and other quantities varying with time.
5. **Limited gross value analysis:**
 - a) **Lost value calculations from 2004 cycle line must be revised:** Severe conservation measures (e.g. severe exploitation rate constraints) to protect Cultus sockeye will likely only be required on the 2004 cycle to ensure achievement of 500 effective spawners. Recognizing that the socio-economic analysis was completed before the 2004 management season, the economic costs of conserving this cycle line will be dramatically reduced in the future given the dramatic declines of most Fraser River sockeye populations this year including disastrous returns to the Summer run aggregate. Recovery of these stocks will require dramatically reduced

exploitation rates on all Fraser sockeye stocks on future cycles (e.g. 2008, 2012, etc...). Thus, the potential impacts of listing with this cycle line are overstated given current conditions.

- b) **Lack of exploration of management flexibility:** Management flexibility is advised in the presentation, yet the analysis fails to explore all potential viable options for harvesting Fraser River sockeye (see impacts on user groups and FN's below). The presentation is a simplistic view of the implications of SARA listing. S73 of SARA prohibits harm that jeopardizes survival or recovery, but that doesn't necessarily mean no fishing. Recovery will occur with a positive generational growth rate. In my view growth is more important than a 'hard' 500 fish limit. No catastrophic events will occur at 499 spawners. The analyses presented to date seem to suggest that only heroic actions are SARA compliant when the population is below 500. More thought and analysis is required, and there are likely alternatives (from a risk-based perspective) that will be less disruptive, yet make progress towards recovery. The black-white view of this problem indicated in the report (and espoused by greens too) will not lead to solutions.

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- c) **Failure to quantify future Fraser River sockeye production benefits:** The socio-economic analysis fails to account for the future production benefits for all Fraser River sockeye populations of reducing exploitation rates to protect Cultus or Sakinaw. This could lead to a large over-estimate of the costs if discount rates are low (or not much effect if discount rates are very high, i.e. future catches are relatively unimportant).

- d) **Failure to account for future harvest restrictions expected:** The analysis does not properly account for future changes likely to impact management of Fraser River sockeye even if Cultus and Sakinaw are not listed. For example, it is likely that there will be increasing fishery restrictions to protect all sockeye runs from adverse environmental conditions associated with increasingly frequent warm water events in the Fraser River (e.g. 1992, 1998, 2004); rebuild other depressed Fraser River sockeye stocks or other species, and increasingly stringent Late run constraints that are now in the 15% range not 20-25% as was used in the analysis. All of these factors will reduce the discrepancy between the total values of the Fraser sockeye resource for listing compared with not listing these stocks.

6. **Commercial and processing impacts overstated:** The impact on the commercial industry under the severe listing scenario is a sockeye harvest of 20,000 sockeye; this is totally unrealistic. Even under a dual listing scenario, a large proportion of the commercial fishing benefits could still be realized by fisheries by area B seine, area H troll, and area E gill net vessels in the Strait of Juan de Fuca, in Georgia Strait off the mouth of the Fraser and in the Fraser River without impacting on Sakinaw and before Cultus sockeye arrived later in the Fraser sockeye migration. The increase in the value for the processing sector would increase commensurate with the increased sockeye harvest. I suspect the current

outcome is Dramatic increases to estimates of gross value would be accrued for fisheries crafted to harvest sockeye upstream of the Fraser/Vedder confluence; although we recognize considerable institutional realignment would be necessary under this option. Fisheries in this area should be able to harvest surpluses in Fraser sockeye populations while meeting even severe conservation restrictions on Sakinaw and Cultus. In addition, the powerpoint doesn't mention that according to Gislason the salmon fleet loses money under all scenarios.

7. **First Nations impacts overstated:** The annual allocation of Fraser River sockeye for First Nations is approximately 950K. Of this, approximately 500K of the allocation (e.g. 300K in BCI and 200K in LFA) is taken upstream of the Fraser/Vedder confluence. The socio-economic analysis of the worst case scenario projects a total catch of 500K, which presumes there will be zero FN catch downstream of the Fraser-Vedder confluence; a highly unrealistic outcome. Considerable flexibility exists for First Nations to meet their FSC requirements in marine areas and the lower Fraser. Marine FN's in Johnstone strait will be impacted by listing of Sakinaw and Cultus, but could fish in non-traditional areas (e.g. area 20 or 29) to meet their FSC needs early in the season before Cultus arrive with the rest of the Late run. Under a listing scenario, marine FSC fisheries would likely be completed earlier because commercial seine vessels used for the majority of these fisheries would be available sooner given reduced commercial opportunities. Lower Fraser FSC fisheries could be completed early in the season harvesting Early Stuart, Early Summer or Summer run sockeye before Cultus sockeye arrive in their area. While the analysis recognizes that FSC opportunities for FN's upstream of the Fraser/Vedder confluence will not be affected by listing considerations it does not consider potential benefits of listing in upstream areas. Listing will likely increase the benefits to FN bands upstream of this area as a result of larger in river escapements that will allow these bands to access fish for FSC and/or sale; especially bands in more terminal locations that have not been able to harvest their FSC in recent years. In addition, the Department has also allowed First Nations that can't access fish in their traditional fishing areas, as a result of low abundance or conservation concerns, to make arrangements for obtaining fish from other areas. For example, terminal area FN's have harvested sockeye in the lower Fraser area in several years.
8. **Recreational impacts overstated:** The impact on the recreation fishing industry may be overstated. Marine recreational fisheries generally target Chinook and Coho stocks and these fisheries would be expected to continue (harvests of sockeye in marine areas are less than 2-5K annually). The vast majority (>95%) of Fraser sockeye harvests by recreational anglers occurs upstream of the Fraser/Vedder confluence; this fishery would not be impacted by conservation constraints for Cultus or Sakinaw.
9. **Social and community impacts unclear:** The social and community impact analysis is incomplete as it fails to quantify the incremental harm that would be caused by reducing exploitation rates on Cultus or Sakinaw as a result of listing. The general decline in the fortunes of these communities was evident before considerations for listing Sakinaw or Cultus became apparent and these declines should not be solely attributed to a listing

decision. The link between small communities and actual Fraser River sockeye catches is not established in the presentation.

10. **Government impacts analysis incomplete:** The discussion of government impacts fails to account for the large potential cost savings associated with reduced costs of management, administration, monitoring, enforcement and reporting associated with reduced fishing opportunities for First Nation, recreational and commercial fisheries. Some past reports have indicated that these costs may actually exceed the value of the fishery in some years.

Risk Assessment Considerations

Based on the previous comments, we are encouraging that a full risk assessment be properly applied to this socio-economic analysis before the information is released. The PVA (population viability analysis) model constructed by this workgroup does have the capacity to include all biological uncertainty which has been excluded from the socio-economic analysis. Further, there needs to be a proper treatment of the output from the pre-season planning model regarding probabilities of remaining below specific exploitation rates.

In the short-term it would be fruitful to think about the types of fisheries management schemes that would lead to compliance under s73 of SARA. This might involve:

- Targets for population growth rates to meet persistence criteria
- Using forecasts to obtain distribution of run sizes and thus growth rates
- Calculating probabilities of meeting growth rate targets for different given forecasts and implementation uncertainties
- Estimate consequences to whole fishery from this process
- Consider effects of alternative management activities for increasing growth rates.
- Project this process into the future

In review, there is a large biological and fishery management component to this analysis. Given the importance of the advice to senior officials it would seem reasonable to document the biological component to the usual scientific standards and subject it to review. Independent economists could be brought in to examine (or conduct) that part of the work. If the group which prepared the socio-economic analysis is able to contribute the required economic components, we feel that a more thorough assessment of the risks associated with fishery restrictions could be developed.