

Response to Marine Stewardship Council

Indicators for Principle 2 - Ecosystem Impacts

Pacific Wild Salmon Fishery

Fraser River Sockeye

Fisheries and Oceans Canada

Pacific Region

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Introduction

The BC Wild Salmon Fishery has applied for certification of its fisheries to the Marine Stewardship Council.

In June 2003, the Marine Stewardship Council published their MSC Evaluation Criteria for the BC Salmon Fisheries (which included Units of Certification, Performance Indicators and Scoring Guideposts) describing in detail how the certification process will be conducted¹. The Marine Stewardship Council has defined a total of 47 Indicators under three Principles.

This document prepared with the assistance of Fisheries and Oceans Canada is the BCSMC's technical submission on the indicators for Fraser River sockeye for all three principles. This principle examines the impact of the fishery upon the marine environment. It examines the effect fishing has on immediate marine environment including other non-target fish species, marine mammals and seabirds.

The Scoring Guideposts as identified by MSC have been colour coded to indicate the level of agreement with the statements.

Green - The requirements of the guidepost have been met.

Red - The requirements of the guidepost have not been met.

Orange - The requirements of the guidepost have partially been met.

Black - The requirements of the guidepost are not applicable to the Fraser River sockeye fishery

Indicator 2.1.1

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

The intent of this measure is to ensure that the management plans for the fisheries require collection of adequate data to address direct impacts of fishing on non-target species.

DFO Response

Current Situation

Fishery monitoring programs including non-target species are described in the *2002/03 Pacific Region Integrated Fisheries Management Plan: Salmon - Southern BC*.²

<http://www.pac.dfo-mpo.gc.ca/ops/fm/mplans/plans02/SSalmon02pl.PDF>

¹ Marine Stewardship Council. 2003. MSC Evaluation of BC Salmon Fisheries: Units of Certification, Performance Indicators and Scoring Guideposts.

² IFMP 2002, Section 2.10, page 19.

Fishery monitoring programs for target and non-target species are obligatory in all fisheries, including Fraser River sockeye marine net fisheries.

Mandatory logbooks, frequent phone-in, and sales slip programs are in place for all commercial fisheries where data on other species of fish, seabirds, etc, either retained or released, must be recorded. (See sample logbook in 2003 IFMP³). In addition, all fishery notices remind fishermen to report sightings of sea turtles.⁴

Use of the logbook is a condition of license. Fishers can be charged if they fail to comply with correct use of the logbook. There are provisions for self-reporting and observer reporting.

Data are entered into a regional database. A variety of reports derived from these data can be accessed at the following web site.

http://www-sci.pac.dfo-mpo.gc.ca/sa/Commercial/default_e.htm

DFO's plans for fishery monitoring and catch reporting are detailed in its Discussion Paper *Pacific Region Fishery Monitoring and Reporting Framework*.

http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/reportingframework/monitoringpaper_e.pdf

Log-book, frequent phone-ins and sales slips are mandatory for all commercial fisheries. These would include non-target species.⁵ Conditions of license (sample attached) describe the details.⁶

Data requirements for "discards, releases, by-catch and other fishery interactions" include observers, log books, hauls, harvester surveys and video monitoring.⁷

By-catch and incidental harvest are factored into the calculation of exploitation rates on Fraser River sockeye stocks.⁸ Fishing plans are thereby designed to keep exploitation rates on stocks of concern within the limits described in the conservation objectives of the IFMP.⁹ If stock levels drop below acceptable levels, specific conservation objectives are identified for stocks of concern.¹⁰

In addition to log books, sales slips, and phone-in programs, real-time monitoring is in place where necessary. For example, in the Juan de Fuca seine fishery targeting Fraser sockeye, incidental coho catches are tracked by set and by vessel, and on-grounds managers adjust

³ IFMP 2003, Appendix 3.

⁴ Fishery Notice Page 2.

⁵ IFMP 2003, Section 2.2, last paragraph, page 13, last two sentences.

⁶ See Conditions of Licence, Section 6.

⁷ Fishery Monitoring & Reporting Framework. Table, page 12, Item 2.

⁸ IFMP 2002, Section 4.3.4, page 41, first paragraph "Run Size Estimation" line 7.

⁹ IFMP 2002, Section 3.1, page 21.

¹⁰ IFMP 2002, Section 3.1, page 21, 2nd paragraph, first two sentences.

open areas and opening lengths.¹¹ Tracking incidental coho catches in the Juan de Fuca seine fishery started in 2001 (the fishery was subject to a total closure from 1998-2000 inclusive) and continues through 2003. There are no plans to discontinue this program: a fundamental management strategy in this fishery will continue to be per-set tracking of all coho encounters. The per-set and per-vessel catch monitoring in Juan de Fuca has not been written up in a report.

Because of the way in which salmon gear is used, the majority gear is not thought to be a problem. Troll gear simply drops to the bottom and is no longer in a fishable state. Seine and gillnet gear is attached to the vessel and constantly being worked and is rarely lost. Accordingly no monitoring systems or impact assessments are carried out for salmon fisheries.

Historic monitoring data are available at the following web site.

http://www-sci.pac.dfo-mpo.gc.ca/sa/Commercial/HistoricStats_e.htm

Scoring Summary

The information presented establishes that the intent of Indicator 2.1.1 has been met.

The 60 Scoring Guidepost has been met.

Both 80 Scoring Guideposts have been achieved.

Two of three 100 Scoring Guideposts have been met and the remaining guidepost is not applicable to the salmon fishery.

Future Changes

DFO is undertaking a comprehensive, detailed review of fishery monitoring and catch reporting programs in consultation with harvesters from all sectors to identify any deficiencies and discuss potential improvements to better meet the needs of the resource, the public and stakeholders. (2002-03 IFMP: Salmon - Southern BC. Section 2.10; page 19; last paragraph). This review will incorporate requirements of the Marine Stewardship Council.

100 Scoring Guidepost

- A monitoring program exists that provides estimates of bycatch that meet statistical criteria acceptable to external reviewers.
- All historic monitoring data is readily available to stakeholder groups and external reviewers.
- 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.

¹¹ Bert Ionson, A/Resource Management Coordinator—Salmon, pers comm.

80 Scoring Guidepost

- A monitoring program exists that provides estimates of bycatch.
- In known problem areas of high bycatch, there is an ongoing monitoring program.

60 Scoring Guidepost

- Data on bycatch of the majority of the stocks are available to determine that impacts on non-target species.

Indicator 2.1.2

The management system includes measures to reduce marine ecosystem impacts.

For salmon fisheries, the primary concerns related to marine ecosystem impacts are related to the bycatch of non-salmon species and the removal of large numbers of the target salmon species.

DFO Response

Current Situation

By-Catch of Non-Salmon Species

The conflict between harvest of target species and ecosystem concerns (non-salmon by-catch) is minimal in Fraser River sockeye fisheries because there is very little interaction between Fraser River sockeye and non-salmon species in fisheries that harvest Fraser River sockeye.

As established in our response to Indicator 2.1.1 above, harvesters are required to report by-catch of non-salmon species as a condition of license.

The data are used to determine whether fishery management actions are required to protect non-target species.¹²

Specific conservation objectives are identified for stocks of concern if stock levels drop below acceptable levels.¹³

- For example, when Thompson coho stocks dropped below acceptable levels (1998), an exploitation objective of 0% in Canadian fisheries was implemented. Since 2001, the conservation objective has remained at an extremely conservative 3% exploitation rate.
- Similarly, when late run Fraser River sockeye stocks were observed to be entering the Fraser River early and experiencing very high mortality rates (80%), exploitation rates were set at 17% (or less) in 2001 and 15% (or less) in 2002 to mitigate the high mortalities and achieve conservation objectives. Pre-spawn mortalities in 2002 were observed

¹² IFMP 2002, Section 3.1, page 21, first paragraph, last sentences.

¹³ IFMP 2002, Section 3.1, page 21, 2nd paragraph, first two sentences.

to be 20% rather than the previous 80% and the conservation objective for 2003 has consequently been set at a 15-25% exploitation rate.

The fishing plan calls for directed harvests of target stocks to be constrained when there are conservation concerns for species, stocks or stock aggregates encountered during directed fisheries. Fishing plans are designed to keep exploitation rates on stocks of concern within the limits described in the Conservation Objectives.¹⁴ For example, the exploitation rate designed to protect late run Fraser River sockeye precludes fisheries on more abundant summer run stocks.¹⁵

Research has been conducted into marine piscivores that indicate that utilization of the target stock is low for harbour seals¹⁶. Research is ongoing into the composition of Stellar Sea Lion¹⁷ and Killer Whale¹⁸ diets but sockeye contributions are thought to be low. Accordingly current levels of commercial harvests are not thought to present any risks to these populations.

Removals of Target Salmon Species

The primary objective of all fisheries is conservation.¹⁹ This objective includes determining the Total Allowable Catch and acceptable harvesting methods.

Managing for conservation also means incorporating a precautionary approach. Fishery management is risk averse and sustainable. Regular monitoring of fisheries, stock assessment and the use of selective fishing methods ensure that healthy stock levels are maintained.²⁰ Examples of precautionary approach, risk averse management and sustainability follow:

- In accordance with the precautionary approach, run size forecasts are developed at the 50% and 75% probability levels. In 1998-2001, when ocean conditions were observed to be poor, the management plan was developed using the 75% probability forecast. More recently, as better ocean conditions have been observed, the management plan has been based on the 50% probability forecast. However when other indicators not considered in the development of the forecast (poor brood year migration, potentially high mortality of out-migrating fry) suggest the 50% forecast might be optimistic, consideration is given to using the 75% probability forecast. In 2003, the 75% probability forecast for the Early Stuart run timing group was used for planning purposes for this reason.

¹⁴ IFMP 2002, Section 4.1.11, page 33, middle of the page.

¹⁵ IFMP 2003, section 3.1.2, second paragraph, page 17.

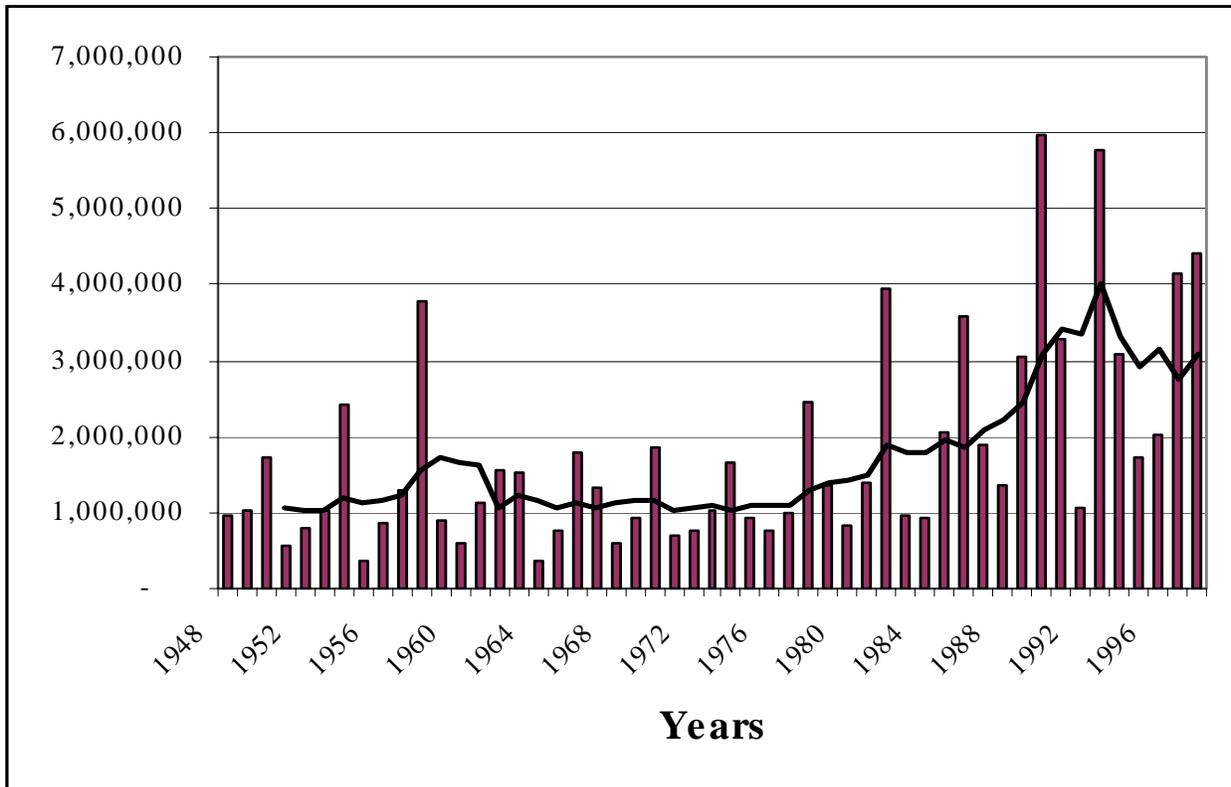
¹⁶ Olesiuk, Peter F., Annual prey consumption by harbour seals (*Phoca vitulina*) in the Strait of Georgia, British Columbia.

¹⁷ Olesiuk, Peter F., Pers Comm

¹⁸ Ford, John, Pers Comm

¹⁹ IFMP 2002, Section 3.1, page 21, first paragraph, first sentence. See entire section.

²⁰ IFMP 2002, Section 3.1, page 21, first paragraph.



- In 2003, exploitation rates are to be capped at 65% regardless of abundance. This reflects a risk averse stance taken to ensure sustainability.

Examples and discussion of fishery monitoring and catch reporting, stock assessment and selective fishing follow:

- Monitoring of harvests of target stocks is addressed in Indicator 1.1.2.1.
- Monitoring of spawning escapements for target stock units is addressed in Indicator 1.1.2.2.
- Catch monitoring, stock assessment and their use in deriving productivity estimates and management guidelines for target stocks is described in indicator 1.1.2.4.
- Selective fishing is discussed in Indicator 3.7.1.

All Fraser River sockeye stocks groups remain within acceptable limits. The graph at the top of this page shows annual escapement counts for Fraser River sockeye from 1948 to 2000. The bars show annual escapements and one can see the four cycle years of Fraser River sockeye. The trend line is a four year moving average indicating a generally rising trend over much of the time span of the data.

Comprehensive decision guidelines were introduced as a feature of salmon management plans in 2002. They provide a summary of the rationale behind management decisions and describe DFO's intended responses to in-season information and conditions as they become available.²¹

Exploitation Rate Ceilings are established pre-season.²²

Decision guidelines provide for low impact fisheries to fish before fisheries having a higher impact. This is particularly so at low run sizes or at the start of the run when the run sizes are uncertain or when stocks of concern have peaked but continue to migrate through an area.²³

Greater detail is available in Section 4.3 of the IFMP 2002.²⁴ See especially Tables 2 and 3.²⁵

Over the past two years (2002 and 2003), the fleet has adopted a range of very small impact fisheries to increase the level of assessment for the target stocks. In addition, in the Straits of Juan de Fuca, the seine fleet has adopted a very controlled fishery to ensure impacts on non-target species remain well below threshold levels.

Where conflicts exist between the harvest of fish and ecosystem concerns (defined as "the bycatch of non-salmon species and the removal of large numbers of the target salmon species") based on their removal, the balance achieved has been the subject of an open review by stakeholders. The process used to achieve this is to include management options in draft IFMPs that are available for review by stakeholders and the public. For example, the harvest plan options to protect the Cultus Lake sockeye stock were incorporated into the draft 2003 IFMP.²⁶

Scoring Summary

It should be clear from the information presented that DFO takes a variety of measures to ensure that removals of target stocks and species are sustainable and that removals of non-salmon species are kept to a minimum.

The two 60 Scoring Guideposts have been met.

All three 80 Scoring Guideposts are in effect.

One of the five 100 Scoring Guideposts has been met, one has not been met and the other three have been partially met.

²¹ IFMP 2002, Section 4, page 26, first paragraph.

²² IFMP 2002, Section 4.1.2, page 28, first paragraph.

²³ IFMP 2002, Section 4.1.8, page 30, last paragraph.

²⁴ IFMP 2002, Section 4.3, pages 45-44.

²⁵ IFMP 2002, Table 2, page 39 and Table 3, page 40.

²⁶ IFMP 2003 Draft for Public Review, section 3.1.2, pages 17-19.

Future Changes

Fisheries and Oceans Canada will be developing a risk assessment framework for assessing Fraser River sockeye.²⁷

100 Scoring Guidepost

- A risk assessment of bycatch concerns has been conducted as part of developing the management plan.
- The effect of the fishery on the marine ecosystem has been explicitly addressed in the management plan.
- 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.
- 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.
- This information is presented in documents that are made available to stakeholders.

80 Scoring Guidepost

- The effect of the fishery on the marine ecosystem has been addressed by the management system.
- Where problems are identified, fisheries managers make adjustments to reduce impacts on non-target species.
- 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.

60 Scoring Guidepost

- The management system does include measures to reduce marine ecosystem impacts to achieve management objectives.
- The management system has a history of responding to bycatch problems and has procedures that are followed to limit bycatch.

²⁷ Review of the 2002 Fraser River Sockeye Fishery, Recommendation 4, pages 51-52.

Indicator 2.1.3

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.

The intent of this measure is to ensure that a research program has been established to evaluate historic and new data to identify future problems. It is also necessary to have an established management process that will ensure research conclusions can quickly be transparently incorporated into future management activities associated with prosecuting the fishery.

DFO Response

Current Situation

Research Program

Research on BC salmon stocks is conducted by Science Branch. Research is focused on achieving a better understanding of salmon habitat and the impact of natural and manmade events and returning stock abundance for the upcoming year.

The Pacific Scientific Advice Review Committee (PSARC) is the Pacific Regional body responsible for review and evaluation of all scientific information on the status of living aquatic resources, their ecosystems, and on biological aspects of stock management.

PSARC advises the Resource Management Executive Committee (RMEC) of Fisheries and Oceans Canada and other bodies on stock and habitat status and potential biological consequences of fisheries management actions and natural events.

PSARC issues Stock Status Reports (SSRs) and Habitat Status Reports (HSRs). These reports are public documents that summarize, in lay terms, scientific information and fisheries information on major commercially-harvested species and their aquatic habitats.

Additional information and PSARC reports are available at:

www.pac.dfo-mpo.gc.ca/sci/english/psarc

In addition to ongoing research activities in the areas of freshwater and marine habitat and stock assessment, specific areas of focus for 2002 included investigations into concerns with early entry and high mortality of Late Run Fraser River sockeye.²⁸ More information is available at the following web site.

<http://www.psc.org/Pubs/LateRun/LateRunUpdate2002.pdf>

Post-release mortality rates are being monitored and assessed to ensure that they are appropriately reflected in the fishing plans.

http://www-comm.pac.dfo-mpo.gc.ca/pages/selective/pdfs/prmsreport_e.pdf

²⁸ IFMP 2003, Section 3.1.

DFO continues to investigate modifications in gear to increase selectivity and reduce impacts on fish and fish habitat.²⁹

A full summary of the selective fishery program including its research program can be found in the Selective (Salmon) Fishing Final Report.

http://www-comm.pac.dfo-mpo.gc.ca/publications/SFFinalReport_e.pdf

These documents reflect a sequential and evolving response to bycatch concerns as new issues were identified.

Established Management Process

The key management process by which "research conclusions can quickly be transparently incorporated into future management activities associated with prosecuting the fishery" is the department's annual post-season review.

Post-season review processes and references are described in Indicator 3.3.1. These include a review of compliance with IFMP by-catch objectives that are incorporated into subsequent IFMPs.

Availability of research results and review of research plans are described in Indicator 3.2.2.

Post-season reviews (by each country) are included in the Pacific Salmon Commission's Annual Report.

<http://www.psc.org/Pubs/PUBFORM.HTM>

Special circumstances in 2002 resulted in a much more extensive review of decision-making processes and rationales. The Report by the External Steering Committee is available at the following web site. An action plan for implementing the recommendations is being developed.³⁰ It is anticipated that the recommendations will be incorporated into future management plans (some are planned to be implemented in 2003; others will be implemented in subsequent management plans).

http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/2002FraserRiverSockeyeReview_e.htm

Non-salmon species are recorded during catch monitoring and eco-system related conservation objectives for non-salmon species may be identified in the IFMP. For example, the IFMP identifies that interim restricted fishing areas to protect inshore rockfish will apply to all salmon gear.³¹ The department has also responded by changing fishing times and areas to minimize by-catch of other species (eg, catch boundaries and opening times were modified in Nootka Sound to minimize dogfish catch).³²

²⁹ IFMP 2003, Sections 7.8.1 and 7.8.2.

³⁰ Bert Ionson, Fisheries and Oceans Canada, pers comm.

³¹ IFMP 2003, Section 3.1.9, page 20, especially paragraph 2, last sentence. See also Appendix 2.

³² Bert Ionson, Salmon Coordinator, A/Resource Management Coordinator - Salmon, pers comm.

DFO has demonstrated a willingness to conserve stocks of conservation concern by closing fisheries in which there will be significant bycatch.

In 1998, in response to serious conservation concerns for Skeena and Thompson coho, DFO closed all marine coho fisheries and closed or reduced a number of other fisheries of significant by-catch concern for Skeena and Thompson stock complexes. Evidence of DFO's willingness to close fisheries in the face of new by-catch problems arise and to incorporate new research findings into management plans is provided by the following examples.

MINISTERS ANNOUNCE CANADA'S COHO RECOVERY PLAN AND \$400 MILLION FOR PACIFIC SALMON FISHERY - June 19, 1998

"Severe restrictions will be imposed on fishing activity in many areas, and selective, conservation-based fishing techniques are being introduced to conserve coho and other stocks at risk."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-re-leas/1998/nr9849_e.htm

DETAILS OF THE 1998 SALMON SEASON CATCH - March 12, 1999

"Commercial fisheries that targeted coho were eliminated as part of the coho conservation program. In areas and times where stocks of concern were not prevalent commercial fisheries proceeded, but fishermen were subject to strict coho conservation measures, including non-retention in all areas of the coast, mandatory brailing for seines, short set times for gillnets, barbless hooks for trollers, and time and area closures."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/bckgrnd/1999/bg990311d_e.htm

1999 SALMON MANAGEMENT PLAN: STAYING THE COURSE FOR SALMON CONSERVATION - June 18, 1999

"The plan continues domestic measures implemented in 1998 to protect threatened coho salmon stocks...", "An objective of zero fishing mortality for Canadian fisheries on Thompson and upper Skeena coho stocks, as in 1998."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-re-leas/1999/nr9960_e.htm

CANADA'S COHO RECOVERY PLAN - Background - June 19, 1998

"The most immediate measure being implemented is the announcement today of a Salmon Management Plan which avoids harvest-related mortalities of coho by restricting all fisheries that impact threatened coho stocks."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/bckgrnd/1998/recov_e.htm

BACKGROUND - May 24, 2000 - Salmon Update

"As in previous years, there are no opportunities for any commercial gear type to retain coho."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/bckgrnd/2000/bg0017_e.htm

Salmon Update - May 24, 2000

"This year, Fisheries and Oceans Canada will again maintain a zero mortality objective for Thompson coho"

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-releas/2000/nr0051_e.htm

Salmon Update - July 5, 2000

"There will be no commercial fisheries directed on coho stocks in northern B.C."

"A key management objective for salmon fisheries in 2000 is to maintain zero fishing mortality on upper Skeena and Thompson River coho stocks..."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-releas/2000/nr0072_e.htm

WEST COAST VANCOUVER ISLAND CHINOOK AND SOUTHERN B.C. COHO - May 4, 2001 - Salmon Update

"No targeted coho opportunities will be provided to commercial harvesters in 2001. All fisheries will have stringent measures applied to limit by-catch of coho and chinook."

http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-releas/2001/nr045_e.htm

To conserve coho in Fraser sockeye fisheries in particular, the department implemented closures and reductions in fishery times and areas, gear modifications attached as licence conditions, modifications in fishing practices, and mandatory revival tanks. These modifications are described in the IFMP.

Fraser commercial and pilot sales fisheries and fisheries continue to be managed to exploitation rate targets on interior coho (IFMP) and will be managed with regard to bycatch of Cultus and Sakinaw sockeye. Conservation objectives for these stocks are identified in the IFMP.

The IFMP does not explicitly require new monitoring programs to be implemented when new problems are encountered. New monitoring programs are, however, very much part of the process of developing management plans. The objective of a management plan is to identify the approach to be taken in prosecuting a fishery. Monitoring programs are part of that approach and are specified in Conditions of Licence³³ (but not explicitly in the IFMP). Recent examples of new monitoring programs implemented when new problems were encountered include:

³³ Conditions Of 2003/2004 Salmon Area B Licence, part 1, sections 6, 7 8 and 9 (there are no page numbers in Conditions of Licence).

- Monitoring of Thompson coho fisheries has been expanded to include releases of coho as well as number of fish landed. Prior to 1998, only catch was monitored; encounters and mortalities were not addressed.
- For Cultus Lake sockeye, DNA analysis to determine stock group composition has been a feature of the monitoring program since 2001.

Scoring Summary

DFO has an entire branch—Science Branch—dedicated to research including assessment and evaluation of historic and new data to identify future problems. The annual post-season review is the primary vehicle by which such research is incorporated into the management of the fishery.

All three of the 60 Scoring Guideposts have been met.

All four 80 Scoring Guideposts are in effect.

All 100 Scoring Guideposts are in place.

100 Scoring Guidepost

- 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.
- The management agency has a proven history of incorporating new research findings into management plans.
- The management agency has a proven history of closing fisheries when bycatch problems arise.
- The management agency has supported the development of more selective fishing practices.

80 Scoring Guidepost

- There is ongoing research of previously identified problems areas to determine if bycatch reduction measures are effective.
- When new problems are identified, the management plans require a new monitoring program be instituted to determine the effectiveness of bycatch reduction measures.
- 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.

- The management agency has a proven history of closing fisheries when bycatch problems or successfully arbitrating stakeholder concerns when balance between fish harvests and ecosystem concerns have arisen.

60 Scoring Guidepost

- The management agency collects or plans to collect data on bycatch problems or ecosystem concerns.
- There are procedures established to incorporate any knowledge obtained about bycatch problems into management actions.
- The management agency responds to data provided on bycatch problems by entities outside of their agency.

Indicator 2.1.4

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

The intent of this is to encourage the collection of information and data that can be used to address freshwater ecosystem concerns. It is our intent that future reviews of Pacific Salmon certification demonstrate that the information developed from these research programs on ecosystem requirements, such as nutrient requirements and piscivore food requirements, are incorporated into the management system.

DFO Response

Current Situation

Analysis in support of freshwater ecosystems includes analysis of:

- lake trophic status,
- limiting factors,
- productivity and productive capacity,
- nutrient monitoring and numbers,
- distribution,
- behaviour and diet in Fraser sockeye nursery lakes. Results of productivity studies are utilized to develop productivity models that are incorporated into the establishment of escapement goals.

A number of studies have been published.³⁴ Additional information can be found by searching for "Hume" and/or "Shortreed" at the following web site.

http://www-sci.pac.dfo-mpo.gc.ca/mehsd/publ/pubs2001-2005_e.htm

Fisheries and Oceans Canada has conducted studies on the impacts of salmon carcasses on stream productivity and nutrient budgets. These consider the impact of salmon-derived nutrients on the terrestrial eco-system, including icon species such as bears, and the role that icon species play in the transfer of nutrients to the terrestrial ecosystem³⁵. Further studies are in progress that track salmon nutrients into higher trophic levels³⁶.

One Canadian paper for Fraser River sockeye is in preparation³⁷. The results of this research will be made available to stakeholders once it is completed. Articles have been written in other jurisdictions (eg, Alaska). Proceedings of a symposium on this subject, held in Eugene Oregon in 2001, are available.³⁸

Escapement targets for Fraser sockeye stocks are based on a long history of spawner-recruitment relationships so freshwater factors are inherently, but not explicitly, incorporated into the establishment of escapement targets. DFO's response to Indicator 3.1.1 describes processes and references for setting escapement goals.

Freshwater environmental conditions (temperature and discharge) are monitored at Fraser River sites during migration. The program and results (updated weekly during migration season) are described in:

http://www.pac.dfo-mpo.gc.ca/sci/fwh/index_e.htm

Outcomes include:

³⁴ Hume, J.M.B., K.S. Shortreed, and K.F. Morton. 1996. Juvenile sockeye rearing capacity of three lakes in the Fraser River system. *Can. J. Fish. Aquat. Sci.* 53:719-733.

Shortreed, K.S., J.M.B. Hume, and J.G. Stockner. 2000. Using photosynthetic rates to estimate the juvenile sockeye rearing capacity of British Columbia lakes. pp. 505-521 in E.E. Knudsen, C.R. Steward, D.D. MacDonald, J.E. Williams, and D.W. Reiser (ed.) *Sustainable Fisheries Management: Pacific Salmon*. CRC Press, Boca Raton, Fla.

Shortreed, K.S., K.F. Morton, K. Malange and J.M.B. Hume. 2001. Factors limiting juvenile sockeye production and enhancement potential for selected B.C. nursery Lakes. *Can. Sc. Advisory Secretariat Res. Doc.* 2001/098

³⁵ N.T. Johnston, E.A. MacIsaac, P.J. Tschaplinski, and K.J. Hall (in prep). Effects of the abundance of spawning sockeye salmon (*Oncorhynchus nerka*) on nutrients and epilithic algal biomass in forested streams in north-central British Columbia. Electronic copy available but not to be distributed.

³⁶ MacIsaac, Erland. Fisheries and Oceans Canada. Pers comm.

³⁷ Johnston, N.T., E.A. MacIsaac, P.J. Tschaplinski and K.J. Hall. 2002. Effects of the abundance of spawning sockeye salmon (*Oncorhynchus nerka*) on nutrients and epilithic algal biomass in forested streams in north-central British Columbia. In preparation. Electronic copy is available for review. Please do not distribute.

³⁸ Ken Shortreed, Fisheries and Oceans Canada, pers comm.

- Provision of Fraser River environmental conditions during periods of sockeye migration to the Fraser Panel.
- Provision of post-season reviews of sockeye migration and spawning success as it relates to environmental conditions.
- Development of models to predict mortality during migration that have been used to adjust fishery allocations and achieve spawner escapement targets.
- Improved 10-day river forecasts through retrospective analysis and additional data-logged sites in the Fraser watershed.
- Preliminary understanding of the life-cycle and development rates of *Parvicapsula sp.*
- Monitoring of environmental conditions are utilized in-season for the adjustment of escapement goals due to potential migratory mortality.

Scoring Summary

We believe the material presented in this section establishes that the management system does indeed support research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs.

The single 60 Scoring Guidepost is true.

Both 80 Scoring Guideposts are in effect.

Both 100 scoring guideposts are true.

100 Scoring Guidepost

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

80 Scoring Guidepost

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

60 Scoring Guidepost

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

Indicator 2.2.1

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 intent of this measure is to ensure that the management system incorporates available knowledge and considers the impacts of the fishery on biodiversity issues. This indicator includes the impacts of enhanced fishery harvests on these issues.

DFO Response

Current Situation

The Department interprets threatened and endangered species to include those so identified by COSEWIC or listed in Schedule 1 of the Species at Risk Act (SARA).

www.speciesatrisk.gc.ca

Fraser sockeye newly listed by COSEWIC include Cultus sockeye.

Other newly listed salmon species that potentially may affect or be affected by Fraser fisheries include Sakinaw sockeye and Interior Fraser coho. At the following web site, the sockeye salmon listings are the sixth, seventh and eighth listings in the Endangered Category.

http://www.cosewic.gc.ca/htmlDocuments/CDN_SPECIES_AT_RISK_Nov2002_e.htm

The remainder of this section is structured according to the main elements indicated in Marine Stewardship Council's "Intent" Statement following the Indicator statement.

Adequate Protection of Significant Components of the Target Species to Provide for a Reasonable Expectation of Sustainability of these Components and their Contribution to the Genetic Diversity of the Target Population

DFO currently manages Fraser River sockeye in four timing groups—Early Stuart, Early Summer, Summer Run and Late Run.³⁹ For each of the timing groups, escapement strategies are developed to protect stocks of low abundance. In addition, a maximum exploitation rate of 65% is set for all stocks to ensure they are maintained and thus to ensure that biodiversity is maintained.

Each target stock (run timing group) consists of component stocks that rear in different lakes and spawn in different locations. Harvest rates are not explicitly adjusted to ensure that biodiversity within each target stock is maintained. Rather, harvest rates are adjusted in-season based on returning abundance according to a schedule agreed to pre-season.⁴⁰ But stock composition including the enhanced component is known and the likelihood of harvest of endan-

³⁹ IFMP 2002, section 4.4.5, page 40.

⁴⁰ See, for example, IFMP 2003, Table 4a, page 42 that shows harvest rates on the four run timing groups at different abundance levels.

gered species has been estimated. For example, impacts on Interior Fraser coho have been evaluated given a range of conditions and a range of fisheries including sockeye fisheries.

A Wild Salmon Policy is under development. This Wild Salmon Policy will describe the future framework for identifying conservation units for all species of salmon that will be used for both assessment and management purposes. A draft policy paper was publicly released in 2000 that outlined many elements of this new approach and this is presently being reviewed and revised while operational guidelines are developed. The operational guidelines will be the subject of consultation in the fall of 2003.⁴¹ Work is underway, under the auspices of the Wild Salmon Policy to establish benchmark reference points for all conservation units of Fraser River sockeye.

Fisheries and Oceans Canada's response to the anomalous timing of late run Fraser River sockeye is an example of how new research data on impacts of fisheries on biodiversity are incorporated into management as they become available. Anomalous timing of late run sockeye has been the subject of research since 2001.⁴² DFO spent \$1.0 million in 2002 and \$700,000 in 2003 for research on this issue and to incorporate the results into management plans.⁴³ Results are available at:

<http://www.psc.org/Pubs/LateRun/LateRunUpdate2002.pdf>

Those results, as well as research results on the pathogen *Parvicapsula* (ref) and their effect on pre-spawn mortality have been incorporated into fishing plans and escapement goals.⁴⁴ And while a formal risk assessment has not been undertaken, the risks to these stocks are considered by managers in the implementation of fishing plans.

Decision guidelines regarding the conduct of all Fraser sockeye fisheries are included in the IFMP.⁴⁵ They take into account environmental conditions, exploitation targets for endangered stocks and expected stock status.

Sources of Uncertainty and Information Available on target stocks/species are described in the response to Indicator 3.1.4

The response to Indicator 3.1.5 describes the department's responses to changing information.

Direct Mortality of Non-Target Species in the Prosecuted Fisheries

Protection for threatened or listed stocks is based on historical timing and migration data because current stock abundances are too low for reliable estimates from test fisheries. Test fishing and racial analyses are used to identify stock composition (including listed stocks) within management units; presence, timing and area of migration; and age composition of

⁴¹ IFMP 2003, section 2.2, fifth paragraph, page 12.

⁴² Pacific Salmon Commission Web site at www.psc.org/Pubs/LateRun/ExecutiveSummaries.pdf.

⁴³ Paul Ryall, Fisheries and Oceans Canada, pers comm.

⁴⁴ IFMP 2002, Section 4.3.2, page 37, first full paragraph: "Late Stock Aggregate".

⁴⁵ IFMP 2002, Section 4.3, pages 35-44.

threatened stocks. The ability to identify stocks of concern is constrained/hampered by their small numbers relative to target stocks.

Specific conservation objectives for listed stocks are included in the Decision Guidelines section of the IFMP.⁴⁶ These are explicitly incorporated into fishing plans.

The Selective Fisheries Program (1998-2001) began the widespread exploration of selective gear and methods.

http://www-comm.pac.dfo-mpo.gc.ca/pages/selective/default_e.htm

The continued development of selective fishing techniques has taken on more importance as a result of heightened conservation concerns on identified stocks as well as a stronger focus on protection of small stocks. Seines have to fish selectively, sorting catch and releasing coho and chinook salmon as well as steelhead.

The region's selective fishing policy

http://www-comm.pac.dfo-mpo.gc.ca/publications/selectivep_e.pdf

outlines the expectations and responsibilities of harvesters to continue to implement and develop new selective techniques and practices. An emphasis has also been placed on the need for continued learning, training and education.

Annually, there is provision for TAC to be put aside for selective fishing experiments. Through that provision, Fisheries and Oceans Canada is experimenting with selective fishing gears and methods. As these methods are perfected, DFO has moved to incorporate them into fisheries. This is especially the case where new and potentially promising selective fishing initiatives may be proposed that are not ready to be implemented without testing.

Fisheries and Oceans Canada will continue to work with harvesters to incorporate new selective gear and fishing practices into the annual fishing plans.

Selective fishing gear and methods are currently widely used and required in all fisheries. Selective fishing is addressed in Indicator 3.1.8. All gears—gillnet, seine and troll—are required to use revival tanks of prescribed design.⁴⁷

- **Gillnets.** Main selective fishing technique is avoidance. Gillnet fisheries, for example, are not authorized in Juan de Fuca due to the potential for impact on Thompson coho.
- **Trolls.** Use barbless hooks to facilitate release of non-target species.
- **Seines.** Brailing and sorting of catch are mandatory.

⁴⁶ IFMP 2002, Section 3.4, pages 35-44.

⁴⁷ Conditions Of 2003/2004 Salmon Area B Licence, part 1, section 3, sub-section 8 (there are no page numbers in Conditions of Licence).

Adequate Protection of Icon Species from Direct or Indirect Impacts of Fisheries

DFO has incorporated a plan to protect killer whale population in Robson Bight into the IFMP.⁴⁸

Fisheries and Oceans Canada has conducted studies on the impacts of salmon carcasses on stream productivity and nutrient budgets. These consider the impact of salmon-derived nutrients on the terrestrial eco-system, including icon species such as bears, and the role that icon species play in the transfer of nutrients to the terrestrial ecosystem⁴⁹. Further studies are in progress that track salmon nutrients into higher trophic levels⁵⁰.

Production or Harvest of Enhanced Stocks does not Affect the Sustainability of Natural Spawning Stocks by Adversely Impacting the Genetic Structure of the Wild Fish.

There is little enhancement done to Fraser River sockeye stocks. There are four spawning channels—Nadina River, Horsefly River, Gates Creek and Weaver Creek—one hatchery program working with the Upper Pitt River stock and fertilization of, and fry release into, Adams Lake in 1997 and 2001.

There has been minimal marking of enhanced sockeye largely because there is no mark sampling program for sockeye in the commercial fishery. Marking programs are not adequate to derive the proportion of enhanced sockeye in fisheries or escapement but an estimate of the proportion of enhanced fish can be made based on juvenile outputs, average survival and numbers of wild spawners. Using those methods:

- The proportion of enhanced fish in the escapement to Nadina, Gates and Weaver is likely over 90% in many years because of poor natural spawning and incubation conditions.
- The proportion of enhanced fish in the escapement to the Upper Adams and the Horsefly is significantly lower, and minor in dominant years.
- The proportion of enhanced fish in the fishery would be inconsequential for Nadina and Gates as these are small stocks relative to others and, as noted, the proportion of enhanced fish in the Upper Adams and Horsefly is negligible in dominant years.⁵¹

In the Fraser, for the most part enhanced stocks are not significant contributors to any of the stock timing groups. The one exception to this is the contribution of enhanced Weaver sockeye which historically has been a relatively significant contributor to the Late run time group in two of the four cycle years (cycle lines 2000 and 2001).

⁴⁸ IFMP 2002, Section 7.1, page 75, first full paragraph.

⁴⁹ N.T. Johnston, E.A. MacIsaac, P.J. Tschaplinski, and K.J. Hall (in prep). Effects of the abundance of spawning sockeye salmon (*Oncorhynchus nerka*) on nutrients and epilithic algal biomass in forested streams in north-central British Columbia. Electronic copy available but not to be distributed.

⁵⁰ MacIsaac, Erland. Fisheries and Oceans Canada. Pers comm.

⁵¹ Cross, C. Impacts of Weaver on Cultus & Enhanced Proportion of Returning Abundance.

Cultus sockeye are managed as part of a Late run group that includes much larger and more productive stocks such as Adams (wild) and Weaver (enhanced). The Department's management policy established fishery objectives and escapement targets for the dominant stocks in the group (either Weaver or Adams), resulting in exploitation rates on other less productive stocks being too high⁵².

For Cultus, generally, exploitation rates have exceeded 75% except in the early 1960's and the 1990's. Cycle-specific exploitation rates differ depending on the stock that triggers management actions. Cultus management is driven by Adams sockeye, a wild stock, in two of the four cycle years, and by Weaver, an enhanced stock, in the remaining two.⁵³ The management regime has been modified in recent years to address conservation concerns. Alternate harvest arrangements for Weaver stock have been used in recent years. For Cultus, beginning in 1995, exploitation rates decreased by over 40% to a mean of 36% as a result of conservation measures (eg, fishery restrictions) to protect all late-run stocks.⁵⁴

Harvests on Weaver stock take place in both mixed-stock and in terminal areas that have minimal impacts on other stocks. Weaver stock is harvested in both the approach areas and the lower Fraser River. These are mixed-stock areas and have the potential to impact upon weaker co-migrating sockeye stock like Cultus Lake. Careful management of this enhanced stock is required to ensure that any impacts upon co-migrating stocks are minimized. Weaver stock is also harvested at the facility as an ESSR⁵⁵ and by beach seine in the Harrison after Birkenhead stocks have passed.

Scoring Summary

The material presented under this Indicator responds to target stocks, non-target species, icon species and interactions between enhanced and wild salmon stocks. In each case, we believe we have described the department's policies and programs, and provided examples of recent initiatives.

All three of the 60 Scoring Guideposts have been met.

All three of the 80 Scoring Guideposts are in effect.

Two of the four 100 Scoring Guideposts are in place. The remaining two scoring guideposts have partially been met.

⁵² Schubert et al. 2002. Cultus Lake Sockeye Recovery Planning Process, section 4.10.4, paragraph 4, first paragraph (page 27).

⁵³ Schubert, N et al. Status of Cultus Lake sockeye salmon (*Oncorhynchus nerka*). Document attached. Section 1.5.1, two bullets following second paragraph (page 12).

⁵⁴ Schubert, N et al. Status of Cultus Lake sockeye salmon (*Oncorhynchus nerka*). Document attached. Section 4.7, first paragraph (page 47).

⁵⁵ This fishery occurs when salmon stocks return to a system after passing through the various fisheries and are at a level in excess of the capacity of the spawning grounds or enhancement facility, usually a hatchery, to receive them.

100 Scoring Guidepost

- 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.
- 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.
- Time and area of migrations of weak year classes, sub-stock or population components are known.
- 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 component, of the targeted species.

80 Scoring Guidepost

- 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.
- The management agency has a history of incorporating new research into management as new research data on impacts of fisheries on biodiversity become available.
- The fisheries management system includes provisions for selective fishing when biodiversity concerns are identified for target or non-target species.

60 Scoring Guidepost

- Efforts are being made to assess the impacts of the fishery on the biodiversity of the endangered, threatened, and protected or icon species.
- The impact of the fishery on endangered, threatened, and protected or icon species is identified and is considered in the management of fisheries.
- 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.

Indicator 2.3.1

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

DFO Response

Current Situation

Non-Listed Stocks of Concern

Monitoring programs are in place for both target and non-target species.⁵⁶

Management actions designed to protect and rebuild stocks of concern (ie, stocks that are expected to return below target levels) to sustainable levels will continue to be implemented. The objective of implementing specific conservation measures is to reduce the impact of harvest and increase the level of escapement to the stock of concern.⁵⁷

The inadvertent harvest of different species of concern is referred to as by-catch. The inadvertent harvest of stocks of concern within the same species (eg, Cultus Lake sockeye when harvesting Summer Run sockeye) is referred to as incidental harvest. Both by-catch and incidental harvest are factored into the calculation of exploitation rates on various stocks. Fishing plans are thereby designed to keep exploitation rates on stocks of concern within limits described under "Conservation Objectives" (Section 3.1 of IFMP 2003).⁵⁸

LRPs have not been defined for non-target salmon stocks, whether by-catch or incidental catch. To protect those stocks, exploitation rates on target stocks are constrained to be low (0% - 25%).

For Early Stuart sockeye, a reference point of 75,000 returning adults has been defined as the minimum abundance necessary to trigger fisheries.⁵⁹

For Thompson coho, extremely conservative Canadian exploitation rates (eg, 3% or less) provide a very high probability that the stock will achieve long term recovery.⁶⁰

COSEWIC-listed Stocks/SARA

Under SARA, Recovery Plans are required for species listed on Schedule 1. Recovery planning processes are beginning for Cultus Lake sockeye,⁶¹ Sakinaw Lake sockeye⁶² and Interior Fraser coho, all newly listed by COSEWIC.

Non-target stocks are identified based on guidelines in the IFMP regarding their rate of occurrence.

⁵⁶ IFMP 2003, Section 2.2, last paragraph, page 13, last two sentences.

⁵⁷ IFMP 2003, Section 3.1, pages 16-20.

⁵⁸ IFMP 2003, Section 4.1.10, first paragraph, page 26.

⁵⁹ IFMP 2003, Table 5, page 44, see first line of table referring to Early Stuart with Run Size less than 75k.

⁶⁰ IFMP 2003, section 3.1.1, page 16.

⁶¹ IFMP 2003, Section 3.1.2, page 17.

⁶² IFMP 2003, Section 3.1.3, pages 17-18.

Decision points for recovery activities are incorporated into recovery plans and are predicated on stock status. See, for example, the Abalone Recovery Strategy.

http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/abalone/AbaloneRecovStrategy_e.htm

The management system incorporates decision points within IFMP guidelines.

As a component of the recovery planning process, stock status reports are prepared for review at PSARC. See for example, the Sakinaw Lake sockeye stock status report at the following web site.

http://www.dfo-mpo.gc.ca/csas/Csas/English/Research_Years/2002/2002_088e.htm

The Cultus Lake sockeye stock status report is listed as being available through the same site but was not an active link when last checked (June 26, 2003).

These reports include an assessment of productive capacity based on species-appropriate indicators using historical data as available. For Cultus Lake sockeye assessment, escapement data dating from 1927 are utilized.

Sediment cores have been taken at some interior sockeye lakes to assess historic productivity levels. This work has largely not been published or even written up at this point (July 2003) but some data have been assembled⁶³.

Monitoring of recovery is assessed through freshwater and marine programs that are specified in Recovery Plans. See, for example, section 3.6 of the Abalone Recovery Strategy at the following web site.

http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/abalone/Abalone_action%20plan_dec02.htm

Results are incorporated into documents for review at PSARC. DFO generally does not calculate a probability of recovery.

Cultus Lake spawning escapement abundance has been estimated under a variety of assumptions about pre-spawning mortality and exploitation rates. Based on a 50% pre-spawning mortality and an exploitation rate not exceeding 30%, the trend of future escapements from three generations hence to twenty-five generations hence is continuously increasing (across a range of exploitation rates). At 30% exploitation rate, the number of spawning escapement into Cultus Lake grows from 3,400 to 20,300 by twenty-five generations.⁶⁴

Responses to changing information, such as escapement targets, is described in the response to Indicator 3.1.5. The specific re-visiting of escapement goals is addressed through PSARC processes.⁶⁵

⁶³ Maclsaac Erland, Fisheries and Oceans Canada, pers comm.

⁶⁴ Schubert, N et al. 2003. Status OF Cultus Lake Sockeye Salmon (*Oncorhynchus nerka*), Table 7, page 71.

⁶⁵ A. Cass et al. Methods for assessing harvest rules for Fraser River sockeye salmon, PSARC S2003-14

Scoring Summary

It should be clear from the information presented that DFO takes a variety of measures to ensure that removals of target stocks and species are sustainable and that removals of non-salmon species are kept to a minimum.

All three 60 Scoring Guideposts have been met.

All six 80 Scoring Guideposts are in effect.

Three of five 100 Scoring Guideposts are in place. One has been determined to not be applicable.

Future Changes

Work is underway under the auspices of the Wild Salmon Policy to establish lower reference points of abundance as performance benchmarks for all Fraser River sockeye conservation units. These lower reference points will be established on a precautionary basis and identify zones of abundance where there are increasing conservation concerns.

100 Scoring Guidepost

- 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.
- 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.
- Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner that recovery is occurring.
- Proposed management strategies have been reviewed and found to be scientifically defensible and appropriate by the Pacific Stock Assessment Review Committee or the appropriate Pacific Salmon Commission technical committee.
- The management system supports the collection of data on non-fishing related human activity in the development of recovery plans for non-target stocks.

80 Scoring Guidepost

- The management system includes assessment of plans for the recovery of non-target stocks to levels above established LRPs.
- Objectives for recovery have at least some consideration of historic documents on stock abundance.
- The management system has a reasonable (>60%) probability of achieving long-term recovery of depleted non-target stocks.

- Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner that recovery is occurring.
- Escapement goals will be revised periodically to accommodate new data indicating success or failure of existing recovery plans.
- The management system considers the impact of non-fishing-related human activity in the development of recovery plans for non-target stocks.

60 Scoring Guidepost

- The management system attempts to prevent extirpation of non-target stocks and does have rebuilding strategies for the majority of the stocks.
- The management system has at least a 50% probability of achieving long-term recovery of depleted non-target stocks.
- The management system has a strategy for periodically revisiting escapement goals to respond to new data on recovery success or failure for the majority of the stocks.