

Marine Stewardship Council Evaluation of the Barkley Sound
sockeye fishery.

Assessment of the Department of Fisheries and Ocean's response to
the Marine Stewardship Council's principles of sustainable fishing.

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Reviewers note:

The scores I have assigned to each indicator follow from applying the SCS Evaluation team's guideposts as closely as possible. The level of scrutiny I have attempted to exercise is equivalent to that used when evaluating a peer-reviewed document. In this light, throughout the responses that DFO has provided, more attention should be paid to accuracy regarding the references and more specific documentation in support of the scores assigned by DFO is needed. When the scores I have assigned are lower than put forth by DFO this has resulted from either a clear failure to meet the guideposts or because guideposts have not been met because there is not sufficient information provided or available to justify the score DFO has given. There is extensive citing of personal communications and documents that are not available, making the statements provided by DFO difficult to evaluate. I have evaluated in a hierarchical fashion how well the fishery conforms to the guideposts based on information provided by DFO and research carried out by myself. The hierarchical scoring followed requires that all the guidepost at each level must be met to get a given score and if all the guideposts at the lower levels are not met then a higher score cannot be assigned. Even if a lower guidepost had not been met, I have also evaluated how well in my opinion the higher guideposts have been met in order to provide guidance for DFO future revision of their responses.

Overall Assessment of indicators:

Out of 46 indicators 15 were assessed with a score of less than 60. The area of most deviancies was under *Principle 1- Stock assessment and Stock Status* where eight of the 13 indicators did not establish the 60-level guideposts. The least deficiencies were identified under *Principle 3-Fishery Management System* with only four out of 27 indicators failing to establish the 60-level guide posts. Three out of six of the 60-level indicators were not established under *Principle 2-Ecosystem Impacts*.

Deficiencies encountered leading to failure to establish the 60-level guideposts were:

1. Lack of sufficient information regarding population structure within Sproat and Great Central lakes.
2. No attention paid to other smaller populations of sockeye within Barkley Sound that are likely harvested in the fishery.
3. Stock units have never been formally evaluated by DFO or another agency.
4. Henderson Lake sockeye which is a weak stock are still caught in significant numbers.
5. Lack of sufficient biological assessment of Henderson Lake sockeye.
6. Impact of the enhanced Sproat and Great Central Lake fish on the smaller populations of the region is not fully considered.
7. Lack of yearly specific catch data for each stock.
8. No target reference points or limit reference points established for individual stocks.
9. No recovery plan developed.
10. Bycatch information for specific fishery not available at sources cited.
11. No system in place to record lost fishing gear
12. Ecosystem impacts are not carefully evaluated
13. Probability of recovery of Henderson Lake sockeye is not high
14. Formal risk assessment is not done
15. No Formalized dispute resolution mechanism
16. Harvest rates are not appropriate for long term sustainability of target stocks.

Table 1.
Summary of DFO indicator scores and scores as evaluated independently
Principle 1 - Fishery Management for Target Populations

	Scores		Page
	DFO	RJN	
Criterion 1.1 - Maintain high productivity of target population & associated ecological community			
Subcriterion 1.1.1 - Stock units			
Indicator 1.1.1.1 Stock units defined	100	<60	4
Indicator 1.1.1.2 Scientific agreement on units	100	80	5
Indicator 1.1.1.3 Geographic distribution known	100	<60	5
Indicator 1.1.1.4 Indicator Stocks	NA	NA	6
Indicator 1.1.1.5 Enhanced Stocks	NA	<60	6
Subcriterion 1.1.2 - Monitoring and assessment			
Indicator 1.1.2.1 Reliable estimates of removals	80	<60	7
Indicator 1.1.2.2 Reliable estimates of escapement	100	<60	8
Indicator 1.1.2.3 Information on fish age and size	100	60	9
Indicator 1.1.2.4 Productivity estimates	80	80	10
Subcriterion 1.1.3 - Management goals			
Indicator 1.1.3.1 Limit reference points	80	<60	11
Indicator 1.1.3.2 Target reference points	100	<60	11
Criterion 1.2 - Fishery allows for the recovery of depleted stocks (Target Stocks)			
Indicator 1.2.1 Well-defined and effective strategy	80	<60	12
Indicator 1.2.2 Stocks are not depleted and harvest rates are sustainable	80	<60	13
Criterion 1.3 - Fishing does not impair reproductive capacity			
Indicator 1.3.1 Age, sex and genetic structure are monitored	80	80	14

Summary of evaluation of DFO Response to Principle 1.

Of the 13 indicators applicable to the Barkley Sound sockeye fishery, eight were assigned scores here that were less than 60. This indicates a major deficiency according to the MSC criteria.

These deficiencies are:

1. Lack of sufficient information regarding population structure within Sproat and Great Central lakes.
2. No attention paid to other smaller populations of sockeye within Barkley
3. Sound that are likely harvested in the fishery.
4. Stock units have never been formally evaluated by DFO or another agency.
5. Henderson Lake sockeye which is a weak stock are still caught in significant numbers.
6. Lack of sufficient biological assessment of Henderson Lake sockeye.
7. Impact of the enhanced Sproat and Great Central Lake fish on the smaller populations of the region is not fully considered.
8. Lack of yearly specific catch data for each stock.
9. No target reference points or limit reference points established for individual stocks.
- 10 No recovery plan developed.

Specific responses to indicators for assessment of Principle 1.

Indicator 1.1.1.1: Score: fails to meet level 60 guideposts.

The stock units are well defined for the purposes of conservation, fisheries management and stock assessment.

Assessment: Genetic testing of stock structuring within Sproat and Great Central lakes should be done by testing whether the populations are different not whether individuals cluster together independently of other populations. In addition, only three spawning sites per lake were surveyed. Did this include beach and just tributary spawners? Beach and tributary spawning populations should be analysed if they haven't been. It is well known that sockeye salmon have great potential to produce semi-isolated locally adapted populations over relatively small spatial scales within lakes. This holds true even for recently colonized lakes (see Burger et al 2000). This local adaptation should be protected as it likely underpins the high productivity of the fishery. This genetic analysis should be redone and additional samples collected and analysed. The PSARC document cited regarding this genetic work is not available on the PSARC documents website. In addition, there are eight other potential spawning populations listed in fish wizard, including Nahmint and Maggie Lake that maybe harvested in the fishery. These populations may be genetically unique and should at be surveyed for genetic diversity. Currently, these populations are not considered at all in the fishery and are likely to be harvested in the fishery. There is no PSARC working paper listed online describing intra-lake genetics research for Somass Sockeye. As far as I can tell it has not been addressed whether other sockeye populations such as Kennedy, Hobiton, or Cheewhat, are taken in the Barkley Sound fishery.

60 Scoring Guideposts:

Yes - The majority of stock units are defined.

No - The rationale for the majority of stock units for the target species is clear with regard to conservation, fisheries management and stock assessment requirements.

80 Scoring Guideposts:

Yes - The stock units are well defined and include details on the major component stocks.

No - The rationale for each stock unit for the target species is clear with regard to conservation, fisheries management and stock assessment requirements.

100 Scoring Guideposts:

No - There is an unambiguous description of each stock unit, including: its geographic location, run timing, details on all the component stocks, and rationale for its definition.

No - The rationale for each stock unit is clear with regard to conservation, fisheries management and stock assessment requirements.

Indicator 1.1.1.2: Score: 80

There is general scientific agreement that the stock units are appropriate.

Assessment: The stock units for the Barkley Sound sockeye fishery have never been specifically reviewed inside or outside the management agency. It appears as though there may be scientific agreement regarding the stock units for non target species such as chinook and coho caught in the fishery (however the Tompkins et al. PSARC paper cited is not available online) There is no evidence presented or cited regarding stock units for steelhead a species which is also intercepted in the fishery.

60 Scoring Guidepost

Yes - There is general agreement among regional fisheries scientists within the management agency that the majority of stock units are appropriate for target species.

80 Scoring Guidepost

Yes - There is general agreement among regional fisheries scientist within the management agency that the stock units are appropriate for target species.

Yes - There is no significant scientific disagreement regarding the stock units used by the management agency to formulate management decision for the fishery.

100 Scoring Guidepost

No - The stock units for target species have been reviewed and found to be scientifically defensible and appropriate by the Pacific Scientific Advice Review Committee or the appropriate Pacific Salmon Commission technical committee.

No - There is general agreement among regional fisheries scientist outside the management agency that the stock units are appropriate.

No - There is general scientific agreement regarding the stock units for non-target species

Indicator 1.1.1.3: Score: fails to meet level 60 guideposts.

The geographic range for harvest of each stock unit in the fishery is known.

Assessment: Migration routes and geographic range of smaller local sockeye populations such as Maggie Lake and Nahmint are not known so these populations are likely harvested along with the larger targeted populations. In addition, although harvest restrictions are in place to avoid catching Henderson Lake sockeye, which is a weak stock, these fish are apparently caught throughout Alberni Inlet in commercial fisheries (Beacham et al 1999). Although there is the potential to monitor catch with

DNA techniques to assess stock composition, this is not done annually or formalized into the management system. Even if this were done, the results would be available after the fish have already been caught resulting in damage to the weak stock. In addition there is apparently little or no separation of Great Central and Sproat Lake sockeye in the area where most of the fishery is conducted. However this does not necessarily present a problem if these populations are always of similar productivity and can withstand similar levels of exploitation pressure.

60 Scoring Guidepost

No –The information available on the geographic range for harvests of target or non-target stocks is sufficient to prevent the over harvesting for the majority of the stocks within each stock unit.

80 Scoring Guidepost

No - The geographic range for harvests of target stocks is defined.

No - The information on the geographic range of the harvests of target stocks is monitored during the fishing season and is sufficient to prevent the over harvesting of these stocks.

No -The information available on the geographic range for harvest of non-target stocks is sufficient to prevent the over harvesting of these stocks.

100 Scoring Guidepost

No - The geographic range for harvests of each stock unit in the fishery is estimated and documented each year.

No - The information on the geographic range of harvests is monitored during the fishing season and used when making in-season management decisions.

Indicator 1.1.1.4: Score: Not applicable

Where indicator stocks are used as the primary source of information for making management decisions on a larger group of stocks in a region, the status of the indicator stocks reflects the status of other stocks within the management unit.

Indicator stocks are not used in the management of the Barkley Sound sockeye fishery.

Indicator 1.1.1.5: Score: fails to meet level 60 guideposts.

Where stock units are composed of significant numbers of fish from enhancement activities, the management system provides for identification of the enhanced fish and their harvest without adversely impacting the diversity, ecological function or viability of unenhanced stocks.

Assessment: Great Central Lake is fertilised annually to increase productivity. In addition, improvement in fish passage into Great Central and Sproat lakes has likely increased production from these lakes (Hyatt

and Steer 1987). Both of these activities are in fact enhancement of specific stocks (see Hyatt and Steer 1987). Returns to Henderson Lake, which once provided the bulk of fish intercepted in fisheries, have declined. This may be due to habitat loss in the Henderson watershed but could also be due to increased competition for nearshore or estuarine rearing areas by increased number of smolts from Sproat and Great Central lakes. In addition, because the Barkley Sound fishery is a mixed stock fishery, increase harvesting of the Sproat and Great Central Lake fish can lead to increased harvest of unenhanced and weaker populations. Smaller populations of the region, such as Nahmint and Maggie Lake apparently go totally unmonitored and are likely to be intercepted in the now scaled up mixed stock fishery.

60 Scoring Guidepost

Yes - There is general scientific agreement within the management agency regarding the impacts of enhanced fish on the resultant harvest rates or escapements of unenhanced fish stocks.

No - Managers have some scientific basis for assuring that harvest rates for enhanced stocks are not adversely affecting the majority of un-enhanced stocks within each stock unit.

80 Scoring Guidepost

No - In fisheries where both enhanced and un-enhanced stocks are harvested at the same time, the harvest guidelines are based on the goals and objectives established for the un-enhanced stocks.

No - There are adequate data and analyses to determine that the presence of enhanced fish in the management units do not adversely impact the unenhanced fish stocks.

100 Scoring Guidepost

No - Fisheries targeting enhanced stocks are geographically removed from unenhanced stocks and separate terminal harvest areas are established for these fisheries.

Yes - Times and areas have been identified where the majority of enhanced fish migrate through the general fishery.

No - There is real time mark recovery program during the prosecution of the fishery that allows determination of harvest rates of the enhanced component of the run and this data is used in regulation of the fishery.

Indicator 1.1.2.1: Score: fails to meet level 60 guideposts.

Estimates exist of the removals for each stock unit.

Assessment: Estimates of catch for the majority of the target stocks were done up to 1993 after which time the method being used became non-viable. Even though genetically based methods for stock identification

have been developed for the three primary stocks intercepted in the fishery (Beacham et al. 1998), catch assessment by stock does not seem to be currently carried out on an annual basis. Although it is stated in a the response to indicator 1.1.1.3 that stock composition of the catch is calculated, these values are not reported in PSARC reviews of the fishery as recently as 2002. The 2004 PSARC review of Barkley sound, including stock status and assessment methods is not shown at the PSARC website.

60 Scoring Guidepost

No - Catch estimates for the majority of target stocks are available.

No - Catch estimates are available for non-target stocks where the catch of the non-target stocks may represent a significant component of that stock.

Yes - Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 10 years.

80 Scoring Guidepost

No - Catch estimates are available for all target stocks harvested in the fishery.

No - Catch estimates are available for non-target stocks where the catch of the non-target stock may represent a significant component of the harvest of that stock.

No - Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 5 years.

100 Scoring Guidepost

No - Catch estimates are available for all fisheries in Canadian waters that harvest the target and non-target stocks harvested in the fishery being evaluated.

Yes - Mortality rates are available for the fish released or discarded during the fishery.

No - Catch estimates are available for fisheries outside Canadian waters that harvest the stocks that are the target of the fishery being evaluated.

Indicator 1.1.2.2: Score: fails to meet level 60 guideposts.

Estimates exist of the spawning escapement for each stock unit.

Assessment: In season counters assess escapement to Sproat, Great Central. Escapement to Henderson Lake (a non-target stock) is not done regularly. Escapement of non-target species is assessed. Escapement of smaller sockeye populations of the region is not carried out.

60 Scoring Guidepost

Yes - Escapement estimates for target stocks are available, where escapement estimates are necessary to protect the target stock from overexploitation.

No - Fishery independent indicators of abundance are available for non-target stocks where the fishery harvests may represent a significant component of the harvest of that stock.

80 Scoring Guidepost

Yes - Estimates are available for the annual escapement of each target stock harvested in the fishery.

Yes - Fishery independent indicators of abundance are available for the non-target species harvested in the fishery.

Yes - In-season escapement data are collected for the target stocks and used to regulate the fishery.

100 Scoring Guidepost

Yes - Estimates are available for the annual escapement for each stock unit harvested in the fishery.

Yes - In-season escapement data are collected for all stock units and used to regulate the fishery.

Indicator 1.1.2.3: Score 60.

The age and size of catch and escapement have been considered, especially for the target stocks.

Assessment: Henderson Lake sockeye a population that is “non-target” but in some instances makes a significant portion of the catch, as high as 15.4% (PSARC Working Paper 200/174), is apparently not assessed for age and size. The counting fence at Clemens Creek is not consistently employed to assess escapement.

60 Scoring Guidepost

Yes - The information on age and size of catch and escapement is adequate, where there is general scientific agreement that these data are important to assess the status of the stocks or adjust fisheries management decisions.

80 Scoring Guidepost

No - Periodic monitoring programs collect data on the age and size of the catch and escapement for target stocks, and for non-target stocks where the fishery harvests may represent a significant component of the harvest of those non-target stocks.

Yes - There is a scientific basis for the frequency of the sampling program to collect age and size data where there is a clear scientific basis for collecting these data.

100 Scoring Guidepost

No - Annual monitoring programs collect data on the age and size of the catch and escapement for target and non-target stocks where there is a clear scientific basis for collecting these data.

Indicator 1.1.2.4: Score: 80

The information collected from catch monitoring and stock assessment programs is used to compute productivity estimates for the target stocks and management guidelines for both target and non-target stocks.

Assessment: Escapement and smolt production from Sproat and Great Central Lake is well monitored and used to forecast returns. Smolt release but not adult escapement is regularly monitored for Henderson Lake (reference is not accurate regarding IFMP pages it is actually pages 44-46). PSARC working paper S2003-08 is not available online. Even so the low productivity of Henderson is factored into fishery management plans. Formal risk assessment is not carried out.

60 Scoring Guidepost

Yes - The available information and analyses are adequate to identify the harvest limitations and production strategies required to maintain the productivity of the majority of target stocks.

Yes - The relative productivity of the non-target stocks is considered in the management strategy, where the fishery harvests may represent a significant component of those non-target stocks.

80 Scoring Guidepost

Yes - There is adequate information to identify the harvest limitations and production strategies required to maintain the high productivity of the target stocks.

Yes - There is adequate information to estimate the relative productivity of the non-target stocks where the fishery harvests may represent a significant component of those non-target stocks.

Yes - The harvest limitations for target stocks take into consideration the impacts on non-target stocks and the uncertainty of the productivity for these stocks.

100 Scoring Guidepost

Yes - Scientifically defensible productivity estimates (e.g. stock/recruitment relationships) have been derived for all target stocks and the relative productivity of non-target stocks is known.

No - Risk assessment has been conducted to determine the impact of alternative harvest strategies on non-target stocks. The risk assessment should include an assessment of the uncertainties with estimates of stock productivity for both the target and non-target stocks.

Indicator 1.1.3.1: Score: fails to meet level 60 guideposts.

Limit Reference Points (LRP) or operational equivalents have been set and are appropriate to protect the stocks harvested in the fishery.

Assessment: DFO has not established LRPs for target stocks. It is debatable the value of having an interim LRP for aggregate Somass sockeye since smaller less productive stocks which may not be doing well could be over harvested before the aggregate LRP is triggered.

60 Scoring Guidepost

No- There is general agreement among regional fisheries scientist within the management agency that the LRP's or equivalent are appropriate to achieve the management goals for target stocks.

80 Scoring Guidepost

No - There is some scientific basis for the LRP's for target stocks and these LRP's are defined to protect the stocks harvested by the fisheries.

No - There is no significant scientific disagreement regarding the LRP's used by the management agency to formulate management decision for the fishery.

100 Scoring Guidepost

No -The Limit Reference Point for target species have been reviewed and found to be scientifically defensive and appropriate by the Pacific Scientific Advice Review Committee or the appropriate Pacific Salmon Commission technical committee.

No - There is general agreement among regional fisheries scientist outside the management agency that the LRP's are appropriate.

No - There is general scientific agreement regarding the LRP's for non-target species.

Indicator 1.1.3.2: Score: fails to meet level 60 guideposts.

Target Reference Points or operational equivalents have been set.

Assessment: DFO has not established target reference points for individual target stocks. If interim target reference points have been established then they should be given, instead a PSARC Advisory document from 1986 is cited with no mention of the specific target reference points in the response provided. It is not clear if the interim target reference points are for individual stocks or an aggregate of Somass stocks.

60 Scoring Guidepost

No -There is general agreement among fisheries scientist within the management agency that the TRP's are appropriate for the target stocks.

No -Target reference points have been defined for the majority of target stocks harvested in the fishery and these target reference points are not scientifically disputed.

No - The management agency has taken into account the relative productivity of non-target stocks when setting the TRP's for the majority of target stocks.

80 Scoring Guidepost

No - There is no significant scientific disagreement regarding the TRP's used by the management agency to formulate management decision for the fishery.

No - The TRP's for the target stocks take into account variability in the productivity of each component of the target stock and the productivity of non-target stocks.

100 Scoring Guidepost

No - The Target Reference Point (TRP) for target species have been reviewed and found to be scientifically defensive and appropriate by the Pacific Scientific Advice Review Committee or the appropriate Pacific Salmon Commission technical committee.

No - There is general agreement among regional fisheries scientist outside the management agency that the TRP's are appropriate.

The TRP's for the target stocks take into account variability in the productivity of each component of the target stock and productivity of non-target stocks.

Indicator 1.2.1: Score: fails to meet level 60 guideposts.

There is a well-defined and effective strategy, and a specific recovery plan in place, to promote recovery of the target stock within reasonable time frames.

Assessment: The IFMP referenced in DFO's response does not describe a specific recovery plan for Barkley sound sockeye or what happens if stock sizes are low other than having a harvest trigger at an aggregate level of 200,000 fish, below which no harvesting takes place. There is no recovery plan developed.

60 Scoring Guidepost

No - In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks within 5 reproductive cycles

No – There are no limit reference points developed for individual stocks. Stocks are allowed to recover to more than 125% of the LRP for abundance before any fisheries are permitted that target these stocks.

80 Scoring Guidepost

No - In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks with 3 reproductive cycles.

No - Stocks are allowed to recover to more than 150% of the LRP for abundance before any fisheries are permitted that target these stocks.

100 Scoring Guidepost

No - There are comprehensive and pre-agreed responses to low stock size that utilize a range of management measures to ensure rapid recovery.

No - Stocks are allowed to recover to the TRP before commercial fisheries are permitted that target these stocks.

No - The management agency does not use artificial propagation as a substitute for maintaining or recovering wild stocks.

Indicator 1.2.2: Score: fails to meet level 60 guideposts.

Target stocks are not depleted and recent stock sizes are assessed to be above appropriate limit reference points for the target stocks.

Assessment: The LRP developed by DFO is for an aggregate of Somass stocks there are no LRP's for individual stocks. I am not convinced that there is no evidence that the target stocks are not depleted. Inspection of Figure 5 that is provided for indicator 1.2.1 suggests that overall returns have been lower than average in the last 10 years.

60 Scoring Guidepost

Yes - There is general agreement among regional fisheries scientist inside the management agency that the methods of estimating escapements and exploitation rates for the majority of target stocks are scientifically defensible.

No - Management actions have reduced fishing as the target stocks approach the LRP and fisheries have only resulted in escapements that approach or are below the LRP escapement goal in no more than two years in a period of the most recent 5 consecutive years, for the majority of the target stocks.

80 Scoring Guidepost

Yes - There is general agreement among regional fisheries scientist inside the management agency that the methods of estimating escapements and exploitation rates for the target stocks are scientifically defensible.

No - Management actions have reduced fishing as the target stocks approach the LRP and fisheries have only resulted in escapements that approach or are below the LRP escapement goal in one year in a period of the most recent 5 consecutive years, for any of the target stocks.

100 Scoring Guidepost

Yes - There is general agreement among regional fisheries scientist outside the management agency that the methods of estimating escapements and exploitation rates for the target stocks are scientifically defensible.

No - Management actions have reduced fishing as the target stocks approach the LRP and fisheries have only resulted in escapements that approach or are below the LRP escapement goal in one year in a period of the most recent 10 consecutive years, for any of the target stocks.

Indicator 1.3.1: Score 80.

Information on biological characteristics such as the age, size, sex and genetic structure of the target stocks is considered prior to making management decisions and management actions are consistent with maintaining healthy age, size, sex and genetic structure of the target stocks.

Presumably biological information is collected and analysed on a yearly basis and has been collected for some time however very little of this data is presented in support of this indicator's score. The data presented by DFO regarding age of returning fish to Sproat and Great Central lakes looks as though overall the proportion of 4.2 and 5.2 returning fish is declining overall. The plot given makes it pretty difficult to assess this trend, a best fit line and regression analysis would be more informative. The data regarding sex ratios in Sproat and Great Central Lakes for six years is not very useful given sockeye's 4 to 5 year life cycle and that fishery induced changes are most likely to be a slow process. The length data provided shows only five years, again, not very useful or informative. Even so if gathering of this data is currently carried out this will provide information for assessing any changes, even if currently these trends cannot be assessed.

Fertilization of Great Central Lake along with facilitation of fish passage into Sproat and Great Central lakes has likely lead to the dramatic increase in sockeye returns overall to the Somass system. Increased competition with unenhanced populations has likely reduced the viability of the unenhanced populations. However, given the relatively high precision of homing of sockeye it is unlikely that the Sproat and Great Central stocks have introgressed genetically into the unenhanced populations.

60 Scoring Guidepost

Yes - The knowledge of the effect of fishing on the biological characteristics such as age, size, sex and component stocks is adequate to detect threats to the reproductive capacity of the majority of target stocks.

Yes - Management actions are consistent with maintaining healthy target stocks relative to biological characteristics such as age, size, sex or genetic structure for the majority of target stocks.

Yes - The management system includes provisions to minimize the major adverse impacts for the majority of un-enhanced stocks that may be due to the enhancement of other stocks.

80 Scoring Guidepost

Yes - The knowledge of the effect of fishing on biological characteristics such as the age, size, sex and component stocks is adequate to detect threats to the reproductive capacity of the target stocks.

Yes - Management actions are consistent with maintaining healthy target stocks relative to biological characteristics such as age, size, sex and genetic structure of all target stocks.

Yes - The management system includes provisions to minimize any adverse impacts to the genetic structure of un-enhanced stocks that may be due to the enhancement of other stocks.

100 Scoring Guideposts

Yes - There is comprehensive knowledge of the effect of fishing on biological characteristics such as the age, size, sex and genetic structure of the target stocks and the impact of changes in these factors on the reproductive capacity of the target stocks.

Yes - Management actions are consistent with maintaining healthy target stocks relative to biological characteristics such as age, size, sex and genetic structure of all target stocks.

No - Enhanced fish are identified and managed as separate target stocks.

References for Principle 1 response critique.

Beacham, T.D., L. Margolis, and R. J. Nelson. 1998. A comparison of methods of stock identification for sockeye salmon (*Oncorhynchus nerka*) in Barkley Sound, British Columbia. North Pac. Anad. Fish. Comm Bull. 1: 227-239.

Beacham, T., K Le, M. Raap, K. Hyatt, K. W. Luedke, R. Withler (2000). Microsatellite DNA variation and estimation of stock composition of sockeye salmon, *Oncorhynchus nerka*, in Barkley Sound, British Columbia Fish.Bull.98:14-24

Burger, C. V., K. T. Scribner, W. J. Spearman, C. O. Swanton, and D. E. Campton. 2000. Genetic contribution of three introduced life history forms of sockeye salmon to colonization of Frazer Lake, Alaska. Canadian Journal of Fisheries and Aquatic Sciences 57:2096-2111.

Hyatt, K and G. Steer (1987). Barkley Sound Sockeye salmon (*Oncorhynchus nerka*): Evidence of over a century of successful stock development, fisheries

management, research and enhancement effort. Can. Spec. Publ. Fish. Aquat. Sci. 96: 435-457.

Hyatt, K. W. Luedke, J. Till, P. Rankin, D. Lewis (2000). Review of the 1999 Return of Barkley Sound sockeye and forecast for 2000. PSARC working paper 2000/174.

Table2.**Summary of DFO indicator scores and scores as evaluated independently
Principle 2 - Ecosystem and Non-Target Populations**

	Scores		Page
	DFO	RJN	
Criterion 2.1 - Maintain natural functional relationships among species			
Indicator 2.1.1 Impacts on non-target species can be identified	80	<60	18
Indicator 2.1.2 Provisions to reduce ecosystem impacts	80	80	18
Indicator 2.1.3 Sufficient research to manage ecosystem impacts	100	80	20
Indicator 2.1.4 Monitoring and research related to escapement goals	100	100	21
Criterion 2.2 - Fishery minimizes impacts on endangered, threatened or protected species			
Indicator 2.2.1 Information on biological diversity acquired and used by managers	80	<60	21
Criterion 2.3 - Fishery allows for the recovery of depleted stocks (Non-target Stocks)			
Indicator 2.3.1 Provide for recovery of non-target stocks	80	<60	23

Summary of evaluation of DFO Response to Principle 2.

Of the 6 indicators applicable to the Barkley Sound sockeye fishery, three were assigned scores here that were less than 60 indicating a major deficiency according to the MSC criteria.

These deficiencies are:

1. Bycatch information for specific fishery not available at sources cited.
2. No system in place to record lost fishing gear
3. Ecosystem impacts are not carefully evaluated
4. Probability of recovery of Henderson Lake sockeye is not high

Specific responses to indicators for assessment of Principle 2.

Indicator 2.1.1: Score: fails to meet level 60 guideposts.

The management plan for the prosecution of the marine fisheries provides a high confidence that direct impacts on non-target species are identified.

This indicator is aimed at determining the effect of fisheries on non targeted species intercepted in the fishery. The fishery monitoring system is well established as suggested by the two documents cited in DFO's response. No where in DFO's response do they say where the bycatch data can be accessed. The links provided show commercial catch stats. I could not find bycatch stats for a specific fishery such as Barkley Sound. If this is available for a specific fishery, which is the intent of the question, DFO needs to specify how to access it. Even so, bycatch monitoring is built into this monitoring system. No monitoring system is in place to record lost gear which has the potential to ghost fish and harm the ecosystem. No evidence is presented that the bycatch reporting methods meet statistical criteria of external reviewers.

60 Scoring Guidepost

No - Data on bycatch in the majority of the fisheries are available to determine impacts on non-target species.

80 Scoring Guidepost

Yes - A monitoring program exists that provides estimates of bycatch.

Yes - In known problem areas of high bycatch, there is an ongoing monitoring program.

100 Scoring Guidepost

No - A monitoring program exists that provides estimates of bycatch that meet statistical criteria acceptable to external reviewers.

Yes - All historic monitoring data is readily available to stakeholder groups and external reviewers.

No - Quantities of gear lost are recorded, and the impacts of lost gear on target and non-target species have been researched and accurate projections of impacts have been completed.

Indicator 2.1.2 Score 80.

The management system includes measures to reduce marine ecosystem impacts.

It appears that there are efforts to reduce interceptions of non-sockeye salmonids. As far as I can tell however, the response provided by DFO understates the use of sockeye by non-human predators. It is well

established that many species directly utilize salmon at all stages of the salmon life cycle. The statement “*impact of fisheries on marine piscivores that utilize the target species is likely minimal*” is based on very little data and does not take a precautionary approach to minimizing impacts on the marine ecosystem. A true precautionary approach would assess more carefully the usage of the resource by marine piscivores including carrying out research on seal and sea lion usage of sockeye in Barkley Sound.

60 Scoring Guidepost

Yes -The management system does include measures to reduce marine ecosystem impacts to achieve management objectives.

Yes - The management system has a history of responding to bycatch mortality problems and has procedures that are followed to limit bycatch.

80 Scoring Guidepost

Yes -The effect of the fishery on the marine ecosystem has been addressed by the management system.

Yes - Where problems are identified, fisheries managers make adjustments to reduce impacts on non-target species.

Yes - Where conflicts exist between the harvest of fish and ecosystem concerns based on their removal, the balance achieved has been made known to stakeholders through publicly available information sources.

100 Scoring Guidepost

No - A risk assessment of bycatch concerns has been conducted as part of developing the management plan.

Yes - The effect of the fishery on the marine ecosystem has been explicitly addressed in the management plan.

No - Research has been conducted on marine piscivores that utilize the target species to ensure that commercial harvests do not present significant risks to the populations of these piscivores.

Yes - Where conflicts exist between the harvest of fish and ecosystem concerns based on their removal, the balance achieved has been the subject of an open review by stakeholders.

Yes - This information is presented in documents that are made available to stakeholders.

Indicator 2.1.3 Score: 80

Research efforts are ongoing to identify new problems and define the magnitude of existing problems, and fisheries managers have a process to incorporate this understanding into their management decisions.

DFO has historically had a strong research component and Barkley Sound is a fishery that has been the subject of much research into stock identification and stock enhancement and the biology that underpins these activities. It is a concern however that little of this information seems to be documented in peer-reviewed articles.

60 Scoring Guidepost

Yes - The management agency collects or plans to collect data on bycatch problems or ecosystem concerns.

Yes - There are procedures established to incorporate any knowledge obtained about bycatch problems into management actions.

Yes - The management agency responds to data provided on bycatch problems by entities outside of their agency.

80 Scoring Guidepost

Yes - There is ongoing research of previously identified problems areas to determine if bycatch reduction measures are effective.

Yes - When new problems are identified, the management plans require a new monitoring program be instituted to determine the effectiveness of bycatch reduction measures.

Yes - The management plan allows for between season assessment and institution of new controls on the fishery or stakeholder consultation following the identification of bycatch problems or ecosystem related impacts.

Yes - The management agency has a proven history of successfully arbitrating stakeholder concerns when balance between fish harvests and ecosystem concerns have arisen.

100 Scoring Guidepost

No - There is detailed knowledge of the relationship between the fishery and the marine ecosystem impacts or ongoing research is attempting to identify if such problems exist.

Yes - The management agency has a proven history of incorporating new research findings into management plans.

Yes - The management agency has a proven history of closing fisheries when bycatch mortality problems arise.

Yes - The management agency has supported the development of more selective fishing practices.

Indicator 2.1.4 **Score: 100** *The management system supports research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs.*

Because of fertilization of Sproat, Great Central and Henderson Lakes at one time or another, the research into the freshwater characteristics and nutritional requirements of these lakes has been significant and ongoing. It would be interesting to see presented a scientific basis for the number of salmon carcasses needed to provide for freshwater ecosystem needs.

60 Scoring Guidepost

Yes - The management system supports research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs.

80 Scoring Guidepost

Yes - Ongoing research is supported to determine the impacts of carcass on freshwater ecosystem processes and identify any tradeoffs between harvests and freshwater ecosystem concerns.

Yes - The management system provides for the communication of research results to managers so that the results can be used in the development of escapement goals for meeting freshwater ecosystem needs.

100 Scoring Guidepost

Yes - There is research to determine tradeoffs of fish harvests with ecosystem concerns such as providing for sustainable populations of dependent components of the aquatic ecosystem.

Yes - Results and conclusions from research are made available to stakeholders.

Indicator 2.2.1 **Score: fails to meet level 60 guideposts.**

The management of the fishery includes provisions for integrating and synthesizing new scientific information on biological diversity at the genetic, species or population level of all species harvested in the fishery and impacts on endangered, threatened, protected or icon species.

The effect of sockeye harvest on the Stellar sea lion which has been listed by COSEWIC as a species of special concern (November 2003) is not being taken seriously. They may rely on the sockeye resource more than assumed. Before making the judgment that they are not affected more data. They may not be largely impacted but this should be assessed more carefully. Also an eared seal or walrus (species unspecified) was taken as bycatch in 2002. It should be assessed whether fishing activities are disrupting feeding areas. Even if it was eventually proven that Stellar sea lions do not take sockeye in significant numbers, it should at least be

established whether fishing disrupts them. Sea otters which are listed as threatened under SARA have now been sighted in Barkley Sound. The response prepared by DFO does not address this. The effect fishery harvest has on the over 140 species both terrestrial and aquatic that depend on salmon is not discussed. It is well documented that bears transfer salmon into the forest resulting in nutrient transfer into the terrestrial system. DFO may be studying this as well, but how this information is incorporated into setting management goals is not discussed.

60 Scoring Guidepost

No - Efforts are being made to assess the impacts of the fishery on the biodiversity of the endangered, threatened, and protected or icon species.

No - The impact of the fishery on endangered, threatened, and protected or icon species is identified and is considered in the management of fisheries.

No - There are provisions in the management system to reduce the impacts of the fishery on the biodiversity of the endangered, threatened, and protected or icon species.

80 Scoring Guidepost

Yes - The fishery has been monitored and the stock composition is assessed with a special effort to determine presence of rare, endangered, protected, or icon species.

Yes - The management agency has a history of incorporating new research into management as new research data on impacts of fisheries on biodiversity become available.

Yes - The fisheries management system includes provisions for harvest reduction when biodiversity concerns are identified for target or non-target species.

100 Scoring Guidepost

No - A risk assessment has been conducted, based on current knowledge of direct and incidental mortalities from the fishery, to ensure the fishery does not pose a significant threat to the biodiversity of the target or non-target species.

No - Stock composition including enhanced component, is known within Fishery Management Units with the likelihood of harvest of endangered, threatened, protected, or icon species has been estimated.

Yes - Time and area of migrations of weak year classes, sub-stock or population components are known.

Yes - The management system contains provisions to reduce harvests based on biodiversity concerns of affected endangered, threatened, protected or icon species, or weak year classes, of stocks, including the enhanced components, of the targeted species.

Indicator 2.3.1 Score: fails to meet level 60 guideposts.

Management strategies include provision for restrictions to the fishery to enable recovery of non-target stocks to levels above established LRPs (Limit Reference Points)

Henderson Lake sockeye could be considered a depleted non-target stock that is not returning at historical levels. Although in the fishery management plan interventions are built in to protect this stock, it is not discussed whether there is a 50% probability to recover this stock. Given that this stock is still inadvertently intercepted in fisheries and has to compete with the increased production from Sproat and Great Central lakes, it is not likely to recover under the current management system. For the last three years where stock specific catch data is available (1991 to 1993) the fishery harvested between 48% and 74% of the total fish returning to Henderson. Unless the management system has been changed substantially it is not very likely that Henderson will recover under this high level of exploitation pressure. Again no LRP have been established for individual stocks harvested in the fishery.

60 Scoring Guidepost

Yes - The management system attempts to prevent extirpation of non-target stocks and does have rebuilding strategies for the majority of the stocks.

No - The management system has at least a 50% probability of achieving long-term recovery of depleted non-target stocks.

Yes - The management system has a strategy for periodic revisiting escapement goals to respond to new data on recovery success or failure for the majority of the stocks.

80 Scoring Guidepost

No - The management system includes assessment of plans for the recovery of non-target stocks to levels above established LRPs.

Yes - Objectives for recovery have at least some consideration of historic documents on stock abundance.

No - The management system has a reasonable (>60%) probability of achieving long-term recovery of depleted non-target stocks.

Yes - Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner that recovery is occurring.

Yes - Escapement goals will be revised periodically to accommodate new data indicating success or failure of existing recovery plans.

Yes - The management system considers the impact of non-fishing related human activity in the development of recovery plans for non-target stocks

100 Scoring Guidepost

No - The management plans and escapement goals have been shown to have a high (>80%) probability of achieving a long-term recovery of depleted non-target stocks using risk analysis.

Yes - Historic data have been thoroughly examined to ensure fisheries restoration objectives are based on the likely habitat capacity, rather than on trends that cover only the most recent decades, thus avoiding the “moving baseline” syndrome.

Yes - Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner that recovery is occurring.

No - Proposed management strategies have been reviewed and found to be scientifically defensible and appropriate by the Pacific Scientific Advice Review Committee or the appropriate Pacific Salmon Commission technical committee.

Yes - The management system supports the collection of data on non-fishing related human activity in the development of recovery plans for non-target stocks.

Table 3.
Summary of DFO indicator scores and scores as evaluated independently
Principle 3 - Fishery Management System

	Scores		Page
	DFO	RJN	
Criterion 3.1 - Management system consistent with MSC principles and criteria			
Indicator 3.1.1 Clear and defensible set of objectives	80	<60	27
Indicator 3.1.2 Periodic assessment of biological status of target species	100	100	28
Indicator 3.1.3 Identify the impact of fishing on the ecosystem	80	60	29
Indicator 3.1.4 Uses best scientific information and precautionary approach	100	100	30
Indicator 3.1.5 Responses to new information are timely and adaptive	100	60	31
Indicator 3.1.6 Responsive to social and economic impact of fishery	80	80	32
Indicator 3.1.7 Useful and relevant information provided to decision makers	80	<60	33
Indicator 3.1.8 Socioeconomic incentives for sustainable fishing	60	60	33
Criterion 3.2 - Framework for research pertinent to management			
Indicator 3.2.1 Research plan for target and non-target species, ecosystem and socioeconomic factors.	80	60	35
Indicator 3.2.2 Research is timely, available and periodic review of research plan	80	80	36
Criterion 3.3 - Transparency in operations and consultation process			
Indicator 3.3.1 Open consultations process	100	80	37
Criterion 3.4 - Measure to control levels of harvest			
Subcriterion 3.4.1 - Catch and exploitation levels			
Indicator 3.4.1.1 Fishery control systems	100	<60	38
Indicator 3.4.1.2 Measures to restore depleted fish populations	60	60	39
Subcriterion 3.4.2 - Ensure that conservation objectives are met.			
Indicator 3.4.2.1 Compliance provisions (effective enforcement)	100	100	40
Indicator 3.4.2.2 Monitoring provisions	100	100	41
Criterion 3.5 - Regular and timely review of management system			
Indicator 3.5.1 Internal review	100	100	41
Indicator 3.5.2 External review	60	60	42
Indicator 3.5.3 Recommendations from reviews incorporated	100	60	42
Indicator 3.5.4 Mechanism for resolving disputes	80	<60	43
Criterion 3.6 - Compliance with legal and administrative requirements			
Indicator 3.6.1 Compliance with international agreements	100	100	43
Indicator 3.6.2 Compliance with domestic laws and regulations	100	100	44
Indicator 3.6.3 Observes legal and customary (First Nation) rights	100	tbd	45
Criterion 3.7 - Ecosystem sensitive gear and fishing practices			
Indicator 3.7.1 Avoid catch and minimize mortality of non-target species	100	80	45
Indicator 3.7.2 No destructive fishing practices	100	100	46
Indicator 3.7.3 Minimize operational waste	100	80	47
Indicator 3.7.4 Cooperation of fishers	100	80	47
Indicator 3.7.5 Fishing methods minimize impacts on habitat	100	100	48

Summary of evaluation of DFO Response to Principle 3.

Of the 27 indicators applicable to the Barkley Sound sockeye fishery, four were assigned scores here that were less than 60 indicating a major deficiency according to the MSC criteria.

These deficiencies are:

1. No attention paid to other smaller populations of sockeye within Barkley Sound.
2. Henderson Lake sockeye which is a weak stock are still caught in significant numbers.
3. Lack of biological assessment of Henderson Sockeye.
4. Lack of catch data for each stock.
5. No target reference points or limit reference points established for individual stocks.
6. Bycatch information for specific fishery not available at sources cited
7. Formal risk assessment is not done
8. No Formalized dispute resolution mechanism
9. Harvest rates are not appropriate for long term sustainability of target stocks.

Specific responses to indicators for assessment of Principle 3.

Indicator 3.1.1: Score: fails to meet level 60 guideposts.

The management system has a clear and defensible set of objectives for the harvest and escapement for target species and accounts for the non-target species captured in association with, or as a consequence of, fishing for target species.

After working through the criteria for Principles one and two, in my opinion the criteria as set forth by the MSC are not being met for this indicator. The fishery is a mixed stock fishery that fishes two main stocks as well as a weak non-target stock. Although efforts are made to control harvest of Henderson Lake fish they are still caught in significant numbers. There is no separation of catch of Sproat and Great Central Lakes and no independent control of harvest in season of these two stocks. I have seen no estimates of specific stock catch later than 1995.

Deficiencies identified for under principles one and two that are relevant to indicator 3.1.1:

- 1. No attention paid to other smaller populations of sockeye within Barkley Sound.**
- 2. Henderson Lake sockeye which is a weak stock are still caught in significant numbers.**
- 3. Lack of biological assessment to Henderson Sockeye.**
- 4. Lack of catch data for each stock.**
- 5. No target reference points or limit reference points established for individual stocks.**
- 6. Bycatch information for specific fishery not available at sources cited.**

60 Scoring Guidepost

No - Management objectives are clearly defined and consistent with MSC criteria for a well-managed fishery for the majority of target stocks.

Yes - Harvest controls are effective for the majority of the fisheries on target stocks.

No - The management system provides for the estimation of catch, landing, and bycatch for the majority of the fisheries.

80 Scoring Guidepost

No - Management objectives are clearly defined for most of the target stocks and are consistent with the MSC criteria for a well-managed fishery.

Yes - Harvest rates and escapement goals are set for target stocks or target species in the fishery, as qualified by relevant environmental factors.

No - Harvest controls are precise and effective for major target stocks or target species in the fishery.

No - The management system provides estimates for all major catches, landings, and bycatch.

100 Scoring Guidepost

No - Management objectives are clearly defined for all of the target stocks and are consistent with the MSC criteria for a well-managed fishery.

No - Harvest rates and escapement goals are precisely set for each target stock unit in the fishery, as qualified by relevant environmental factors.

No -Target Reference Points and Limit Reference Points are clearly defined and documented for each target stock unit in the fishery.

No -Harvest controls are effective with respect to the attainment of management objectives for each target stock unit in the fishery.

No -The management system provides estimates for all catches, landings and bycatch.

Indicator 3.1.2: Score: 100

The management system provides for periodic assessment of the biological status of the target species and the impact of fishing.

Escapement, smolt release, and biological characteristics are collected for the target stocks.

60 Scoring Guidepost

Yes - Assessments or updates of the status of the stocks for the majority of the target species are made for major fishing regions within the fishery.

Yes - Results of assessment or updates of the status of the stocks are made available to stakeholders.

Yes - Technical analysis and methodologies used for the assessments are published or distributed to stakeholders.

80 Scoring Guidepost

Yes -Assessments or updates of the status of the stocks for the major target stock units are made on a periodic basis, dependent upon the level of exploitation.

Yes - Results of assessment and updates of the status of the stocks are made available to stakeholders in a timely fashion.

Yes - Reports on the methodologies used for the assessments are published in non-peer reviewed reports, and PSARC or the appropriate PSC committee reviews the technical analyses for the assessments.

100 Scoring Guidepost

Yes -There is an annual assessment or update of the status of stocks for each major target stock unit in the fishery.

Yes - When results of the assessments or updates indicate that there has been a substantial change in the status of the stocks, this new information is made available to stakeholders in conjunction with the implementation of changes to management measures.

Yes - Reports on the methodologies used for the assessments are published on a regular basis in peer-reviewed journals and PSARC, and/or the appropriate PSC committee regularly reviews the technical analyses for the assessments.

Indicator 3.1.3: Score: 60

The management system includes a mechanism to identify and manage the impact of fishing on the ecosystem.

The effect on marine mammals has not been sufficiently addressed. The importance of marine predation on sockeye smolts for example, by predators such as coho, is not addressed. Specific carcass requirements to support the nutritional requirements of Sproat and GCL have not been established (although this is under study). I do not think that because the larger than historical populations established in Sproat and Great Central lakes are due to human intervention is a good argument to put forth that the escapement is high enough to support nutritional requirements. The ecosystem will have adapted to the increased nutritional flow eventually becoming dependent upon it. Bears for example migrate to spawning sites in the fall come to rely on this annual pulse of nutrients. Now that this is established it is necessary to continue to support this system at the state to which it has evolved. Bear and other species that are dependent on the salmon resource are not monitored (if so evidence to this effect should be presented). Allotment to non-human predators has not been built into the fishing management system.

60 Scoring Guidepost

Yes - The management system takes measures to control the impacts of the fishery on the ecosystem in the majority of cases where impacts have been verified.

80 Scoring Guidepost

No - The management system includes mechanisms to identify and evaluate the impact of fishing on the ecosystem.

Yes - Control mechanisms are used to minimize impacts of fishing on the ecosystem.

100 Scoring Guidepost

No - Monitoring systems are in place to detect the impact of fishing on the ecosystem.

Yes - Where potential impacts of fishing on the ecosystem have been identified, the management system has clear and well-defined objectives for evaluating and managing the impact of the fishery on the ecosystem.

No - Control mechanisms are used to minimise impacts of fishing on the ecosystem.

No - There is sufficient evidence to indicate that when used, control mechanisms are adequate for meeting the management objectives.

Indicator 3.1.4: Score: 100 *When dealing with uncertainty, the management system provides for utilizing the best scientific information available to manage the fishery, while employing a precautionary approach.*

I agree the management system incorporates the best scientific information available. The precautionary approach has been adopted as a fisheries dictum by DFO however it is a very subjective and there is no operational policy and framework currently in place that can be used to implement this principle.

60 Scoring Guidepost

Not applicable - The management system for the majority of newly developing fisheries is consistent with a precautionary approach.

Yes - The management system considers the effect of implementation uncertainty on the effectiveness of the majority of the proposed management actions.

80 Scoring Guidepost

Yes -The management system provides for some assessment of the level of uncertainty in the information collected for management and establishes management controls which take into account these uncertainties, using the best available scientific information and a precautionary approach.

Yes - In situations when precautionary measures are necessary to manage the fishery, the management system calls for increasing research efforts in order to fill data and information gaps.

Not applicable -In most cases where there are newly developing fisheries, the management system implements controls on the development of the fishery that are precautionary in nature.

Yes -The management system considers the effect of implementation uncertainty on the effectiveness of most of the proposed management actions.

100 Scoring Guidepost

Yes -The management system provides for the routine assessment of the level of uncertainty in the information collected for management and establishes management controls to address these uncertainties using the best available scientific information and a precautionary approach. .

Yes -The management system implements research efforts to address data gaps.

Not applicable - For newly developing fisheries for which there is very limited data and information, the management system implements controls on the development of the fishery that are precautionary in nature.

Yes -The management system always quantitatively evaluates the effect of implementation uncertainty (the tendency for actual harvest rates or escapements to differ from those intended by the management regulations) on the effectiveness of the proposed management actions.

Indicator 3.1.5: Score: 60

Management response to new information on the fishery and the fish populations is timely and adaptive.

During the fishing season there are periodic updates and consultation with stakeholders as the fishery develops. Fishing plans can be changed in season to adjust for catch, escapement and environmental conditions. From what I have been able to find out consultations are varied in their effectiveness. DFO has not provided any evidence for this indicator that adjustments are made within 12 to 6 months of obtaining new information.

60 Scoring Guidepost

Yes - For the majority of cases there are provisions for making timely adjustments to the management program, and when they are made the lag time is not so great as to result in the adjustments being ineffectual.

80 Scoring Guidepost

Yes -The management system provides a mechanism for responding to unexpected changes in the fishery.

No - When new information or findings support altering the management and conservation programs, adjustments are made within 12 months of obtaining the new information.

100 Scoring Guidepost

Yes -The management system provides a mechanism for rapid adjustments to be made to its management programs.

No - When new information or findings support altering the management and conservation programs (such as stock recovery plans), there is evidence to demonstrate that such adjustments are made within 6 months of obtaining the new information.

Indicator 3.1.6: Score: 80 *The management system provides a process for considering the social and economic impacts of the fishery.*

A big part of managing the Barkley Sound sockeye fishery is balancing the allocation of the harvest to sport, commercial, and aboriginal sectors. Intrinsic to the process DFO uses to consult with the various parties, is consideration of the social and economic aspects of allocation and management decisions.

60 Scoring Guidepost

Yes - The management system more often than not considers the views, customs, and interests of indigenous peoples who depend on fishing for a livelihood or food.

Yes - More often than not the management system considers the impact of the fishery on coastal communities that are closely tied to the fishery.

Yes - For the majority of the fisheries there are no subsidies that threaten sustainable fishing.

Yes - More often than not, the input of stakeholders is sought by the management system.

80 Scoring Guidepost

Yes - The management system regularly undertakes to consider the views, customs and interests of indigenous peoples whose livelihood or food are dependent on the fishery.

Yes - The management system regularly takes into consideration the impact of the fishery on coastal communities that are closely tied to the fishery.

Yes - There are no subsidies to the fishing industry that would lead to unsustainable fishing or ecosystem degradation.

Yes - The management system regularly undertakes measures to understand the socioeconomic impacts resulting from the management of the fishery.

100 Scoring Guidepost

Yes - There exists a formal and well-defined process to consider, over the short and long term, the views, customs, and interests of indigenous peoples who depend on fishing for their food or livelihood.

No - There is a formal and well-defined process to consider, over the short and long term, the impact of the fishery on coastal communities that are closely tied to the fishery.

Yes - There are no direct subsidies to the fishing industry.

Yes - The management system regularly seeks and considers input from stakeholders in an effort to understand and address socioeconomic issues related to the fishery.

Indicator 3.1.7: Score: fails to meet level 60 guideposts.

The management system provides decision makers with useful and relevant information and advice for managing the fishery.

Although formal risk assessments are not made for fishery alternatives, it is clear that fishery management decisions are made in light of the consequences and risks of each alternative. As such I interpret this is built into the management system. Following the indicators however, does not allow a score of 60.

60 Scoring Guidepost

Yes- The majority of management decisions rely on data, useful and relevant information, or advice provided through the management system.

No -Risk assessments are considered in formulating important management decisions.

80 Scoring Guidepost

Yes - The management system provides managers with a range of alternatives for management.

No - Management decisions consistently rely on useful and relevant information provided within the system and there is not a record of decisions going against the information provided.

100 Scoring Guidepost

No - The management system provides decision makers with a range of alternatives for achieving the objectives of management, including risk assessments for each alternative.

Yes - All management decisions are based on useful and relevant information and advice that is provided through the management system.

Yes - The management system, whenever possible, provides information to decision makers within a time frame that permits management controls to be determined before they need to be taken.

Indicator 3.1.8: Score: 60

The management system provides for socioeconomic incentives for sustainable fishing.

Support of selective fishing can be considered an economic incentive to encourage sustainable fishing. Co-management can be considered a social incentive to encourage sustainable fishing. Although there are penalties for exceeding target catches or exploitation rates, it does not

appear as though are incentives developed (penalties exist) to encourage compliance.

60 Scoring Guidepost

Yes - The management system provides for the use of social or economic incentives to ensure sustainable fishing.

Yes - The management system attempts to understand the impact of its decisions on social and economic factors affecting the stakeholders in the fishery and is responsive to requests to reduce these impacts.

80 Scoring Guidepost

Yes -The management system regularly considers the use of social and economic incentives to the stakeholders in the fishery, which are designed to facilitate the development of fishing gear and practices that can lead to sustainable fishing.

No -The management system includes a program to create incentives for harvesters to not exceed target catches or exploitation rates.

No - Evidence demonstrates that the stakeholders in the fishery have used such incentives.

Yes -The management system attempts to understand the impact of their management decisions on social and economic factors affecting the major stakeholders in the fishery and takes action to lessen the major impacts on stakeholders.

100 Scoring Guidepost

Yes -The management system has formal procedure for providing social and economic incentives to stakeholders in the fishery to develop and utilize sustainable fishing practices, particularly the development of selective fishing gear and practices that lead to improved conservation.

No -The management system creates strong incentives for harvesters to not exceed target catches or exploitation rates

No -The stakeholders in the fishery regularly avail themselves of the opportunity to utilize these incentives.

No - Evidence provided by the management system demonstrates that such incentives have contributed to improved conservation.

Yes - The management system continually attempts to understand the impact of their decisions on social and economic factors affecting the stakeholders in the fishery and regularly takes action to mitigate the impacts on stakeholders.

Indicator 3.2.1: Score: 60

The research plan covers the scope of the fishery, includes all target species, accounts for the non-target species captured in association with, or as a consequence of fishing for target species, and considers the impact of fishing on the ecosystem and socioeconomic factors affected by the management program.

Much of these issues have been addressed in previous indicators. Fishery impacts on marine mammals and other marine predators of juvenile and adult sockeye should be addressed more fully. I do not believe that research is funded to high enough levels to support the research and management needs of the Barkley Sound fishery. More research should be placed on understanding Henderson Lake sockeye. Also local and possibly other West Coast of Vancouver Island sockeye populations are not considered in the fishery and vulnerable to over-exploitation.

60 Scoring Guidepost

Yes - Research provides for the collection of catch statistical and biological data for the target species.

Yes - There has been useful research on the impact of fishing on target and non-target species taken in the fishery, and on the ecosystem in general.

80 Scoring Guidepost

Yes - The management system incorporates a research component that provides for the collection and analysis of information necessary for formulating management strategies and decisions for both target and non-target species.

No - The research plan addresses concerns related to the impact of the fishery on the ecosystem.

No - The research plan addresses socioeconomic issues that result from the implementation of management.

Yes - The research plan is responsive to changes in the fishery.

No - Funding is adequate to support short-term research needs.

Yes - There is progress in understanding the impact of the fishery on target and non-target species.

Yes - Research results are utilized in forming management strategies.

Yes - Research is reviewed by PSARC or PSC, or other appropriate and technically qualified entities.

100 Scoring Guidepost

Yes - The management system incorporates a research component that considers relevant data and information needs for formulating management strategies for all target species, and also information leading to an understanding of the dynamics of the ecosystem including data on the catch, landings and discards of non-target species.

No - The framework for research includes investigations dealing with socioeconomic impacts of the fishery.

Yes - The research plan responds in a timely fashion to unexpected changes in the fishery.

No - Funding is secure and sufficient to meet long-term research needs.

No - There is significant continuing progress in understanding the impact of the fishery on target and non-target species, and the ecosystem in general.

Yes - Research results form the basis for formulating management strategies and decisions.

Yes - Research is regularly published in peer review journals and/or is reviewed by PSARC or the PSC.

Indicator 3.2.2: Score: 80

Research results are available in a timely fashion to interested parties, and there is a mechanism for periodic review of the content, scope and results of the research plan.

PSARC is the formal process by which fishery research papers are distributed and subjected to peer review. The PSARC process (at least observer status is open to the public). DFO research is also published in peer reviewed journals which are available at DFO libraries, online or university libraries. The fishery research plan however is not generally available or subject to public review. In addition I would not say that the research results are available in a timely manner, at least online and requests to get PSARC documents that are listed but not online, have not been fruitful. Out of diadromous working papers from 2003 nine out of 14 are available and none of the working papers from 2004 are currently available online.

60 Scoring Guidepost

Yes - While there are no formal arrangements for stakeholder research review, such reviews are held on a periodic basis for the majority of the research plans and/or results.

Yes - While there are no formal arrangements for peer review of ongoing research, such reviews are periodically conducted for the majority of ongoing research plans and/or results.

Yes - The majority of research results are available to interested parties.

80 Scoring Guidepost

Yes - The management system provides for periodic reviews by stakeholders in the fishery, of the content and scope of research, including funding requirements.

Yes - There are periodic peer reviews of ongoing research.

Yes - Inputs from these reviews are used by the management system to modify research plans.

Yes - Research results are available to interested parties on a regular basis.

100 Scoring Guidepost

No - There is a formal and codified arrangement for annual stakeholder review of the content and scope of research plans and results, including matters related to its funding, which is open and transparent.

Yes - There is a formal and codified arrangement for peer review of ongoing research

Yes - The management system regularly incorporates into the research plan recommendations emanating from these reviews.

Yes - Research results are made available to all interested stakeholders on a regular basis and in a timely manner.

Indicator 3.3.1: Score:80

Provides for a consultative process that is open to all interested and affected stakeholders, which allows for their input on a regular basis into the management process.

Fishery stakeholders are involved in the development of fishery management plans as well as being involved in season management. There is no formal arrangement for direct participation of all interested and affected stakeholders from both the public and private sectors, on matters of a social, cultural, economic and scientific nature.

60 Scoring Guidepost

Yes -The majority of interested and affected stakeholders are provided with a forum for input into the formulation of management plans and measures.

80 Scoring Guidepost

Yes -The management system provides for the regular participation of most interested and affected stakeholders on matters of a social, cultural, economic and scientific nature.

Yes - The management system generally provides notice of meetings at which there can be stakeholder participation.

Yes - The management system does not usually exclude involvement of any interested and affected stakeholder.

Yes - The views of most interested and affected stakeholders are regularly considered in the formulation of management strategies.

100 Scoring Guidepost

No - The management system provides a formal arrangement for the direct participation of all interested and affected stakeholders from both the public and private sectors, on matters of a social, cultural, economic and scientific nature.

Yes - The management system provides timely, advanced notice of meetings at which there can be stakeholder participation.

Yes - The management system does not exclude any interested and affected stakeholder from the consultative process.

Yes - The management system addresses the interests of all interested and affected stakeholders.

Indicator 3.4.1.1: Score: fails to meet level 60 guideposts.

Utilizes methods to limit or close fisheries in order to achieve harvest and/or escapement goals, including the establishment of closed areas, no-take zones, and closed dates and times when appropriate.

Salmon have persisted along the coast of North America for millions of years and most recently over the past 15,000 years, have become widespread along the coastline after the retreat of the glacial ice. Part of the adaptive strategy that salmon have evolved, is to produce periodic large escapements which serve to transfer large quantities of nutrients into the ecosystem and buffer any effects of disease or other environmental factors. Removal of up to 67% of returning adults when the runs are strong and an average of 42% exploitation from 1980 to 2001 is a level of exploitation that will result in the long term vulnerability of the Somass runs. No information is provided that shows the current level of exploitation to be sustainable over the long term. Rivers Inlet sockeye for example, which for almost 100 years sustained a fishery with exploitation rates similar to those proposed for the Somass, practically missed an entire year of returns when ocean conditions were unfavorable. It seems very likely that harvesting of fish from the Rivers inlet run undercut the viability of these populations, genetically, ecologically and demographically and therefore potentiated the near collapse seen. In the spirit of the precautionary approach, it is critical to carry out an empirical case study analysis of fishery exploitation rates and the sustainability of fisheries over the long term. This would provide support (or not) of the exploitation rates put forth by DFO as sustainable. Ecologically speaking, sustainability over the long term can more likely be accomplished by modeling fishery exploitation rates after the levels at which they have evolved over the past millennia to tolerate; exploitation of the runs, especially under increasing environmental pressures, should be more on line with natural predation rates.

60 Scoring Guidepost

No - Harvest rates and/or escapement goals for the majority of the target stocks are effective in halting declines in stock abundance caused by the fishery.

No - Established harvest and/or escapement goals for target stocks consider the impact of the fishery on the majority of the non-target species, and on the ecosystem generally.

80 Scoring Guidepost

Yes - Harvest rates and/or escapement levels designed to achieve target goals are regularly implemented.

Yes - The management system provides for the establishment of closed areas, no-take zones and closed dates and times.

No - Controls are set to maintain or restore target species to high productivity levels, and in a manner that does not contribute significantly to ecosystem degradation.

Yes - Measures that limit harvest rates and set escapement goals are implemented when necessary.

100 Scoring Guidepost

Yes - The management system provides a formal and codified system to achieve harvest and/or escapement goals for target stock units and, as appropriate, non-target species of fish.

Yes - The management system provides a formal and codified mechanism for establishing closed areas, no-take zones, and closed dates and times for any areas of the fishery.

No - Management sets exploitation and escapement levels designed to maintain the target stock units at levels of abundance that can sustain high productivity.

Yes - There is no evidence provided by the management system to indicate that, as a result of fishing, target stock units are in serious decline or degradation of the ecosystem is occurring.

Which objectives? - Measures are currently implemented to achieve these objectives.

Indicator 3.4.1.2: Score:60

Provides for restoring depleted target species to specified levels within specified time frames.

The variable harvest rate strategy allows for a reduction of harvest if returns are low thus allowing depress stocks to recover. No time line is assigned for this recovery. Once returns increase harvest rates do as well.

60 Scoring Guidepost

Yes - The management system includes measures for restoring the majority of depleted populations of target stock to the TRP or equivalent high level of abundance.

80 Scoring Guidepost

Yes - The management system includes measures, which are adequate to restore depleted populations of target stock to the TRP or equivalent high level of abundance as qualified by relevant environmental factors.

No - A time schedule for restoration, which considers environmental variability, is determined by the management system.

100 Scoring Guidepost

Yes - The management system has a formal and codified mechanism, which is adequate for restoring depleted target stocks to the TRP or equivalent high level of abundance, as qualified by relevant environmental factors.

No - The mechanism includes strict guidelines for restoring these depleted populations within a certain time frame are formalized by the management system.

Indicator 3.4.2.1: Score: 100

The management system includes compliance provisions.

Compliance to management regulations is difficult to enforce in the Barkley Sound given, the multi-sectoral user groups. However, for the most part the rules and regulations are followed.

60 Scoring Guidepost

Yes - The management system includes compliance provisions that are effective for the majority of the fisheries.

80 Scoring Guidepost

Yes - The management system includes compliance provisions that are effective for the fisheries.

Yes - Infractions, which result in adverse impacts on the status of the stocks or on the ecosystem, are rare.

100 Scoring Guidepost

Yes - The management system provides for a formal arrangement, such as a compliance committee or a staff review team on compliance, to review the effectiveness of enforcement.

Yes - Education and enforcement procedures are implemented and applicable rules are consistently applied.

Yes - Enforcement actions are effective in achieving the objectives of management.

Yes - There are no infractions being consistently committed in the fishery.

Indicator 3.4.2.2 Score:100***The management system includes monitoring provisions.***

There are extensive mechanisms in place to monitor the fishery. It would be useful to know more details about the number of fishery officers, the degree of dockside sales that are not recorded and the number of fishery observers.

60 Scoring Guidepost

Yes - The management system includes provisions for a monitoring program to evaluate the performance of the majority of the fisheries against its policies and objectives.

80 Scoring Guidepost

Yes - The management system incorporates an effective monitoring program, which evaluates the performance of the fishery relative to management goals and policies.

Yes - Monitoring is broad in scope, and results are available to the majority of the stakeholders.

100 Scoring Guidepost

Yes - The management system incorporates a formal, effective program for monitoring the fishery, which fully evaluates the performance in terms of whether the regulations are resulting in the intended harvest rates and/or escapements, and achievement of objectives regarding impacts on the ecosystem caused by the fishery.

Yes - Monitoring is comprehensive, and includes all relevant components of the fishery

Yes - Results are reported widely on a regular and timely basis.

Indicator 3.5.1: Score:100***There is an effective and timely system for internal review of the management system.*****60 Scoring Guidepost**

Yes - The management system provides for internal review of its performance, and when available, review results are made available to the majority of interested stakeholders.

80 Scoring Guidepost

Yes - The management system includes provision for an internal review that is conducted periodically as the need arises.

Yes - The results of the review are made available to interested stakeholders.

100 Scoring Guidepost

Yes - The management system provides for continuing internal review that is broad in scope, effective, and timely.

Yes - The review process and results are made available to all stakeholders.

Indicator 3.5.2: Score:80

There is an effective and timely system for external review of the management system.

60 Scoring Guidepost

Yes - The management system is open to external review at least once every 10 years.

80 Scoring Guidepost

Yes - The management system provides for a review of management performance by one or more independent experts at least once every five years.

No - The format and standards of the review are established within the management system.

Yes - Review results are made available to the public.

100 Scoring Guidepost

No -The management system provides for one or more independent experts to review at least bi-annually all of the important components of management performance.

Yes - The format and standards of the review are established with input from outside the management system.

Yes - Provision is made for making public the review results.

Indicator 3.5.3: Score:60

There is a mechanism for incorporating into the management system recommendations resulting from the review process.

60 Scoring Guidepost

Yes - Recommendations from internal and external reviews are considered by the management agency and an explanation is provided for the actions or lack of action associated with the majority of these recommendations.

80 Scoring Guidepost

No - The recommendations from internal and external reviews are usually, but not always, used to make changes to the management system.

100 Scoring Guidepost

Yes - The recommendations from internal and external reviews are always acted upon and, where appropriate, incorporated into the management system.

Yes - The management system provides for a report to all interested stakeholders describing how it acted on the recommendations of these reviews.

Indicator 3.5.4: Score: fails to meet level 60 guideposts.

There is an appropriate mechanism for resolving disputes.

The pre, post and in season advisory and consultations do not officially have a dispute resolution mechanism built into them.

60 Scoring Guidepost

No - There is a mechanism for resolving disputes that is provided for by the management system.

80 Scoring Guidepost

No - The management system has a dispute-resolution process for resolving significant disputes.

No - The dispute resolution mechanism is available for use by affected parties, but is not routinely used.

Not applicable - The dispute resolution mechanism does not discriminate against any disputing party.

100 Scoring Guidepost

No - The management system has a formal and codified mechanism for resolution of disputes arising as a result of the fishery.

No - Affected parties routinely use the dispute resolution mechanism.

Not applicable - The dispute resolution mechanism is unbiased and fair respecting all disputing parties.

Indicator 3.6.1: Score: 100

The fishery is not operated in a unilateral manner in contravention to international agreements.

60 Scoring Guidepost

Yes - The management system is in compliance with the majority of international treaty recommendations dealing with the fishery.

80 Scoring Guidepost

Yes - The management system does not willingly act in contravention to any international treaty obligations pertaining to the fishery.

Yes - The management system does not knowingly undertake unilateral exemption from any treaty obligation pertaining to the fishery.

Yes - Evidence indicates any inadvertent action with regard to the contravention of any international treaty obligations by the management system is rare.

100 Scoring Guidepost

Yes - When the stocks of fish under the authority of the management system are also under the authority of an international treaty to which the Government of Canada is a party, treaty obligations are respected, and actions by the management system are coordinated with the recommendations of the treaty organization.

Yes - All measures taken within the management system are in compliance with relevant international treaty obligations.

Yes - The management system does not undertake unilateral exemption from any treaty obligation pertaining to the fishery.

Indicator 3.6.2: Score: 100

The fishery is carried out in a manner consistent with all relevant domestic laws and regulations relevant to the fishery.

60 Scoring Guidepost

Yes - The management system conducts periodic assessments of the fisheries compliance with relevant domestic laws and regulations, and these assessments have not identified any violations that would result in failure to achieve the objectives of the management plan.

80 Scoring Guidepost

Yes - The management system conducts at least bi-annual assessments of the fisheries compliance with relevant domestic laws and regulations, and these assessments have confirmed that none of the violations that have occurred would result in failure to achieve the objectives of the management plan.

100 Scoring Guidepost

Yes - The management system conducts annual assessments of the fisheries compliance with relevant domestic laws and regulations, and these assessments have confirmed full compliance with these laws and regulations.

Indicator 3.6.3: Score to be determined

The management system provides for the observation of legal and customary rights of First Nation peoples.

60 Scoring Guidepost

? - The management system is in compliance with the legal rights of First Nation peoples that are impacted by the fishery.

80 Scoring Guidepost

? - The management system is found to be in compliance with all legal and most of the customary rights of First Nation peoples that are impacted by the fishery.

? The management system includes processes for providing information to First Nations peoples on the major impacts of the commercial fishery on their food, social and ceremonial fisheries.

100 Scoring Guidepost

? - The management system is in compliance with all major legal and customary rights of First Nation peoples that are impacted by the fishery.

? - The management system includes processes for consultation with First Nations peoples on the impact of the commercial fishery on their food, social and ceremonial fisheries.

Indicator 3.7.1: Score:80

Utilization of gear and fishing practices that minimize both the catch of non-target species, and the mortality of this catch.

60 Scoring Guidepost

Yes - The majority of fisheries are conducted in a manner that is consistent with the goal of reducing the catch of non-target species or undersized individuals of target species.

80 Scoring Guidepost

Yes - Through educational programs for members of the fishing industry and other relevant stakeholders, the management system discourages the use of gear types and fishing practices that result in high catches of non-target species or undersized individuals of target species, and encourages them to avoid fishing in areas identified to have high concentrations of non-target species or undersized individuals of target species.

Yes- Taking into consideration natural variability in population abundance, there is evidence that the capture and discard of non-target species or undersized individuals of target species is trending downward, or is at a level of exploitation that has been determined by management to be acceptable.

Yes - Fishers generally conduct their fishing activity in a manner that is consistent with the goal of reducing the catch of non-target species or undersized individuals of target species.

100 Scoring Guidepost

Yes - There are requirements in the management system to reduce the capture of non-target species, which include:

Controlling the use of gear types and fishing practices that result in significant catches of non-target species or undersized individuals of target species, and/or
Implementing closed seasons and no-fishing zones during times and in areas where the probability of making significant catches of non-target species or undersized individuals of target species is high, and

Holding education programs for the fishing industry and other relevant stakeholders to make them aware of the benefits of using fishing techniques and gear that minimize the catch of non-target species or undersized individuals of target species.

No - Taking into consideration natural variability in population abundance and the possibility of declining abundance resulting from heavy exploitation, the management system can demonstrate the effective use of these methods by fishers by the existence of downward trends in the catches of non-target species.

No -The management system creates incentives to decrease the catch of non-target species (e.g. by providing more fishing time for vessels achieving certain standards for reducing such catches).

Indicator 3.7.2: Score:100

Prohibits the use destructive fishing practices, such as poisons and explosives.

60 Scoring Guidepost

Yes - The management system prohibits or discourages the use of destructive fishing practices.

80 Scoring Guidepost

Yes - The management system can demonstrate that destructive fishing practices, such as poisons or explosives, are not currently being used in the fishery.

100 Scoring Guidepost

Yes - The management system prohibits fishing practices that utilize poisons or explosives, or other such devices that damage or destroy physical, chemical, and/or biological features or characteristics of the areas where such practices are prosecuted.

Yes - Evidence can be provided by the management system that such destructive practices are not currently being employed in the fishery.

Indicator 3.7.3: Score:80

Minimizes operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.

60 Scoring Guidepost

Yes - There is a program to reduce operational waste.

80 Scoring Guidepost

Yes - The management system has a program that sets guidelines for reducing operational waste.

100 Scoring Guidepost

Yes - The management system has a formal program to reduce operational waste in the fishery, with the long-term goal of eliminating such waste.

No - The program is effective, as reflected by reduced incidents of operational waste.

Yes - The management system has a formal program in which they work with the fishing industry and other relevant stakeholders to promote the proper handling of catch.

Yes - The management system encourages the fishing industry and other relevant stakeholders to promote programs for the proper handling of catch.

Indicator 3.7.4: Score: 80

The management system solicits the cooperation of the fishing industry and other relevant stakeholders in the collection of data on the catch and discard of non-target species and undersized individuals of target species.

There are only four fishery observers during the commercial fishery. It is not likely that reporting of bycatch is accurate.

60 Scoring Guidepost

Yes - Catch and discard data provided by the fishing industry and other relevant stakeholders are sufficient to manage the harvests from the majority of the non-target species and undersized individuals from the majority of the target species.

80 Scoring Guidepost

Yes - Sufficient numbers of fish harvesters and processors comply with requests for data on catches and discards of non-target species and undersized individuals of target species to ensure that reliable estimates of total catches and discards for the fishery can be obtained.

100 Scoring Guidepost

Yes -The majority of fish harvesters and processors are in compliance with management requests for the collection of data on catches and discards of non-target species and undersized individuals of target species.

No - Continued improvement in the quality and quantity of catch and discard data is evident.

Indicator 3.7.5: Score:100

Implements fishing methods that minimize adverse impacts on habitat, especially in critical zones.

I think this response was just pasted in from the Fraser River review. I am not exactly sure how having a commercial fishing fleet in place affects habitat noise, sonar etc. If this question is just referring to fishing gear, it is likely that the fishing methods used do not have a great impact on habitat.

60 Scoring Guidepost

Yes - The management system has a program for assessing the impact of the fishery on habitat, and for making fishers aware of suitable fishing gear and practices that are known to reduce adverse impacts on habitat.

80 Scoring Guidepost

Yes - The management system undertakes measures to identify and document the impact of the fishery on habitat and to set guidelines for reducing habitat impacts.

Yes - Fish harvesters are encouraged to follow the guidelines for reducing habitat impacts.

100 Scoring Guidepost

Yes - The management system has a formal program to identify and document the impact of the fishery on habitat, and implements measures to restrict gear and fishing practices that have been shown to adversely affect habitat.

Yes - The crews of fishing vessels comply with such measures and thereby avoid damaging the habitat.

Yes - There is no evidence of continued impacts of fishing on habitat.