INTERTEK MOODY MARINE

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British Columbia Chum Salmon (*Oncorhynchus keta*) Fisheries

British Columbia Coastal and Adjacent Canadian Pacific EEZ Waters

PUBLIC COMMENT DRAFT REPORT

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CONFIDENTIAL

EXECUTIVE SUMMARY

In January 2008, the client, Canadian Pacific Sustainability Fisheries Society, contracted TAVEL Certification to conduct a full fisheries evaluation to the Marine Stewardship Council Sustainable Fisheries standard on three units of pink salmon and four units of chum salmon in British Columbia. The pink salmon fisheries were certified in July 2011. Evaluation of the chum units of certification proceeded on a slower schedule as a result of additional analyses required to respond to performance indicators.

This report provides the results of the assessment of the four chum salmon units of certification including the north and central coast fisheries, the inner south coast fisheries, west coast Vancouver Island and the Fraser River fisheries. The assessments evaluated a number of gear types, including seine, gillnet, troll, beach seine, fish wheels, weirs, dipnets.

The site visit assessment was conducted by TAVEL Certification (Mr. Steve Devitt) and its' Assessment Team (Dr. Ray Hilborn, Dr. Dana Schmidt and Mr. Karl English). The assessment was conducted using the MSC Principles and Criteria for Sustainable Fishing, Issue 2, November 2002. The MSC Fisheries Certification Methodology (FCM) Version 6, September 2006 was used for all steps of the assessment process. In January 2010 TAVEL Certification was acquired by Moody Marine Ltd, a Moody International company. In recognition of this fact, this Public Certification Draft Report now bears the Intertek Moody Marine company name.

Several information sources informed scoring rationales including: the client submission, available science and management documents, and information and testimony attained during the fishery site visit. The client and Fisheries and Oceans Canada (DFO) prepared an extensive response to the finalize performance indicators drafted to evaluate the fishery. The client submission documents are available on the MSC website (http://www.msc.org/track-a-fishery/in-assessment/pacific/british-columbia-chum-salmon/assessment-downloads) and are integral in the presentation of evidence and subsequent scoring of the fishery. Conducted in January 2009 in Vancouver, BC the fishery site visit enabled the assessment team to meet with DFO scientists and managers, the clients; and representatives from environmental/conservation organizations. Subsequent to the site visit, two important additional documents were provided to the assessment team including detailed run reconstruction analysis for inner south coast (copied in part in Appendix B) and a review of north and central coast chum salmon indicator stream and escapement information conducted by LGL Limited in November 2011.

Over the course of the assessment, it was clear that the management agency, DFO, has committed significant effort over the last decade to improve the consultative processes and tools used to manage these fisheries. Furthermore, the DFO has greatly improved the transparency of its management processes. Conversely, reduced DFO personnel resources have lead to the degradation of some of the key stock and escapement

monitoring activities traditionally undertaken by DFO. These reductions have resulted in lower amounts of stock health benchmark data from the field and subsequently has resulted in lower confidence in the escapement estimates produced by DFO. Establishment of formal limit reference points, or suitable proxies remains a challenge to DFO.

The overall performance of the four chum salmon fisheries units of certification conducted in the BC coastal waters, and adjacent Canadian Pacific waters is identified in the table below. The Assessment Team has recommended that the fishery be certified under the MSC Sustainable Fishing program as the following performance criteria have been met:

1. Each MSC Principle has an aggregated, weighted score of 80 or higher.
2. No individual performance indicator had a score below 60.
3. The client has agreed to improve the fishery performance for the performance indicators which had scores below 80 and above 60.

Final scores allotted to British Columbian chum salmon fisheries and number of conditions issued.

Unit of Certification Performance								
MSC Principle	**North Central Coast Chum**	**Conditions Issued**	**West Coast Vancouver Island Chum**	**Conditions Issued**	**Inner South Coast Chum**	**Conditions Issued**	**Fraser River Chum**	**Conditions Issued**
1	80	7	82	6	80	7	82	5
2	85	1	85	1	85	1	85	1
3	86	8	90	3	90	3	89	4

This report provides the details of the certification process that was undertaken for the candidate fisheries to the end of the client draft report phase, however, much of the information referred to in this document is either directly appended to the report or can be downloaded from the MSC website at the following address: http://www.msc.org/track-a-fishery/in-assessment/pacific/british-columbia-chum-salmon/assessment-downloads.

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Amendments Issued Since Original Draft

Version	Date	Amendment Description
1	November 5, 2009	First Draft
2	December 11, 2011	Client comment edits
3	February 27, 2012	Peer review edits
4	April 18, 2012	Public Comment Draft Report
5		Final Public Report
6		Public Certification Report

1. INTRODUCTION

The Marine Stewardship Council (MSC) is a non-profit organization whose mandate is the long-term protection of the world's marine fisheries and the associated ecological components. Through a process of consultation with various stakeholders over a two-year period commencing in 1996, the MSC established its standard for well managed and sustainable fisheries called the "MSC Principles and Criteria for Sustainable Fishing" (MSC P&Cs).

The finalized MSC Fisheries Certification standard was issued in 1998, and has since been used as the basis by which fisheries are evaluated under the MSC program. The fisheries certification methodology (FCM) has since been updated periodically with the current version (FCMv6) issued in September 2006.

The objective of the MSC is to promote fisheries certified as sustainable directly in the marketplace through the use of the MSC Fish-tick eco-label on certified fish products. Ultimately, through educating fish product consumers about the plight of fishing stocks in the world and the MSC Program, it is hoped they will reward sustainable fisheries by choosing those fish products originating from certified sustainable fisheries.

Interested fisheries can submit their candidature to an accredited certification body for comparison against the MSC P&Cs. The comparison is a three part process inclusive of a pre-assessment (data gap analysis of the fishery), a full assessment (measurement of the fishery against the MSC P&Cs) and certification (5 year validity with annual surveillance requirements) for those fisheries that meet the standard. Successfully certified fisheries can claim their fishery is well managed and sustainable through the use of the MSC Fish-tick eco-label on product and marketing materials.

1.1 Unit of Certification

The MSC certification methodology defines a candidate fishery unit of certification as follows "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock)."

For the purposes of MSC certification, the defined units of certification for this project are the fisheries targeting chum salmon in the following geographic areas as described below:

- Fraser River
- West Coast Vancouver Island
- Inner South Coast
- North Coast and Central Coast

These fisheries represent the majority of the BC commercial fisheries that harvested chum salmon in recent years. In this report, each unit of certification has been scored separately.

The specific information related to the candidate Units of Certification (UoC) are as follows:

Species:	Chum Salmon (*Oncorhynchus keta*)
Geographic Area:	Canadian Pacific EEZ and British Columbia Coastal Waters
Method of Capture:	Seine, troll and gillnet
Fleet:	All salmon troll and gillnet vessels licensed to harvested chum salmon in British Columbia.
Fisheries:	**Fraser River Chum -** Commercial fisheries occur in Canadian Statistical 20 (Juan de Fuca), Area 29 (Fraser) and United States Statistical Areas 4B, 5, 6C and 7 and 7A. First Nations harvest local chum stocks throughout the Fraser River and its tributaries in food, social and ceremonial (FSC) fisheries and in economic opportunity fisheries. Long-term harvest patterns depend on the local abundance of all salmon species, and annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations. Recreational fisheries occur in the Fraser River mainstem and tributaries, with angler effort concentrated on the mainstem, Harrison River, and Chilliwack River. Fraser chum are also intercepted in major mixed-stock fisheries in the Strait of Georgia and Johnstone Strait, which are covered in the profile for Inner South Coast Chum Profile (excluding Fraser) **West Coast Vancouver Island -** Fisheries harvesting chum salmon on the West Coast of Vancouver Island from Juan de Fuca Strait (Area 20) north to the Cape Scott (Area 27). WCVI chum are harvested primarily in terminal areas by commercial fisheries targeting single hatchery or mixed hatchery and wild stocks. Major commercial fisheries occur in Nootka Sound and offshore from the Nitinat Lake outlet. Assessment fisheries with limited effort have also occurred in Esperanza Inlet, Barkley Sound and Clayoquot Sound in recent years. First Nations target local salmon stocks for food, social and ceremonial (FSC) purposes throughout the west coast of Vancouver Island. Long-term harvest patterns depend on the local abundance of all salmon species. Annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations. **Inner South Coast -** Fisheries harvesting chum salmon in Johnstone Strait and the Strait of Georgia (statistical areas 11 to 19). Harvesting sectors include First Nations, recreational, and commercial (seine, gill net and troll). Major commercial fisheries are the Johnstone Strait mixed-stock fisheries in Areas 12 and 13,

with terminal opportunities where local surpluses are identified (Areas 12, 13, 14, 16, 17, 18, 19). First Nations harvest chum salmon in marine areas (Areas 12 to 20 and 121 to 126; Subareas 29-1 to 29-7) in food, social and ceremonial (FSC) fisheries. Long-term harvest patterns depend on the local abundance of all salmon species. Annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations. In United States Fisheries, chum are caught commercially in Panel Areas 4B, 5, 6C and 6 & 7 Net, and Washington Troll and in non-Panel Areas Washington, Oregon and California Troll and Alaska Troll and Net, and also in recreational and US Ceremonial Fisheries. Inner South Coast chum salmon may also be caught in test fisheries in Areas 12, 13, 16, 20, 29, and 123-127.

North and Central Coast - This profile covers fisheries harvesting chum salmon in the Queen Charlotte Islands, the North Coast, and the Central Coast (Statistical areas 1 to 10). Harvesters include First Nations (FSC fisheries), recreational, and commercial (seine, gill net and troll). Major commercial fisheries are:

- *Queen Charlotte Islands:* Terminal commercial net fisheries may target chum salmon when a surplus abundance has been identified in-season. Generally the required escapement is secured within the streams or behind boundaries near the estuary location before fisheries are allowed to proceed, and fishing locations are usually channels or inlets adjacent to the natal stream of the target stocks.
- *North Coast:* Terminal commercial fisheries may target salmon in Area 3 (Nass), Area 4 (Skeena), and Areas 5 and 6 (Hecate Strait), but there have been no targeted harvests of wild chum for at least a decade due to low abundance concerns. Hatchery returns to Kitimat River are harvested terminally, in Kitimat Arm adjacent to the natal stream, when surplus hatchery stocks are identified. Measures are in place to conserve chum in fisheries targeting other salmon species, including frequent non-retention requirements for commercial seines, and frequent non-retention for gillnets combined with requirements for short nets and short sets to facilitate the release of non-target species. Possession of revival boxes for release of non-retention species is mandatory for all commercial gear. Chum non-retention is mandatory for trollers throughout the whole season.
- C*entral Coast:* Mixed-stock commercial fisheries may harvest chum in Fisher-Fitz Hugh Channel, but the majority of fishing effort in Areas 7 and 8 has been shifted towards terminal fisheries. There have been no targeted commercial salmon

harvests in Area 9 (Rivers Inlet) or Area 10 (Smith Inlet) since the mid-1990s to protect local salmon populations. First Nations target local salmon stocks for food, social and ceremonial (FSC) purposes throughout the North and Central Coast, and in the Nisga'a treaty fisheries (Nass River, Area 3). Long-term harvest patterns depend on the local abundance of all salmon species, with effort concentrated in the Nass, Skeena, Kitimat, and Bella Coola systems. Annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations.

Management: The British Columbia chum salmon fisheries are managed by Fisheries and Oceans Canada (DFO).

Traceability: All commercial salmon landings are subject to weight verification and the issuance of sales slips, which are also forwarded to DFO to use in catch monitoring. Commercial salmon harvesters are also required to maintain accurate logbooks, and conduct frequent phone-ins.

At-Sea Processing: There is no at sea processing in the commercial salmon fishery in British Columbia.

Point of Landing: Product must be landed designated ports, which allow Fisheries and Oceans compliance and enforcement officers to observe and verify landings.

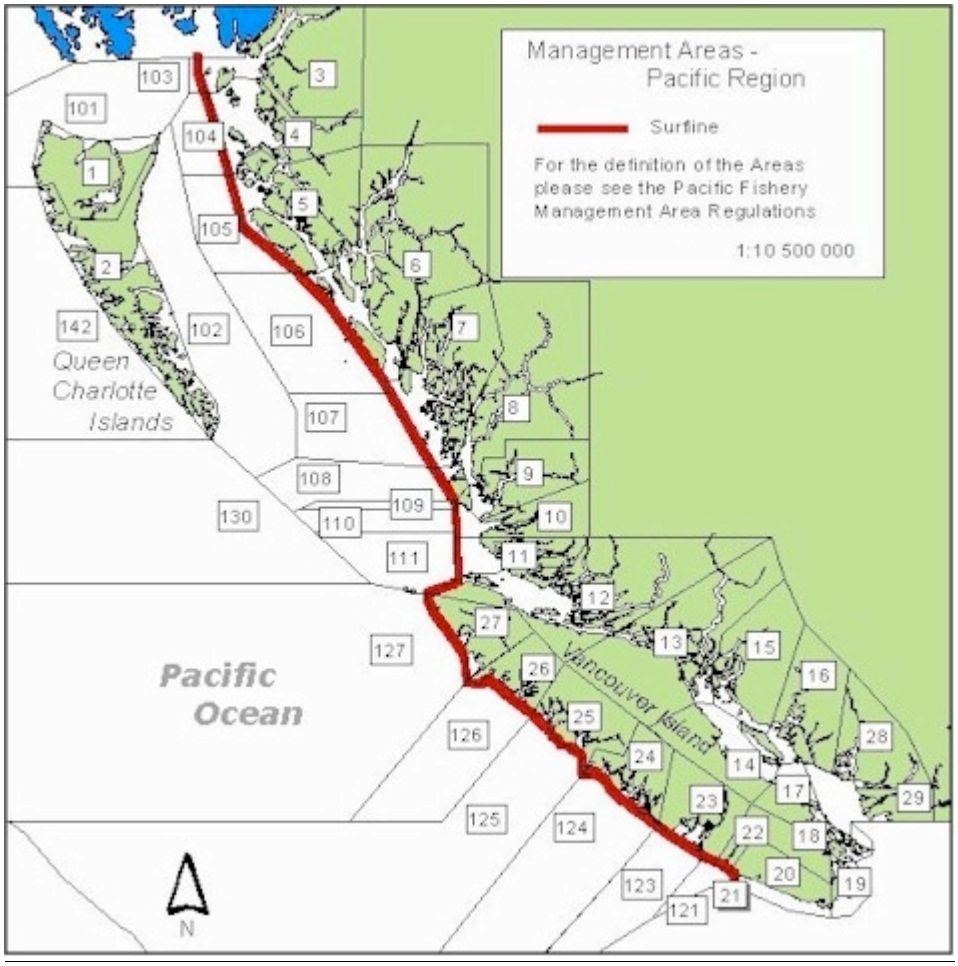

Figure 1: Management areas defined in the Pacific Region salmon fisheries. Source: DFO, 2008

1.1.1 Point of Entry in Chain of Custody and Eligibility

The specific scope of this full certification assessment is the commercial harvest of chum salmon (*Oncorhynchus keta*) by seine, troll and gillnet fisheries in the British Columbia coastal and Canadian Pacific EEZ waters. With exception to a small amount of troll caught salmon that is dressed at sea (bled, dressed and quick frozen), product from the commercial British Columbia salmon fishery is landed and processed in BC coastal ports. Processed fish from the troll sector is also landed in on shore. Only chum salmon caught in Canadian waters and landed in BC would be eligible to be sold as MSC certified fish and fish product.

Integrity of the landings for MSC Chain of Custody requirements was only checked to the point of first landing for BC chum salmon landed by legally permitted, salmon fishing vessels with valid salmon licenses where the landings can be monitored in accordance with monitoring requirements.

Intertek Moody Marine and the British Columbia chum salmon certification clients have agreed that the eligibility date for this certification will be six months prior to the publication

date of the Public Comment Draft Report. All client companies wishing to sell certified product must have a valid Chain of Custody certification audit conducted in accordance with this the MSC Chain of Custody standard, methodology and relevant Policy Advisories and TAB Directives.

1.2 The Clients

The client for this certification is the Canadian Pacific Sustainable Fisheries Society, a group of salmon industry harvesting and processing companies gathered to specifically act as a client for the MSC certification process and to respond to necessary conditions.

1.3 Summary

The certification process and this report is considered stock status and fishery management practices to the end of the 2010 fishing season and includes information updated until December 2008 and as presented in the stock status information provided in Appendix A and B.

The MSC pre-assessment of the BC Pink and Chum salmon seine, troll and gillnet fisheries was completed in April 2001, by Scientific Certification Systems (SCS). The full assessment of the candidate fishery was started in January 2008. There were no site visits conducted as part of the pre-assessment, rather the meetings to further understand the fishery, its management and relevant scientific work were conducted both in person and via teleconference calls. The Assessment Team drafted the Performance Indicators (PIs) for the fishery over the course of the spring of 2008 via electronic correspondence. The basis of the performance indicator drafting was the performance indicators drafted for previous certifications including the BC Sockeye certification PIs, the Alaskan Salmon initial and recertification PIs. The official fishery visit was conducted in January 2009, with meetings taking place in Vancouver, BC. The assessment was conducted using the MSC Principles and Criteria for Sustainable Fishing, Issue 2, November 2002. The MSC Fisheries Certification Methodology (FCM) Version 6, September 2006 was used for all steps of the assessment process.

The management of Canada's Pacific fisheries resources is clearly divided between federal and provincial authorities. Marine fish typically fall under federal jurisdiction, and freshwater fish under provincial jurisdiction. However, the boundaries for the management of salmonid fisheries are a bit more complex:

- DFO regulates First Nations fisheries, even if they occur in freshwater
- DFO regulates all commercial fisheries in tidal waters
- DFO regulates all sport fisheries in tidal waters, and salmon sport fisheries in freshwater. DFO's regulations for salmon sport fisheries in freshwater are published as a supplement to provincial regulations for all freshwater fisheries.
- Province of British Columbia, under delegated authority from Federal Government, manages the freshwater sport fisheries for steelhead and conducts steelhead stock assessments.

Therefore, Fisheries and Oceans Canada (DFO) is the ultimate authority with regards to management of the candidate fishery. In British Columbia all salmon fisheries (First Nations, Commercial and Recreational) is conducted within the framework of an inter-annual management cycle. The management cycle includes; a pre-season analysis of potential salmon returns, setting of conservation objectives and annual management objectives, in-season management and post-season review. Salmon fisheries are managed with the objective of reaching escapement targets or harvesting a certain proportion of the returning run.

There are detailed fishery management plans for all salmon fisheries in BC including First Nations, commercial and recreational. These plans describe the policy framework of the fisheries, the objectives of the management plan, decision guidelines and specific management measures as well as the fishing plans for the First nations, commercial and recreational fisheries.

Integrated Fisheries Management Plans (IMP) are a central element of the annual planning cycle for Pacific Salmon. Each IFMP describes management objectives, general decision guidelines, specific fishing plans for each fishery, and a review of the previous season.

DFO produces two IFMPs for sockeye, coho, pink, chum and Chinook salmon:

- The Southern BC Salmon IFMP covers salmon fisheries in tidal and non-tidal waters from Cape Caution south to the BC/Washington border, including the Fraser River watershed
- The Northern BC Salmon IFMP encompasses tidal and non-tidal waters from Cape Caution north to the BC/Alaska boundary. The tidal waters within this area are denoted as Management Areas 1 to 10 inclusive, 101 to 110 inclusive and 130 to 142. For the purposes of this IFMP, non-tidal waters are defined as the watersheds that contain anadromous salmon and flow into Areas 1 to 10 (see Figure 1 for a map of Areas).

The Province of British Columbia has a regulatory role with respect to on-shore processing, and acts in an advisory capacity to DFO in the fishery management process.

The Assessment Team consisted of three expert assessor members and one lead auditor to provide guidance on the certification methodology as required by the MSC FCM. The team members were, in order of MSC Principle, Dr. Ray Hilborn, Dr. Dana Schmidt, and Mr. Karl English, M.Sc. The Lead Auditor for TAVEL Certification was Mr. Steven Devitt, B.Sc.

The Assessment Team drafted sub-criteria groupings, performance indicators and criteria that were used to evaluate the performance of the fisheries' conformance to the MSC Principles and Criteria for Sustainable Fishing. Through the prescribed process of public comment, the performance indicators and scoring guidelines (PISGs) were finalized based on comments by the client, the MSC and stakeholders. Stakeholders were contacted personally and/or through the electronic media, and were given the opportunity to make written and oral submissions.

After consideration of all objective evidence presented, the assessment team recommends that all units of certification be certified with conditions.

1.4 Strengths and Weaknesses of Client Operation

Strengths

Fisheries and Oceans Canada has committed significant effort over the last decade to improve the consultative processes used to manage these fisheries. Furthermore, the DFO has greatly improved the transparency of its management processes.

Weaknesses

Reduced DFO resources have lead to the degradation of some of the key stock and escapement monitoring activities traditionally undertaken by DFO. These reductions have resulted in a lower amount of stock health benchmark data from the field and subsequently, have resulted in lower confidence in the escapement estimates produced by DFO.

Establishment of formal limit reference points, or suitable proxies remains a challenge to DFO.

1.5 Conditions and Recommendations

Conditions, condition intents and suggestions provided by the team can be seen in Section 10 below. Currently, there are 16 performance indicators conditions which the client addressed through an action plan which will necessarily be approved by the assessment team and the certification body.

Most conditions will require the cooperation of DFO scientific and management department staff. In the instance that the client requested assistance from DFO to conduct specific condition tasks, the certification body will formally confirmed that DFO is prepared to assist and be responsible for those action undertakings.

1.6 Salmon Fishery Terminology

Managers and biologist use a wide variety of terms to describe the groups of fish they manage for specific fisheries. For the purpose of this evaluation we will use the following terms and definitions:

Bycatch – the harvest of non-target species or non-target stocks.

Enhanced stocks - stocks of salmon that have been directly augmented using artificial propagation techniques (e.g. hatcheries, in-stream incubators, spawning channels, hatchery out-planting)

Escapement – those mature salmon that are not harvested and thus may contribute to the spawning component of the stock.

Fisheries scientists outside the management system – this includes fisheries scientists that are not full-time employees of Alaska Department of Fish and Game but have demonstrated expertise related to the fisheries management or stock assessment issues in question. These could include professional scientists employed in the private sector, universities or other non-governmental organizations.

Harvest – those fish or other species that are caught and killed during a fishery or die as a direct result of fishing activity.

Indicator stock – a salmon stock for which detailed information is collected and used to manage a larger group of salmon stocks or stock management unit.

Limit Reference Point (LRP) - indicates the state of a fishery and/or a resource, which is not considered desirable. Fishery harvests should be stopped before reaching it. If a LRP is inadvertently reached, management action should severely curtail or stop fishery development, as appropriate, and corrective action should be taken. Stock rehabilitation programs should consider an LRP as a very minimum rebuilding target to be reached before the rebuilding measures are relaxed or the fishery is re-opened.

Majority – this could be a simple majority (e.g. >50% of the stocks in a stock management unit) or a numerical majority (e.g. >50% of the fish in a stock management unit or scientists in a region), where the management system has provided acceptable rational for the definition used in their submission for each indicator.

Natural salmon stock – a naturally-spawning stock that includes spawners produced by hatcheries. This terminology is used to distinguish it from a "wild" or native stock that has not been influenced by artificial propagation.

Non-target species – species that are not the focus of the fishery but are caught in a fishery that is attempting to harvest other species.

Non-target stock – a stock of salmon that is not the focus of the fishery but is caught in a fishery that is attempting to harvest other salmon stocks.

Precautionary approach - A set of measures and actions, including future courses of action, which ensures prudent foresight, reduces or avoids risk to the resources, the environment, and the people, to the extent possible, taking explicitly into account existing uncertainties and the potential consequences of being wrong.

Productivity, related to ecological community or the ecosystem – the rate of biomass production per unit area per unit time.

Productivity, related to salmon – the number of salmon per spawner per unit of time (usually per year). A common measure of productivity for salmon is the number of recruits per

spawner, where a fish is classified as a recruit if it survives to be harvested or escapes to a spawning area.

Reference points - A (management) reference point is an estimated value derived from an agreed scientific procedure and an agreed model to which corresponds a state of the resource and of the fishery and which can be used as a guide for fisheries management.

Risk - the possibility of suffering harm or loss; danger; a factor, thing, element, or course involving uncertain danger, a hazard. In decision theory "the degree of probability of loss. A statistical measure representing an average amount of opportunity loss." This terminology is used "when large amounts of information are available on which to base estimates of likelihood, so that accurate statistical probabilities can be formulated"

Risk analysis - Any analysis of unknown chance events for purposes of effecting or evaluating decisions in terms of possible penalties and benefits attending these events. A method for generating different probability distributions with accompanying cost and benefits that may attend different courses of action.

Stock – meaning a group of salmon defined by its species, spawning location or spawning region, and in some cases run timing.

Stock management unit – meaning the stock or group of salmon stocks that are treated as a single unit when setting management goals or making fisheries management decisions.

Target Reference Point (TRP) - corresponds to the state of a fishery and/or a resource, which is considered desirable. Management action, whether during a fishery development or stock rebuilding process, should aim at maintaining the fishery system at its level.

Target species – the species of salmon that a specific fishery is attempting to harvest.

Target stocks – specific salmon stock or stock management unit that a specific fishery is attempting to harvest.

Uncertainty - The condition of being uncertain. Doubt. Something uncertain. In statistics, the estimated amount or percentage by which an observed or calculated value may differ from the true value. The incompleteness of knowledge about the states or processes in nature.

Wild stocks – stocks of salmon that have not been augmented through artificial propagation techniques (e.g. hatcheries, in-stream incubators, spawning channels, hatchery out-planting).

(Adapted from FAO, 1995 The Precautionary Approach To Fisheries and its Implications for Fishery Research, Technology and Management: an updated review by S.M. Garcia, Fishery Resources Division, FAO Fisheries Department.)

2.0 BACKGROUND TO THE REPORT

2.1 Authors and Peer Reviews.

The assessment team consisted of the following four individuals.

Dr. Ray Hilborn, Ph.D. – Ray Hilborn is Professor at the School of Aquatic and Fishery Sciences, University of Washington specializing in natural resource management and conservation. He teaches graduate and undergraduate courses in conservation, fisheries stock assessment and risk analysis and currently serves as an advisor to several international fisheries commissions and agencies. He authored "Quantitative fisheries stock assessment" with Carl Walters in 1992, and "The Ecological Detective: confronting models with data" with Marc Mangel, in 1997. He has received the American Fisheries Societies Award of Excellence and the Volvo Environmental Prize. He is a Fellow of The Royal Society of Canada.

Dr. Dana Schmidt, Ph.D. - Dana Schmidt is a limnologist and quantitative fisheries biologist with 35 years of experience of which 18 were in Alaska and 10 in British Columbia. He is responsible for statistical design and analysis of many of Golder Associates Ltd. western North America fisheries and limnology studies and has directed numerous projects involving environmental assessment and investigations of population dynamics of species that are impacted by development. He spent 16 years with the Alaska Department of Fish and Game conducting fisheries research are Alaska lakes, streams, and marine habitat with much effort directed at numerous sockeye salmon lakes across Alaska. He directed stock assessment programs on all Pacific Salmon species in the westward region of Alaska during his tenure as regional research supervisor on Kodiak Island. He has been a senior reviewer of BC lake fertilization programs targeting kokanee. He has been recognized as the lead author of the "Most Significant Paper" in the North American Journal of Fisheries Management for his research on ecology of Karluk Lake sockeye salmon on Kodiak Island, Alaska and has authored over 50 publications and research reports on environmental impacts on aquatic systems and fisheries management. He has served as an assessment team member for the sockeye salmon component of the MSC BC salmon certification program since 2002.

Mr. Karl English, M.Sc. – Karl English, Past President of LGL Limited, is a professional fisheries biologist with over 26 years of experience related to Pacific salmon fisheries and stock assessment research. He is responsible for overseeing and guiding LGL's operations across Canada, in the Pacific Northwest, Alaska and Eastern Russia. His fisheries work has included a wide variety of studies conducted throughout BC, the Yukon, Alaska and Washington State. Karl has spent most of his career designing and implementing studies to improve the quality and quantity of information available for the management and assessment of Pacific salmon and steelhead stocks. He has designed catch monitoring programs for commercial, sport and First Nation fisheries; directed multi-year studies to assess fish distribution, abundance and migration behaviour in coastal waters and large river systems; and provided expert advice to First Nations, industry, NGO's, university researchers and all levels of government. He has served as an assessment team member for the sockeye salmon component of the MSC BC salmon certification program since 2002.

Lead Auditor – Certification Process

Mr. Steven Devitt, B.Sc. – Currently an Associate Auditor with Moody Marine, formerly Operations Manager and Lead Auditor for TAVEL Certification Inc., since 2000. His principle responsibilities include management of the project, verification of proper MSC Fisheries Certification Methodology (FCM) procedural implementation during the full assessment, preparation of report and client contact. Mr. Devitt brings a broad environmental and fisheries background to the project, he is a trained ISO 14000 lead auditor. He also has a strong working knowledge of anthropogenic causes of disturbance to coastal zones.

Peer Reviewers

As required by MSC Fisheries Certification Methodology, version 6, the client reviewed report must be peer reviewed by two individuals. The peer reviewers for this report are as follows:

Dr. Sean Cox - Simon Fraser University, Burnaby, BC, Canada - Sean Cox is a fisheries scientist focusing on aquatic conservation and management of human impacts on aquatic ecosystems. His research develops and applies quantitative fisheries stock assessment methods and field research to address issues in the management of commercial and recreational fisheries. Current research themes include (i) design and evaluation of management procedures for commercial groundfish, herring, and salmon fisheries, (ii) design, evaluation, and application of visual survey methods for assessment of Pacific salmon, rockfish, and marine invertebrates, and (iii) spatial ontogeny of inshore rockfish and implications for marine protected area design. All theme areas involve the extensive use of mathematical and statistical modelling techniques. Sean works closely with federal and provincial fisheries management agencies and he has served as a consultant providing training and support for aquatic resource management programs in Canada and the USA.

Dr. Greg Ruggerone - Natural Resource Consultants Corp., Seattle, WA, USA - Dr. Ruggerone is Vice President at Natural Resources Consultants and has more than 20 years of research and management experience in Pacific salmon from California to Alaska. He has held positions at the University of Washington, Jones & Stokes Associates, and BioSonics. Dr. Ruggerone has been an assessment team member on 2 MSC assessments of salmon and a peer reviewer for 2 or more MSC reports. . Dr. Ruggerone has conducted applied research in salmonid predator-prey interactions, effects of habitat changes on salmonid production, limnological studies, salmon stock identification techniques, effects of hydropower operations on downstream smolt and upstream adult migrations, forecasting salmon run sizes, and investigations of oil spill effects on anadromous fish populations. Dr. Ruggerone has published more than 50 papers on salmon including studies on marine competition, the potential impacts

2.2 Previous Assessments

This is the first full assessment of conformity of the British Columbia Chum salmon seine, troll and gillnet fisheries within BC coastal and adjacent Canadian Pacific EEZ waters to the MSC Principles and Criteria for Sustainable Fishing.

2.3 Field Inspections

In the absence of a site visit during the pre-assessment, findings were based on the review of relevant scientific and technical literature as well as through interviews conducted with key people via teleconference and in person when possible. Interviews were conducted with the clients, representatives from the Department of Fisheries and Oceans, the provincial government, First Nations technical advisors and non-governmental organizations.

The Assessment team members completed the certification assessment process; including evaluation of the current fishery context to drafted the performance indicators for the fishery during the spring of 2008 via electronic correspondence.

The fishery assessment visit was conducted during the period of January 20-23, 2009 with meetings held in Vancouver, British Columbia. These meetings included discussions with members of the client group, individual processors, stock assessment biologists, resource management staff, and Fisheries and Oceans Canada (DFO) scientific and management staff.

2.4 Consultations

During the assessment process, the assessment team received input from two groups of stakeholders during the consultation process. The first group, including the client and Fisheries and Oceans Canada provided specific information about the fishery and its management, science and operations. The client and DFO provided significant information and published the submissions on the MSC website. Submissions can be seen at the following web address: http://www.msc.org/track-a-fishery/in-assessment/pacific/british-columbia-pink-and-chum-salmon/assessment-downloads. The assessment team also met with members of these groups during the fishery assessment site visit.

As part of the MSC defined stakeholder process, the assessment team also met with stakeholders wishing to meet with the team and discuss the fishery management directly. This group included personnel from the British Columbia Ministry of Environment and members of the Marine Conservation Caucus.

The stakeholder meeting attendance list for the fishery assessment visit is displayed in Table 1 below.

During the stakeholder meetings with the MCC, the main topics discussed with the team were:

1. Wild Salmon Policy (WSP)
   Concerns raised about the WSP include: the robustness of the WSP to save fisheries and weak stocks; funding to implement the requirements of the WSP in a timely and meaningful way; the objectives of the WSP particularly as related to biodiversity protection through implementation of limit reference points.

2. Conservation Units (CUs) within the WSP

CUs are defined and has the team evaluated the health of the CUs, how do pink/ chum CUs match with the define units of certification, level of assessment of pink/ chum populations with the CUs, protection of biodiversity within the CUs.

3. Limit and Target Reference Points
   Concern was raised about the importance of development of LRP/ TRPs, particularly because of the importance of these species in the freshwater habitat.

4. Ecosystem based management objectives
   Concern was noted regarding the importance of these species in the freshwater habitat, specifically in relation to nutrient loading and forage needs of birds and terrestrial animals; is there consideration of contribution of pink and chum salmon on the health of habitat and ecosystem indicators in the freshwater habitat when setting limit and target reference points. DFO needs to implement a clear process of ecosystem based management.

5. Fishery Management
   Members of the MCC have provided input into the development of the South Coast Salmon IFMP and are concerned that their abilities to inform decisions in that process is very low. The Fraser River Sockeye Spawning Initiative was raised as an example of where specific suggestions and concerns were raised and were not fairly reflected in the process, concern raised about harvesters ability to effect this management process, consensus based suggestions into that process do not work well.

Table 1: Stakeholder Meeting Attendance

Date	Activity	Attendees
01/19/09 Monday	09:00 - 16:00 Briefing Meeting PI&SG Weighting Session (Closed to client and stakeholders)	Assessment Team
01/20/09 Tuesday	Assessment Interviews 09:00 - 12:00 - DFO - North Central Coast 13:00 - 16:00 – DFO - West Coast Vancouver Island	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt – Assessment Team Dave Peacock – DFO Diana Dobson – DFO Alistair Thomson - DFO Sandy Argue – BC MoE Christina Burridge – Can. Pacific Sustainability Fisheries Society (CPSFS) Dan Averill – MSC

01/21/09 Wednesday	Assessment Interviews 09:00 - 12:00 DFO - Inner South Coast	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt - Assessment Team Pieter Van Will – DFO Randy Brahniak – DFO Sandy Argue – BC MoE Christina Burridge - CPSFS Dan Averill – MSC
	Stakeholder Interview 13:30 - 15:00 – Marine Conservation Caucus	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt - Assessment Team Jeffery Young – David Suzuki Foundation. Vicky Husband –Watershed Watch Salmon Society (WWSS) Craig Orr - WWSS Aaron Hill - WWSS Greg Knox – Skeena Wild Conservation Trust Dan Averill – MSC
	Stakeholder Interview 15:45 - 16: 30 – British Columbia – Ministry of Environment	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt - Assessment Team Andrew Wilson BC MoE
01/22/09 Thursday	Assessment Interviews 09:00 - 12:00 – DFO Fraser 13:30 - 15:00 – DFO Resource Management	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt - Assessment Team Paul Ryall – DFO Resource Management Sue Grant – DFO Brian Matts – DFO Debra Sneddon - DFO Sheldon Evers – DFO Barbara Mueller - DFO Dan Averill – MSC
01/22/09 Friday	Client Interviews 09:00 - 11:00 –- Canadian Pacific Sustainability Fisheries Society	Steve Devitt – TAVEL Karl English – Assessment Team Ray Hilborn - Assessment Team Dana Schmidt - Assessment Team Christina Burridge - CPSFS Rob Morley – Canadian Fishing Company Greg Taylor – Ocean Fisheries

3.0 FISHERY BACKGROUND INFORMATION

3.1 The Target Species - *Chum salmon (*Oncorhynchus keta*)*

Distribution

Chum salmon (*Oncorhynchus keta*) have the widest distribution of any Pacific salmon. They range south to the Sacramento River in California and the island of Kyushu in the Sea of Japan. In the north they range east in the Arctic Ocean to the Mackenzie River in Canada and west to the Lena River in Siberia (ADFG, 2009). BC populations are found mostly north of 50^0N latitude and east of 175^0W longitude (Grant and Pestal, 2008).

Life History

Chum salmon have been identified as the largest Pacific salmon species, with an average fork length of about 70 cm and average weight of roughly 5.0 kg. Similarly, chum eggs are large in size relative to other pacific salmon, with fecundities of between about two and three thousands eggs per female depending on size (40-45 eggs per cm of fork length). Fertilized eggs are buried in gravel nests (redds) by the female as a means of protecting them from predation (ADFG, 2009).

Fry emerge from the gravel in early winter, generally between February and April, and immediately begin migration downstream. Chum may remain in estuaries and near shore areas between days and months prior to entering the ocean. In the estuaries and near shore areas, chum feed on a diet dominated by amphipods and benthic copepods, before forming into schools in salt water where their diet usually consists of zooplankton (ADFG, 2009). Following their adaptation to marine waters, they rapidly migrate northwest to the Gulf of Alaska.

Adult chum salmon remain at sea for 3-6 winters, before they return to their natal steams to spawn in the fall of the year. Most chum salmon spawn at age 4. Chum salmon are the poorest jumpers of the Pacific salmon and waterfalls that do not impede any of the other species from upstream migration can often stop chum. Once spawning is complete, adult chum salmon die (DFO, 2009).

Reproduction

Chum salmon often spawn in small side channels and other areas of large rivers where upwelling springs provide excellent conditions for egg survival. They also spawn in many of the same places as pink salmon, small steams and intertidal zones. Age at maturity appears to follow a latitudinal trend in which a greater number of fish mature at a later age in northern portions of the species range. Most chum salmon mature and return to the natal streams to spawn between 3 and 5 years of age, with 60-90 percent of the fish maturing at age 4 (NMFS, 2009)

Typical of Pacific salmon, female chum salmon deposit their eggs in redds which they have dug out with their tails. At the same time that the females release their eggs, males release a

cloud of milt. Once the nest if full the female will cover the eggs with gravel to protect them from predators. This process is repeated several times until the female has spawned all her eggs (DFO, 2009). Female chum may lay as many as 4,000 eggs, but fecundity typically ranges between 2,400 and 3,100 eggs (ADFG, 2009). Once spawning is complete, adult salmon die.

In short coastal streams chum emerge from gravel spawning beds in the spring as fry and move directly to the sea. This migration is accomplished in a day or two. In larger river systems, the young remain in freshwater for up to several months before reaching the ocean. Most chum spend two or three summers at sea before returning to their home streams to spawn. In May or June of their final year at sea, maturing chum are found throughout the eastern and western Pacific, north of the California border (DFO, 2009).

In general chum salmon in British Columbia spawn in the fall, with peak spawning occurring in October. Fraser River and the Inner South Coast stocks emerge from the gravel in February, with peak downstream migration taking place in March and April (Grant and Pestal, 2008; Will et al., 2008). The North Coast/Central Coast and West Coast/Vancouver Island young emerge in March/April and April/May respectively, with migration downstream commencing almost immediately (Spilsted and Pestal, 2008; Dobson and Pestal, 2008). Chum salmon return to the Fraser River in late September (Grant and Pestal, 2008), the Inner South Coast return in August (Will et al., 2008). Chum salmon from the North Coast/Central coast and West Coast/Vancouver Island in general return from July to September and mid to late September respectively. (Spilsted and Pestal, 2008; Dobson and Pestal, 2008).

Mortality

The survival of chum salmon eggs and fry is influenced largely by fluctuations in environmental conditions, particularly rainfall and water temperature. By comparison, fry to adult survival may be related to competition for resources and predation during the marine states (and to a lesser extent during the short period of freshwater rearing). (Grant and Pestal, 2008).

Behaviour

While in the near shore and estuary habitats juvenile salmon feed on small insects before forming into schools in salt water where their diet usually consists of zooplankton. At sea the fish feed near the waters surface at night and range down as far as 60 meters during the day. As adults, their diet consists of copepods, fishes, mollusks, squid and tunicates.

Salmon characteristically stop eating just before they re-enter the freshwater to spawn. From the point of entry into the freshwater until they die after spawning, with exception of steelhead and cutthroat, salmon live only on stored body fats and proteins (DFO, 2009).

Migration

Chum fry emerge from the gravel as early as February and migrate downstream shortly after emergence, primarily in March and April. Juvenile chum rear near the estuary and in near-

shore areas until approximately late May, and subsequently enter the major marine water bodies to gradually migrate northward. Juvenile migration continues to more off-shore waters and towards the Gulf of Alaska beginning in June and July and continues through the summer months. In the first year, chum are primarily located along the coast of North American and into the Gulf of Alaska (Will et al., 2008).

Chum salmon remain at sea for between 3 and 6 summers before returning to their natal streams to spawn in the fall of the year. Most chum return to spawn as four year old individuals (Will et al., 2008). See Figure 2 for migration routes of chum salmon.

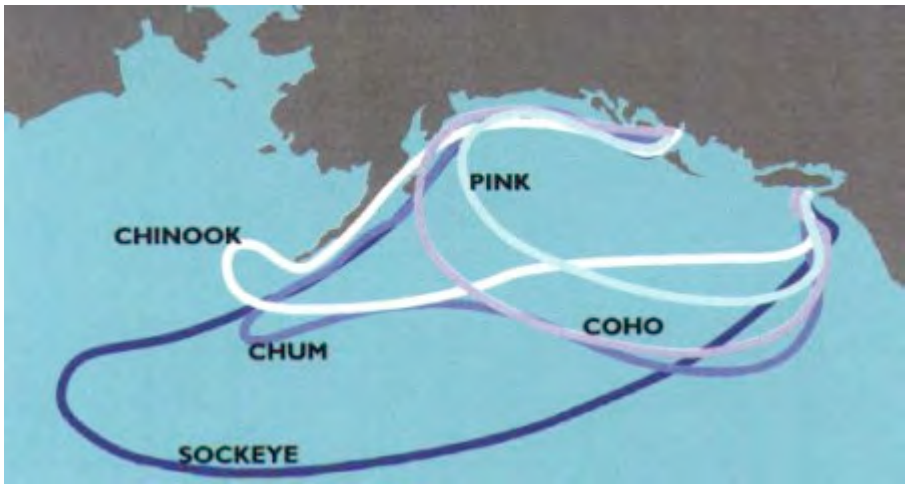

Figure 2: Migration routes of Pacific Salmon. **Source (Agriculture and Agri-Food Canada, 2004).**

3.2 Candidate Fishery Summaries

The following summaries have been extracted from the certification unit profiles (CUP) for each of the four respective units of certification, provided by the client as a component of the client submission.

Fraser River

The Fraser River CUP addresses commercial, First Nations, and recreational fisheries harvesting chum salmon in the Lower Fraser and approach areas. Commercial fisheries occur in Canadian Statistical 20 (Juan de Fuca), Area 29 (Fraser) and United States Statistical Areas 4B, 5, 6C and 7 and 7A.

First Nations harvest local chum stocks throughout the Fraser River and its tributaries in food, social and ceremonial (FSC) fisheries and in economic opportunity fisheries. Long-term harvest patterns depend on the local abundance of all salmon species, and annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations.

Recreational fisheries occur in the Fraser River mainstem and tributaries, with angler effort concentrated on the mainstem, Harrison River, and Chilliwack River. Fraser chum are also intercepted in major mixed-stock fisheries in the Strait of Georgia and Johnstone Strait, which are covered in the profile for Inner South Coast Chum Profile (excluding Fraser).

Inner South Coast

The Inner South Coast Unit of Certification includes all chum salmon spawning in watersheds in Johnstone Strait and the Strait of Georgia (i.e. Areas 11 to 19), except for Fraser River chum. The major Inner South Coast chum systems, grouped by management area, are:

- *Johnstone Strait:* Major systems in this management area include the Fulmore River on the mainland side of Statistical Area 12, Adam River, Kokish River, and Nimpkish River on the Vancouver Island side of Area 12, as well as Amor de Cosmos Creek, Hyacinthe Creek, and Salmon River on the Vancouver Island side of Area 13.
- *Upper Vancouver Island:* Major systems in this management area include the Cluxewe River and and Quatse River in Area 12.
- *Mid Vancouver Island:* Major systems in this management area include Campbell River, Quinsam River, Puntledge River, Qualicum River, and Little Qualicum River. Production of enhanced chum is concentrated in this area.
- *Lower and South Vancouver Island*: Major chum runs in this area originate from the Nanaimo River, Chemainus River, Cowichan River, and Goldstream River.
- *Kingcome Inlet*: Major systems include the Kingcome River and the Wakeman River.
- *Bond Inlet to Knight Inlet*: Major systems include the Ahta River, the Kakweiken River, and Viner Sound Creek.
- *Loughbourough Inlet to Bute Inlet:* Major systems include the Southgate River, Orford River, and Heydon Creek.
- *Toba Inlet*: Major systems are the Little Toba River and the Theodosia River.
- *Jervis Inlet:* Major systems include Lang Creek and Sliammon Creek in Area 15, and Tzoonie River, Deserted River, and Skwawka River in Area 16.
- *Howe Sound / Sunshine Coast*: Persistent chum runs spread across in several small systems.
- *Burrard Inlet:* The major system in this area is the Indian River.

West Coast Vancouver Island

The Unit of Certification for West Coast Vancouver Island addresses fisheries harvesting chum salmon on the West Coast of Vancouver Island from Juan de Fuca Strait (Area 20) north to the Cape Scott (Area 27).

WCVI chum are harvested primarily in terminal areas by commercial fisheries targeting single hatchery or mixed hatchery and wild stocks. Major commercial fisheries occur in Nootka Sound and offshore from the Nitinat Lake outlet. Assessment fisheries with limited effort have also occurred in Esperanza Inlet, Barkley Sound and Clayoquot Sound in recent years.

First Nations target local salmon stocks for food, social and ceremonial (FSC) purposes throughout the west coast of Vancouver Island. Long-term harvest patterns depend on the local abundance of all salmon species. Annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations.

Recreational salmon harvests in tidal waters and freshwater occur throughout the west coast of Vancouver Island, but harvest relatively few chum salmon.

North Central Coast

The NCC Unit of Certification profile covers fisheries harvesting chum salmon in the Queen Charlotte Islands, the North Coast, and the Central Coast (Statistical areas 1 to 10). Harvesters include First Nations (FSC fisheries), recreational, and commercial (seine, gill net and troll). Major commercial fisheries are:

- *Queen Charlotte Islands:* Terminal commercial net fisheries may target chum salmon when a surplus abundance has been identified in-season. Generally the required escapement is secured within the streams or behind boundaries near the estuary location before fisheries are allowed to proceed, and fishing locations are usually channels or inlets adjacent to the natal stream of the target stocks.
- *North Coast:* Terminal commercial fisheries may target salmon in Area 3 (Nass), Area 4 (Skeena), and Areas 5 and 6 (Hecate Strait), but there have been no targeted harvests of wild chum for at least a decade due to low abundance concerns. Hatchery returns to Kitimat River are harvested terminally, in Kitimat Arm adjacent to the natal stream, when surplus hatchery stocks are identified.
- C*entral Coast:* Mixed-stock commercial fisheries may harvest chum in Fisher-Fitz Hugh Channel, but the majority of fishing effort in Areas 7 and 8 has been shifted towards terminal fisheries. There have been no targeted commercial salmon harvests in Area 9 (Rivers Inlet) or Area 10 (Smith Inlet) since the mid-1990s to protect local salmon populations.

First Nations target local salmon stocks for food, social and ceremonial (FSC) purposes throughout the North and Central Coast, and in the Nisga'a treaty fisheries (Nass River, Area 3). Long-term harvest patterns depend on the local abundance of all salmon species, with effort concentrated in the Nass, Skeena, Kitimat, and Bella Coola systems. Annual chum catches depend on in-season assessments of actual stock strength, management measures taken to ensure conservation of individual stocks, and targeted fishing effort by First Nations.

Recreational salmon harvests in tidal waters and freshwater occur throughout the North & Central coast, but harvest relatively few chum salmon. Marine angler effort is concentrated in Area 1, coastal outside parts of Areas 3 and 4, the Kitimat Arm/Douglas Channel parts of Area 6, outside part of Areas 7 and 8, and Area 9. Freshwater recreational fisheries focus on the Skeena River, the lower Kitimat River, and the Bella Coola River.

3.3 Candidate Fishery

The specific scope of this full certification assessment is the British Columbia seine, troll and gillnet fisheries for chum salmon in the Canadian Pacific EEZ and British Columbia coastal waters supplying their product to the shore side facilities in British Columbia.

The certification client eligible to use this certification is:

CANADIAN PACIFIC SUSTAINABLE FISHERIES SOCIETY
Address: 1100-1200 West 73 Ave
City: Vancouver, BC
Postal Code: V6P 6G5
Country: Canada
Contact: Christina Burridge
Email: cburridge@telus.net

3.4 Historical Management Context

Under the 1867 Fisheries Act, the federal government has sole responsibility for the management of tidal fish harvesting in British Columbia. The underpinnings of Canadian fisheries regulation are licensing restrictions and input controls such as time, area and gear restrictions. DFO first implemented limited entry licencing in 1969 for the BC commercial salmon fishery. Since then, limited entry has been applied to most of the valuable Pacific fisheries (GSGislason & Associates, 2004).

During the mid-to-late 1990s, some BC salmon stock declined and consequently, commercial salmon catches, prices and landed value also declined as a result of management changes. In response, the federal government rationalized the salmon fishery, first in 1996 through the so-called "Mifflin Plan", and then in 1998 with the Pacific Fisheries Adjustment Restructuring Program. The Mifflin Plan implemented area and gear licensing for the salmon fleet (2 areas for seine, 3 for gillnet, 3 for troll) and allowed stacking of more than one licence onto a single vessel. A key part of the federal government initiatives in 1996 and 1998 was the purchase or retirement, on a voluntary basis of commercial salmon licences. The $280 million buyback program resulted in a substantial decline in fishing vessels and licences. The number of commercial salmon licences in BC halved from approximately 4,400 to 2,200 between 1995 and 2000 (GSGislason & Associates, 2004).

Another substantial change in the fisheries during the 1992 was the announcement of the Aboriginal Fisheries Strategy, which resulted from the Supreme Court of Canada's 1990 Sparrow decision which clarified the aboriginal right to fish for food, social and ceremonial purposes. Under the AFS, DFO entered into agreements with aboriginal groups to address: joint management including regulation of fishing surveillance and catch monitoring, financial contribution to cover infrastructure and training costs, and specific salmon allocations of two types (GSGislason & Associates, 2004).

The two types of salmon allocations were the communal "F" category licence and the Pilot Sales Agreements (PSA). Communal "F" category licences were licences that were purchases by the federal government from existing fishing participants and transferred to First Nations or aboriginal organizations as communal licences which were to be fished under the same rules as the regular commercial fishery. These licences still exist in the fishery today (GSGislason & Associates, 2004).

One component of the Aboriginal Fisheries Strategy in British Columbia was the Pilot Sales Program (PSP) whereby certain First Nation Bands could sell fish caught under an Aboriginal Communal Fisheries Licence Regulation licence. The PSP was introduced in 1992 to serve a number of objectives. First, it was implemented to provide guidance on the design and conduct of Aboriginal in-river commercial fisheries in advance of treaties, and to assist in building First Nation capacity to take on increased fishery management responsibility. Second, they were intended to reduce conflict with First Nation communities over illegal sale of fish taken in the FSC fishery, and provide economic benefits to First Nations. The program also intended to introduce improved catch monitoring programs and thus lead to better control of harvesting.

The legality of the PSP was challenged a number of times by commercial harvesters who engaged in protest fisheries and were subsequently prosecuted. Those prosecutions ended with a Supreme Court of Canada ruling in *R. v. Kapp (2008)*, that upheld the validity of the AFS and PSP.

The 1999 development of "An Allocation Policy for Pacific Salmon" confirmed the precedence of conservation and described allocation principles for allocating among the commercial, recreational and aboriginal fisheries after conservation requirements have been met. The policy states that 95% of the combined commercial and recreational and sockeye, pink and chum quotas are to be allocated to the commercial sector. Of the commercial allocation 40% is allocated to the seine fleet, and 38% and 22% are allocated to the gillnet and troll fisheries respectively (Pestal, Spilsted and Dobson, 2009).

The Pacific Fisheries Reform, announced by DFO in April 2005, describes a policy framework for improving the economic viability of commercial fisheries, and for addressing First Nations aspirations with respect to FSC fisheries, commercial access and involvement in management. The Pacific Fisheries Reform is central to ensuring well integrated, sustainable fisheries for all species. Goals of the Reform included post treaty fisheries that are resilient to variation in both nature and markets, and greater stakeholder involvement in planning and management processes (Pestal, Spilsted, and Dobson, 2009).

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Given that Pacific salmon are migratory, and that some salmon produce by each country are caught by fishermen in the other country, known as interception, cooperation between Canada and the US is integral in the management of salmon resources. In 1985 the Unites States and Canada agreed to cooperate in the management, research and enhancement of Pacific salmon stocks of mutual concern by ratifying the Pacific Salmon Treaty. The Treaty commits both nations to carry out salmon fisheries and enhancement programs so as to: prevent overfishing and provide for optimum production, and to ensure that both countries receive benefits equal to the production of salmon originating in their waters. Since 1985 two significant revisions to the Pacific Salmon Treaty have occurred, 1999 and 2009. Key elements introduced in 1999 included the creation of the Transboundary Panel and Committee on Scientific Cooperation; the inclusion of habitat provisions in the Treaty; a move from fisheries based on negotiated catch ceilings to abundance based management fisheries; and the establishment of the Northern and Southern Restoration and Enhancement Funds. The 2008 revision represents a major step forward in science-based conservation and sustainable harvest sharing of salmon resources between Canada and the US (DFO 2008 a,b).

3.5 The Fishery Area of Operation

The chum salmon fishery in British Columbia is conducted both in the provincial coastal waters and adjacent Canadian Pacific EEZ. Harvest of chum salmon generally occurs between July and October in British Columbia. Coastal and marine areas of British Columbia have been divided into areas, which define where particular gear types can be utilized. See Figures 3-5 below.

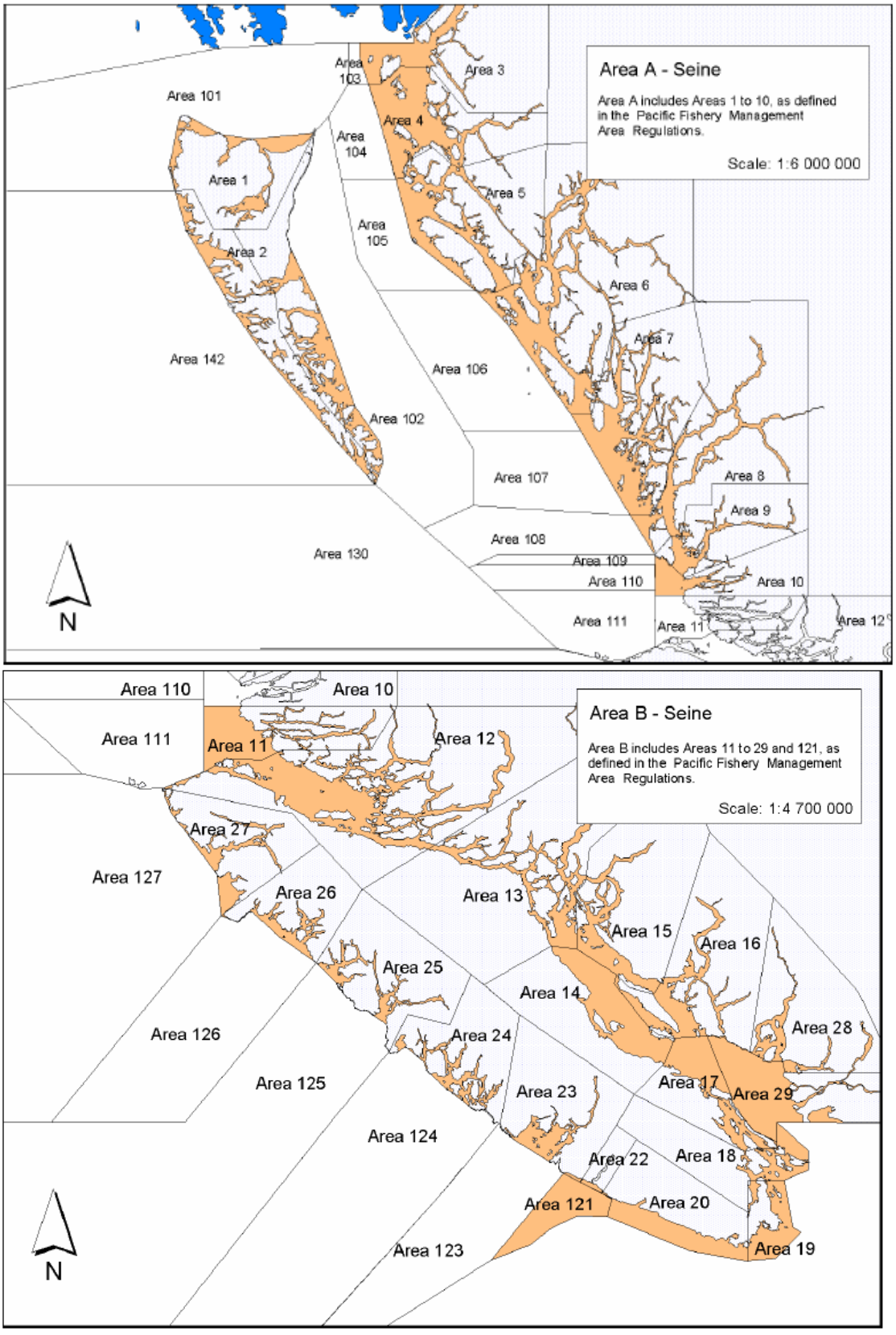
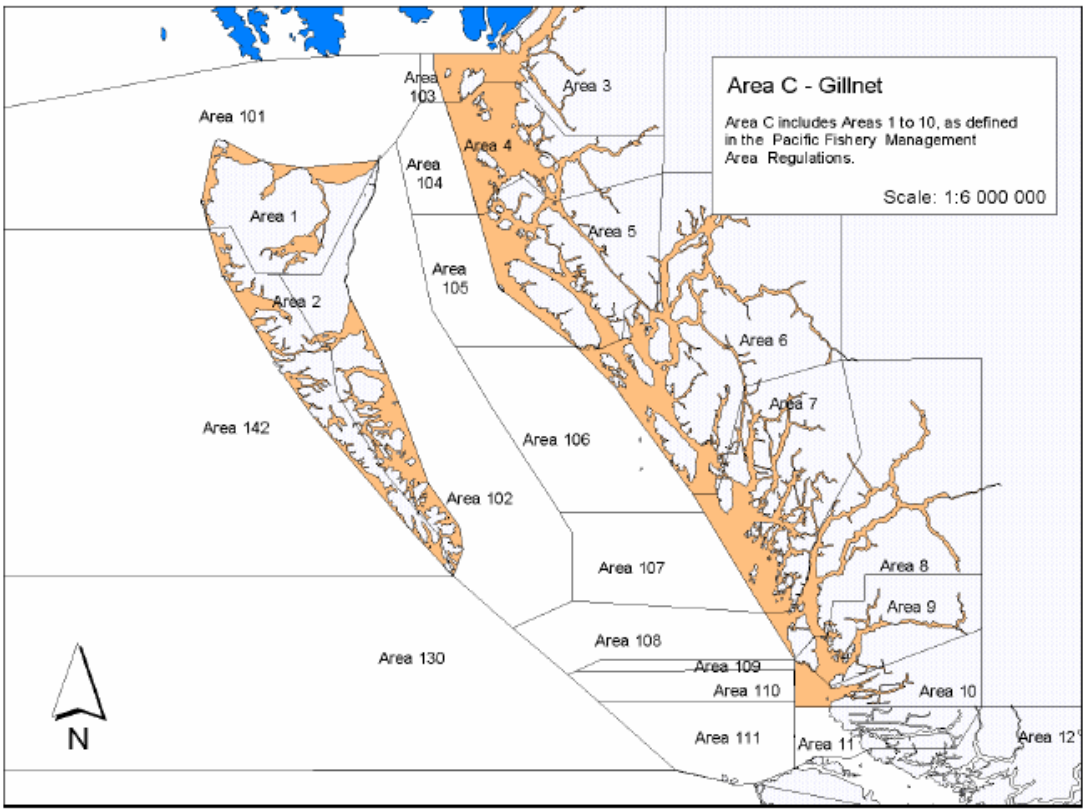


Figure 3: North (top) and South (bottom) salmon seine fishing Management Areas.


Area C - Gillnet
Area C includes Areas 1 to 10, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:6 000 000
Area 101
Area 103
Area 3
Area 4
Area 104
Area 1
Area 5
Area 105
Area 2
Area 6
Area 7
Area 142
Area 106
Area 102
Area 107
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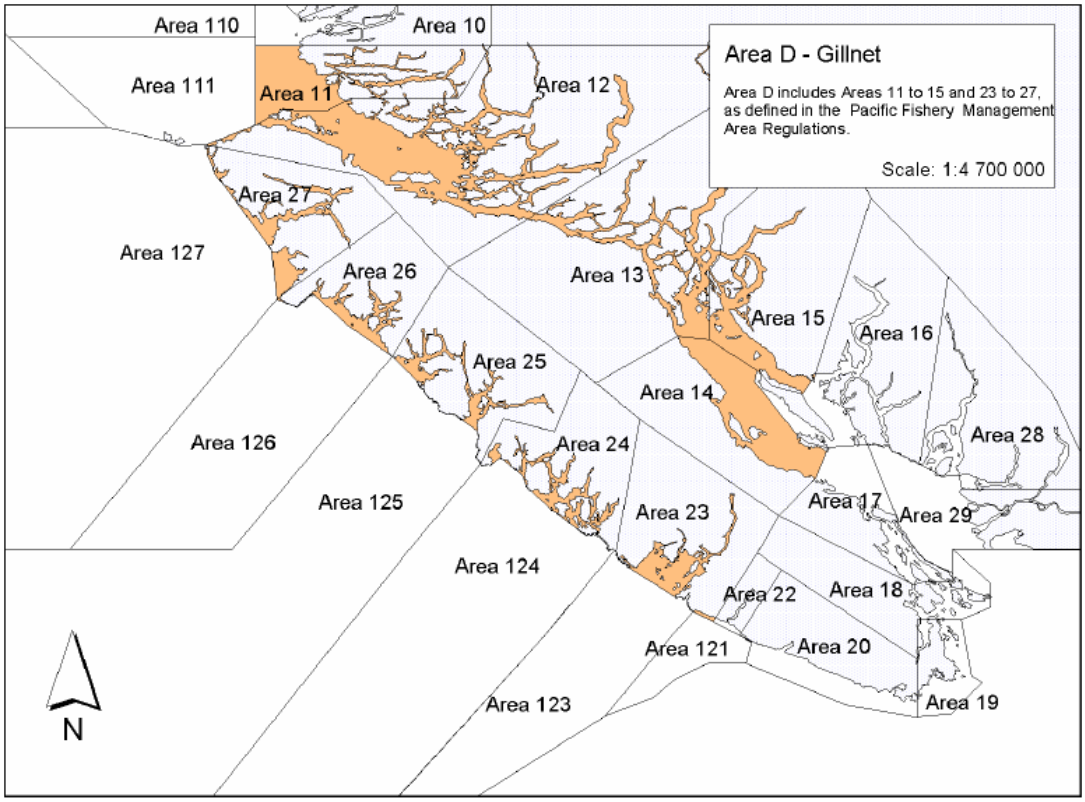
Area 111
Area 11
Area 12
N


Area D - Gillnet
Area D includes Areas 11 to 15 and 23 to 27, as defined in the Pacific Fishery Management Area Regulations.
Scale: 1:4 700 000
Area 110
Area 10
Area 111
Area 11
Area 12
Area 27
Area 127
Area 26
Area 13
Area 15
Area 16
Area 25
Area 14
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Area 123
Area 19
N

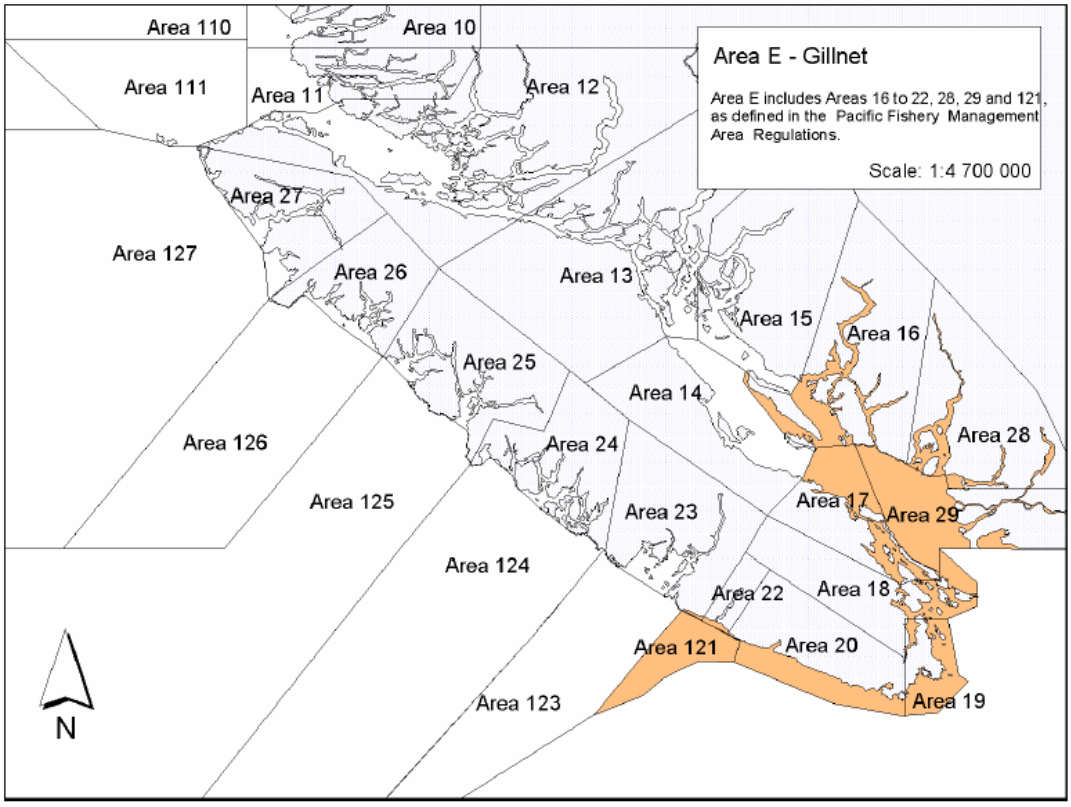
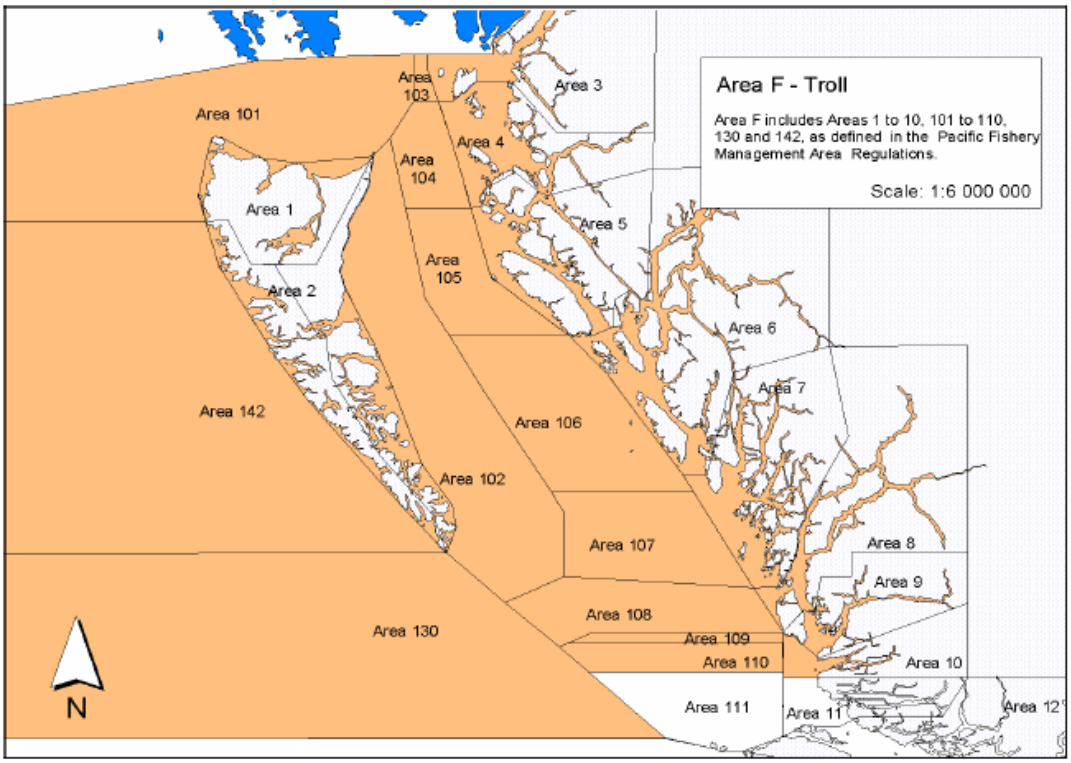


Figure 4: North (top) and South (bottom two) salmon gillnet fishing Management Areas.



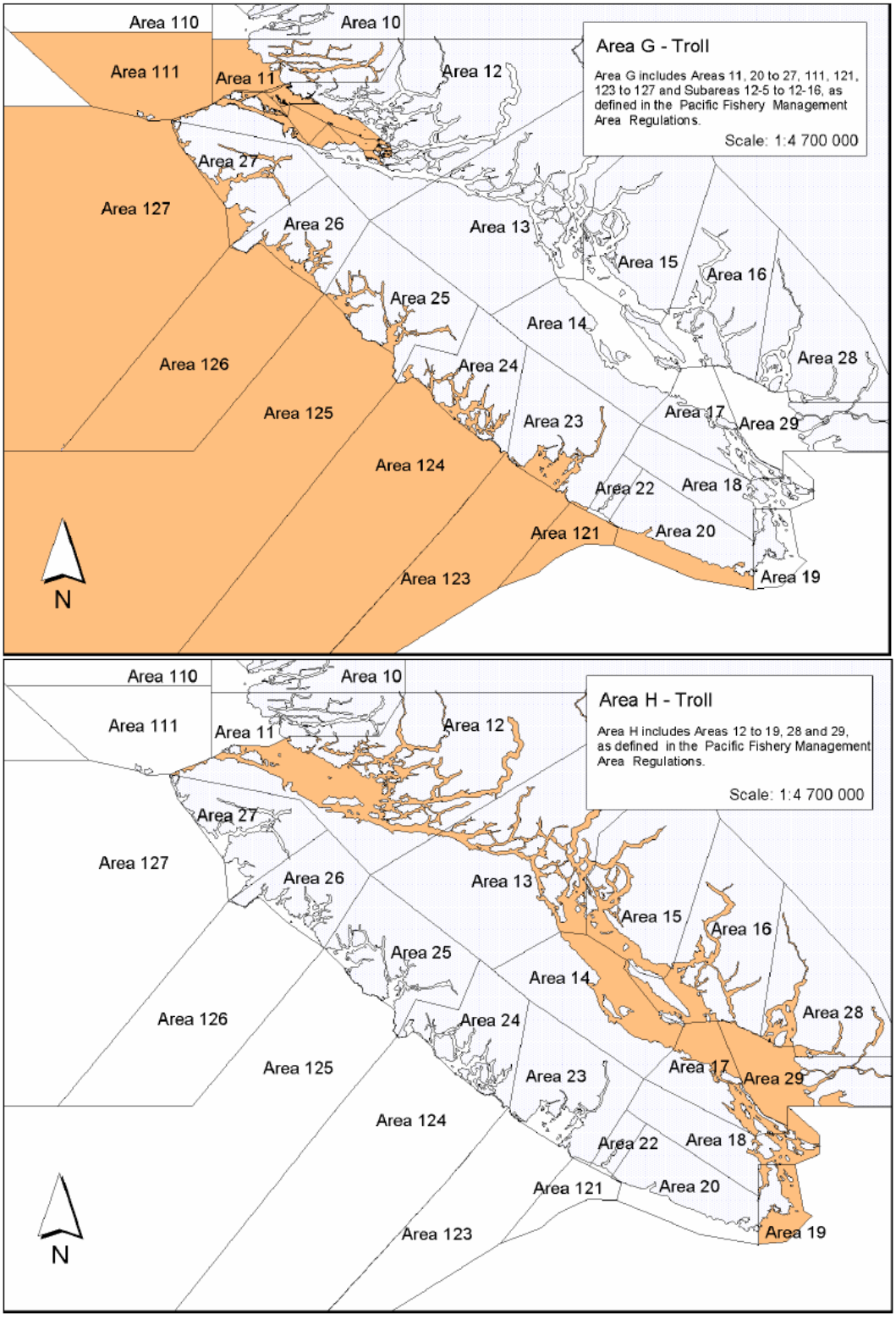


Figure 5: North (top) and South (bottom two) salmon troll fishing Management Areas.

3.6 Fleet, gear and harvest controls

Licences within the commercial BC pink and chum fishery are issued for three gear types: seine, gillnet and troll.

Trollers employ hooks and lines, which are suspended from large poles extending from the fishing vessel. Altering the type and arrangement of lures used on lines allows various species to be targeted. Trollers catch approximately 25 per cent of the commercial harvest.

Seine nets are set from fishing boats with the assistance of a small skiff. Nets are set in a circle around aggregations of fish. The bottom edges of the net are then drawn together into a "purse" to prevent escape of the fish. Seiners take approximately 50 per cent of the commercial catch.

Salmon gill nets are rectangular nets that hang in the water and are set from either the stern or bow of the vessel. Altering mesh size and the way in which nets are suspended in the water allows nets to target selectively on certain species and sizes of fish. Gill netters generally fish near coastal rivers and inlets, taking about 25 per cent of the commercial catch.

Licence conditions and commercial fishing plans lay out allowable gear characteristics such as hook styles, mesh size, net dimensions and the methods by which gear may be used (e.g. set times for nets, mandatory brailing and sorting of fish). On the North Coast, the commercial net fishery is open in defined terminal areas of various systems, notably the Skeena/Nass systems and the Bella Coola/Atnarko. Openings could occur anywhere inside the surf line depending on local stock strength.

British Columbia Chum Salmon Management Measures

Annual management objectives applicable to the British Columbia salmon fisheries are outlined in Salmon Integrated Fisheries Management Plans. There are separate IFMPs for the North and South salmon fisheries, however primary management measures are the same. The Salmon IFMP for the south addresses fisheries in tidal and non-tidal waters from Cape Caution south to the BC/Washington border, including the Fraser River watershed. The northern salmon IFMP encompasses tidal and non-tidal waters from Cape Caution north to the B.C./Alaska boundary. Tidal waters in this area is denoted as Management Areas 1 to 10 inclusive, 101-110 inclusive and 130 and 142, non-tidal waters are those watersheds which contain anadromous salmon and flow into Areas 1 to 10. Current Salmon IFMPs cover the management period of June 1, 2011 to May 31, 2012. Management Plans incorporate the results of consultation and input from the Integrated Harvest Planning committee, First Nations, recreational and commercial advisors and environmental non-government organizations.

Key management measures utilized in British Columbia salmon fisheries include:

- Limited entry. In order to participate in the commercial salmon harvest in British Columbia, harvesters are required to have a valid licence and Fisheries Identification Number (FIN). Licences are issued annually and valid from April 1 to March 31 of the

following year. The FIN allows for fast, easy and reliable on-grounds identification of fish harvesters for data collection, fisheries management and enforcement purposes.

- Catch reporting and monitoring. For all commercial fisheries there is a mandatory log-book and phone in program in place.
- Catch retention regulations. In order to protect species that may be caught incidentally to the fishery, there are regulations regarding the retention of catch. For example, there is non-retention of steelhead in all commercial fisheries. There are additional gear specific measures implemented which regulate the retention of some species.
- Gear restrictions. Within the candidate fishery there are management measures in place regarding gear configuration, retrieval times and fishing times (i.e. net fishing in on the north and central coast, is normally restricted to daylight hours).
- Measures to reduce incidental harvest and by-catch. Guidelines attempt to limit impacts on non-target species through gillnet mesh restrictions, time and area restrictions and seine brailing, sorting and release guidelines to limit impacts on sockeye, coho, Chinook and steelhead stocks.
- Area and time closures. Seasons are defined by DFO in the salmon fishery. Additionally there are fishing closures in areas with persistent conservation concerns.

British Columbia pink and chum salmon fisheries are currently planned and implemented using four types of management reference points (Pestal et al., 2008):

- Escapement goals – generally based on experience and judgment (e.g. past escapements, habitat capacity). Annual fishing plans, covering all harvests, are designed to achieve escapement targets with an acceptable risk tolerance.
- Exploitation rate ceilings – in place to support recovery efforts. This includes any incidental harvest or by-catch in fisheries targeting other stocks and species, and fisheries are shaped to balance economic constraints on fisheries targeting other stocks against cumulative fishing impacts on the stock of concern. Fro example, the Canadian fishery exploitation rate for the Interior Fraser coho is limited to 3%.
- Fixed harvest rates – for several mixed-stock fisheries to minimize long-term impacts on component stocks. For example, Johnstone Strait mixed-stock chum fisheries are constrained to 20% while terminal fisheries harvest local abundances where they exceed the escapement goals.
- Allocation targets – describe either a target amount (FSC fisheries), a target opportunity (recreational fishery), or a target share (commercial gear types). Allocation targets are generally defined by species, not by stock, but in practical implementation allocations tend to be area-specific.

The Wild Salmon Policy introduced two additional management reference points, which are currently under development (Pestal et al., 2008):

- Lower benchmarks intended to delineate an undesirable level of abundance, but with a substantial buffer above the level that would cause it to be considered at risk of extinction under the Species at Risk Act
- Upper benchmarks intended to identify whether abundance is sufficient to provide maximum levels of catch, on average

3.7 Catch

Wild salmon harvest has been the mainstay of the British Columbia commercial capture fishery for over a century. Five Pacific salmon species comprise the commercial harvest: sockeye, pink, chum, Chinook and coho. In 2010 the total wild salmon harvest was 23,531 metric tons. At 541.6 landed metric tons, chum salmon had the lowest harvest volume of all wild salmon in 2010 (British Columbia, 2011). Figure 6 displays the proportion of landings of the different species for the years 2001 to 2010.

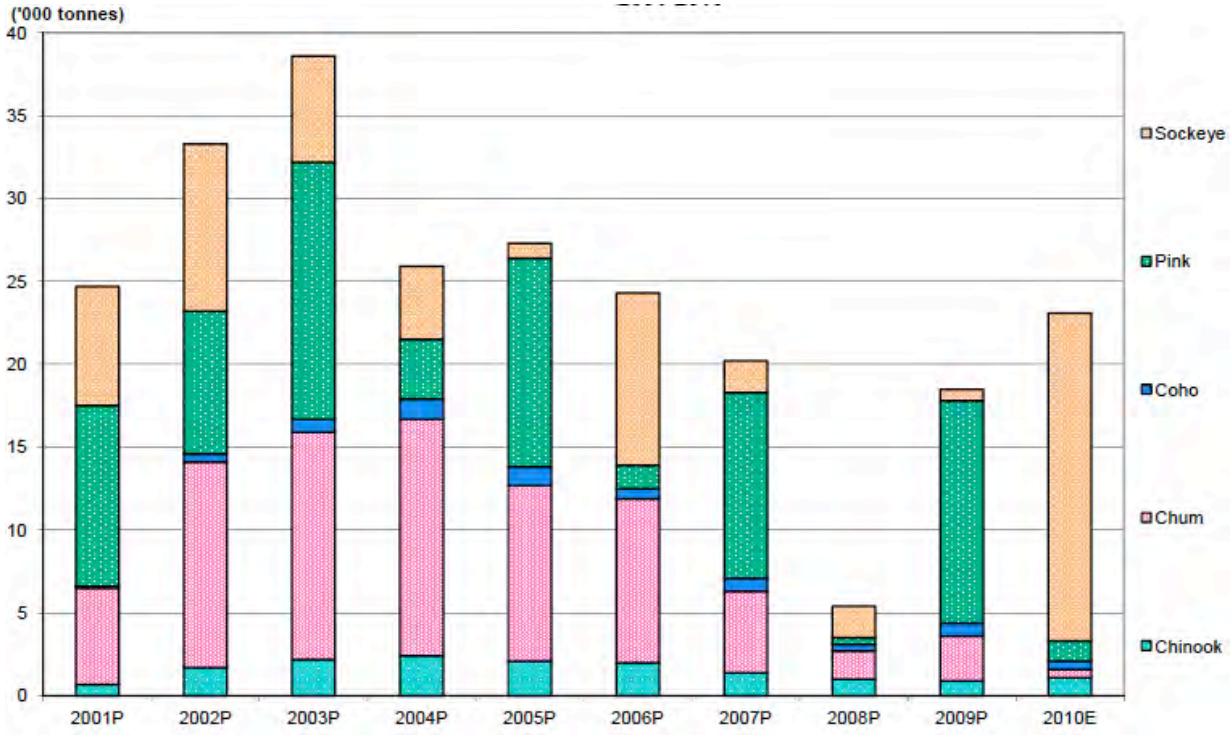


Figure 6: British Columbia Commercial Fisheries Salmon Landings by Species 2001 – 2010.
Source: Government of British Columbia, 2011.

Chum salmon landings in 2010 were the lowest in the past decade (Figure 7). Detailed landing data for the period 2000 to 2011 (preliminary) are presented in Table 2. This data is summarized by fishing gear type for the entire BC fishery and includes results from areas not evaluated in this assessment.

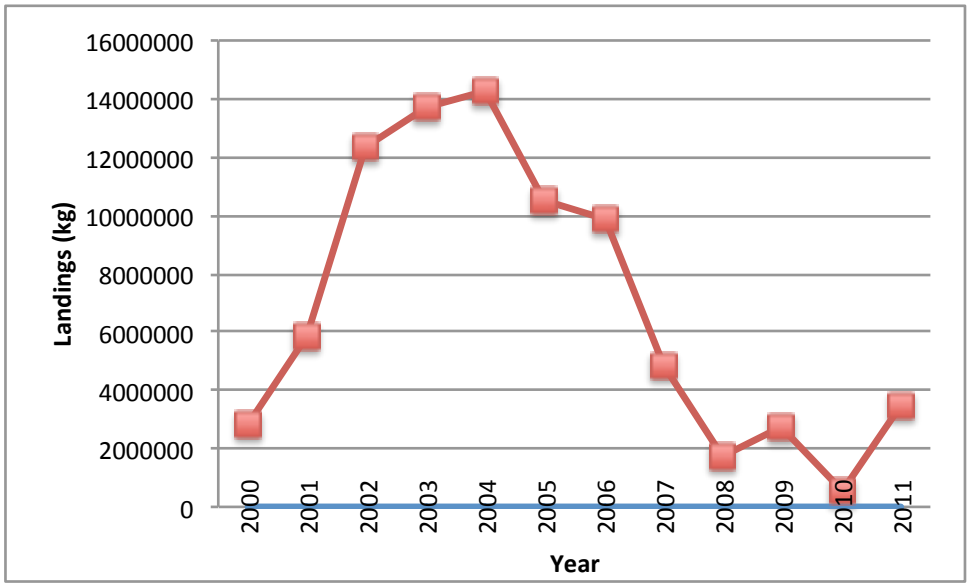


Figure 7: British Columbia commercial chum salmon landings (kg) by all gear types, 2000-2011.
Source: DFO website

Table 2: Total commercial landings (kg) for gear type (gillnet, seine, and troll), and total commercial landings for chum salmon, 2000-2011. **Source: DFO Website.**

Year	Gillnet	Seine	Troll	Total Landings (kg)
2000	1,221,112	1,589,202	37,905	2,848,219
2001	3,409,600	2,399,763	40,537	5,849,900
2002	4,854,447	7,335,922	160,456	12,350,825
2003	6,477,106	6,868,254	385,430	13,730,790
2004	7,239,000	6,683,000	380,000	14,302,000
2005	5,354,920	4,935,191	233,404	10,523,515
2006	5,435,576	4,158,575	295,595	9,889,746
2007	2,639,933	2,046,547	174,945	4,861,425
2008	791,172	865,689	78,605	1,735,466
2009	1,123,968	1,327,970	254,983	2,706,921
2010	300,310	239,275	2,094	541,678
2011	1,057,486	2,379,974	69,452	3,506,912
Total (kg)	39,904,630	40,829,362	2,113,406	82,847,397
Average kg/yr	3,325,386	3,402,447	176,117	6,903,950

Chum landings for the period 2000 to 2011 by gear type are graphically presented in Figure 8.

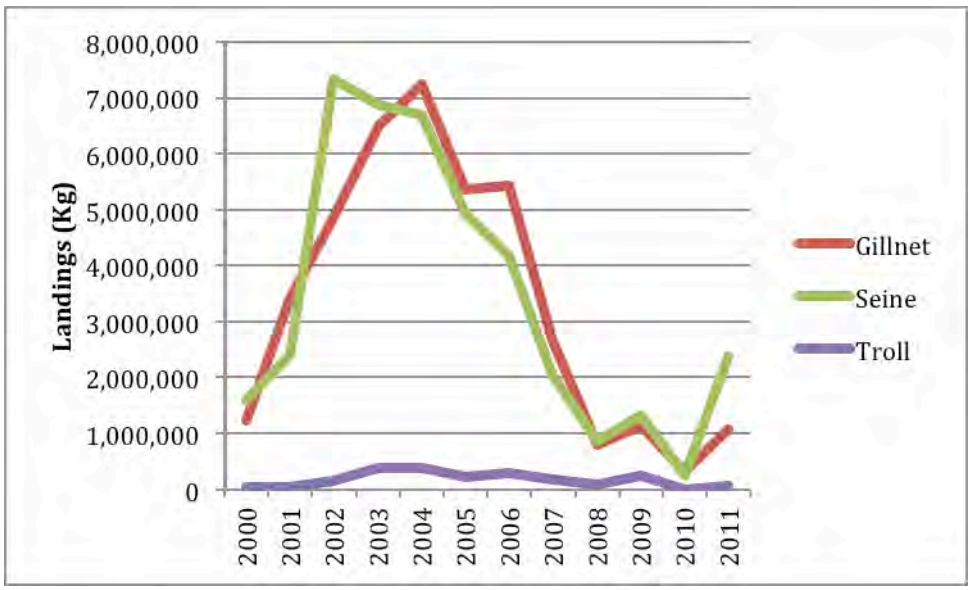


Figure 8: Chum salmon landings (kg) in British Columbia by gear type, 2000-2011.
Source: DFO website

3.8 Bycatch

Within the British Columbia chum salmon fisheries, bycatch composition and quantity may vary between gear types. However, common to all gear types is the incidental catch of other salmon species including: coho, Chinook, sockeye and steelhead trout. The gillnet fishery has also been identified as catching seabirds incidentally, including the marbled murrelet which is designated as threatened under SARA.

The Salmon Fishery Management Plans in place in the candidate fishery recognize the mixed species nature of salmon harvest. Under the Plans for the north and south salmon there are prohibitions on the retention of some species, including a restriction on the retention of steelhead trout by all commercial fisheries. The South Coast Salmon FMP state that Chinook and coho salmon in most southern BC commercial fisheries, with the exception to some Area E (Fraser River) and Area G (WCVI) fisheries as well as some terminal opportunities where excess is identified, is prohibited (DFO, 2008a).

The North Salmon FMP outlines the management measures in place regarding non-retention, based on area and gear type. The retention of coho, chum, Chinook and sockeye salmon varies among areas and by gear types, as outlined in section 7.6.1 in the 2008 North Coast Salmon FMP. It should be noted that in the seine fisheries, chum retention may be allowed only in certain areas and certain times, depending on stock strength. Chum non-retention may be

implemented in season in the gill net fisheries and there is a non-retention of chum in the troll fishery (DFO, 2008b).

For salmon troll fisheries, only, any vessels wishing to retain lingcod, may do so given they have sufficient quota and that their fish is validated through the established dockside monitoring program. When retaining lingcod the following requirements are in place: vessel must have sufficient IVQ, transportation requirements, hail in and hail out requirements, specific locations and times at which landing of fish is permitted, and landing requirements (landing of any fish species is not permitted unless designated observer is present to authorize the commencement of weight verification). If greater than 500 pounds of lingcod is retained per trip, the vessel is also subject to new electronic monitoring requirements (DFO 2008 a,b).

Additionally, salmon troll vessels are currently permitted to retain 20 rockfish per day, with exception to yelloweye, quillback, china, tiger, and copper, as by catch to salmon fishing (DFO, 2008a,b).

3.9 Interactions with Protected, Endangered, Threatened Species

Commercial chum and pink salmon fisheries in British Columbia interact with several populations in which there are concerns about status. The Inner Fraser population of coho salmon (*O kitsch*), Cultus Lake and Sakinaw populations of sockeye (*O. nerka*), and the Okanagan population of Chinook salmon (*O. tshawytscha*) have been designated as at risk by COSEWIC. All populations, under COSEWIC are considered endangered, with exception to the Chinook in the Okanagan population, which are considered threatened.

While the COSEWIC listing is not legally binding, and the species have not yet been listed under the Species at Risk Act, there are measures implemented in the fishery, which aid in minimizing the impact on these populations.

4.0 MANAGEMENT SYSTEM

4.1 Management System and Objectives

Management of the fishery is the responsibility of the Department of Fisheries and Oceans Canada. Management measures for the BC salmon fisheries are detailed in the two Integrated Fisheries Management Plans for Salmon; Southern BC Salmon Integrated Fishery Management Plan and the Northern BC Salmon Integrated Fishery Management Plan. The Southern BC FMP covers tidal and non-tidal waters from Cape Caution south to The B.C/Washington border, including the Fraser River watershed. The Northern BC salmon FMP covers recreational and commercial fisheries directed toward Pacific salmon in the north and central coast areas of BC, encompassing tidal and non-tidal waters from Cape Caution north to the B.C/Alaska boundary. Salmon species covered by the FMPs include sockeye, coho, pink, chum, and Chinook.

The salmon fishery is a limited entry licence fishery, with commercial salmon fishing authorized by issuance of a category "A" (vessel based commercial), "N" (party based) or "F" (communal commercial) licence. All salmon licence eligibilities must be applied for annually by the renewal date and the applicable fee paid in order to maintain eligibility. In 1996, permanent gear choice, area selection and licence stacking were introduced. For permanent gear choice, each salmon licence eligibility is restricted to either seine, gillnet or troll fishing. Area selection meant that vessel owners/licence eligibility holders selected one area to fish for a period of 4 years, the coast was divided into 2 areas for seine gear, 3 for gillnet and 3 troll areas (see Figures 3-5). In 2000, the department reaffirmed its commitment to area licensing as long-term feature of commercial salmon management. Harvesters are permitted to stack licence, and a request may be made for an area change at the time of submission of application for licence stacking (DFO, 2008c)

4.2 Management Plan

The current Integrated Fisheries Management Plan (IFMP) for Pacific salmon species pertains to salmon harvest taking place between Jun 1, 2011 and May 31, 2012. The IFMP addresses First Nations, recreational and commercial fisheries in British Columbia. As noted previously there are separate plans for the Northern and Southern coasts. The IFMPs incorporates the results of consultations and input from the Integrated Harvest Planning Committee, south coast First Nations, and south coast recreational and commercial advisors (DFO, 2008 a,b).

Pacific salmon fisheries are managed in a regular annual cycle of pre-season planning, in-season implementation and post season review, with the IFMPs as central elements of the annual planning cycle. Each IFMP describes the management objectives, general decision guidelines, specific fishing plans for each fishery and a review of the previous season. The plans also include detailed annual fishing plans for each sector and areas, which are developed based on the management strategies, long-term trends, and pre-season expectations (e.g. brood year escapements, patterns in survival, abundance forecasts) (Pestal, Spilsted, and Dobson, 2009).

The IFMP lists the conditions under which fishing will be conducted. Fishing regulations for the salmon fishery in British Columbia include: non-retention of species of concern, catch monitoring, coded wire tag (CWT) sampling of troll catch, licence conditions, season and area closures, and gear restrictions. The plan includes compliance objects and overall conservation and protection program priorities. In the IFMP DFO commits to continual consultation with First Nations, recreational and commercial fish harvesters to co-ordinate fishing activities. Consultations with these groups also occur as updated forecast information becomes available or when observed in-season returns are not covered by the decision guideline (DFO, 2008 a,b).

New management changes for the 2008/2009 include the development of an improved catch monitoring regime, implementation of the Pacific Integrated Commercial Fisheries Initiative (PICFI) which is aimed at achieving environmentally sustainable and economically viable commercial fisheries, where conservation is the first priority and First Nations' aspirations to be more involved are supported, Area Harvest Committees will continue to explore innovative ways to access TAC more efficiently, to increase market value of product, or TAC that may be unavailable due to the conservation concerns, or to access TAC that a full fleet fishery is unable to access. The Department is implementing additional measures to reduce harvest impacts, measures are required for commercial, recreational, and First Nation fisheries to halt the decline of early timed Chinook. Also, additional actions in 2008 include the requirement to ensure that the exploitation rate does not exceed 10% for the WCVI Chinook stocks. Actions that will be considered to achieve this include; time and area restrictions in northern and WCVI troll fisheries, for First Nations, opportunities in most terminal areas will be similar to 2007 and for recreational fish harvesters, additional restrictions in WCVI fisheries (DFO, 2008 a,b).

In order to effectively manage salmon stocks, a series of policies and regulations have been adopted to address biological uncertainty, legal requirement and the sharing of resources. A range of considerations that include; legislated mandated, judicial guidance and international and domestic commitments that promote biodiversity and a precautionary guides policies related to the management of fisheries, ecosystem approach to the management of marine resources. These policies continue to guide salmon management. Policy frameworks considered within the salmon fishery include; Canada's Policy for Conservation of Wild Pacific Salmon (WSP), An Allocation Policy for Pacific Salmon, Pacific Fisheries Reform, A Policy for Selective Fishing, A Framework for Improved Decision Making in the Pacific Salmon Fishery, the Integrated Harvest Planning Committee, and Pacific Region Fishery Monitoring and Reporting Framework.

5.0 STOCK HEALTH EVALUATION

5.1 Stock Health Monitoring

The following information was extracted from DFO, 2008c, unless otherwise noted.

Stock assessment for B.C. chum salmon are based on catch data from test, commercial and First Nations fisheries, biological samples for age composition and genetic stock identification, mark-recovery program fin clips, and escapement estimates from wild and enhanced systems.

Data collected pre-season, in-season and post season are crucial to the stock assessment process. The PSARC Salmon Sub-Committee, comprised mainly of DFO scientists, with participation from fisheries managers, academics, First Nations, stakeholder, and the general public, is the primary body providing pre-season scientific advice for the development of management plans for Pacific Salmon. The sub-committee provides advice on the forecasts of returns to specific systems for the upcoming season as well as management advice based on more extensive scientific reviews of the status of selected salmon stocks.

Pre-season forecasts of returns are based on biological and/or statistically based models. Models vary between different stocks or stock groupings depending on the life history and production patterns of that stock and the data available. Typical variables examined include: historic trends in escapements and total returns, returns of sibling age classes, and returns and escapement of brood (parental) year. In addition to short-term forecasts, the sub-committee also produces stock status reports. Stock status reports focus on long term trend in the status of a given stock, its current status, and the extent of conservation measures required to maintain stock viability for the future.

In-season activities that contribute to stock status monitoring for salmon include stock re-forecasting, catch monitoring, and escapement surveys. As salmon begin returning to spawn each year, DFO engages in a process of in-season "re-forecasting", adjusting the pre-season run size based on actual observations of salmon abundance. Re-forecasting is conducted on a regular basis using a variety of analytical models, and information from several sources including catch rates in test and commercial fisheries, other harvest information and escapement surveys. In mixed stock fisheries, DNA analysis, scale analysis, coded wire tags from hatchery produced fish and other tagging programs are used to differentiate stocks.

Catch monitoring programs in place in the recreational, First Nations and commercial fisheries, and are a crucial piece of stock assessment process. In the commercial fishery harvesters are required to fill out logbooks, conduct frequent phone-ins reporting weekly harvests, and landing slips are mandatory. In addition in some instances independent observers may be required to verify catch data to managers. Within the recreational sector, catch is monitored through creel surveys, vessel counts, and logbook programs. Harvest by First Nations is monitored and sampled and regular reports are produced. Mandatory landing programs are in place for First Nations economic opportunity fisheries.

A third component of in-season monitoring is escapement surveys conducted by DFO and its partners. Escapement surveys determine salmon escapement, the number of salmon that reach the spawning grounds after "escaping" the fisheries. In determining the number of escapes, techniques including counting fences, visual surveys, and mark recapture are used.

At the end of the salmon harvest and spawning season, actual escapement is compared with pre-season targets to evaluate the effectiveness of management measures. Escapement data are used in the development of subsequent years' forecasts and escapement goals and in tracking long term trends in survival and productivity.

5.2 Current Stock Status

The Certification Unit Profiles (CUPs) for North Coast and Central Coast (NCCC), West Coast Vancouver Island (WCVI) and Inner South Coast (ISC) chum salmon fisheries all indicate that "Formal Limit Reference Points (LRP) or Target Reference Points (TRP) have not yet been developed" for these fisheries but operational Management Escapement Goals (MEG) have been identified for each of the management areas and major systems within each management area. Each of these CUPs provide the following explanation of the basis for these MEGs:

> "These operational equivalents were developed by interviewing DFO managers, biologists and contract field enumeration staff who had considerable years of local knowledge of particular streams and corresponding escapements of salmonids. The MEG represent the best estimate by these local experts and are used in a non-technical way as the operational equivalent for long-term benchmarks reflecting highly productive stocks (i.e. high sustainable yields)."

For Fraser chum, the MEG was set at 800,000 based on recommendations from PSARC in 1992 and 1999.

The annual salmon outlook report defines stocks of concerns as those stocks that are "25% of target or declining rapidly". The interim LRPs for NCCC and WCVI chum salmon stocks were set at 25% of the MEGs and the interim TRPs for chum salmon were set equal to the MEGs (Appendix A). In March 2011, DFO used time series of historical escapement estimates and sustainable escapement goals (SEGs) similar to those used for Alaskan salmon stocks (Eggers and Heinl, 2008) to define the interim LRPs and TRPs for ISC chum management units (DFO 2011). The interim TRP for fall ISC chum stocks were set at the upper bound of the SEG range (75th percentile of escapement time series) and interim LRPs for ISC chum were set at the lower bound of the SEG range (25% percentile) (see Appendix B).

The CUPs also provide summaries stock status and trends for each of the major management areas. These summaries were the source of the information on escapement trends provided below.

North and Central Coast

Appendix A Figures A1 to A11 show trends in total observed escapement for each statistical area. Note that survey coverage fluctuates across years, and comparisons of annual estimates must be approached with caution. Section 4.3 of the NCCC CUP briefly describes how the observed escapements presented in these figures were adjusted to reconstruct run size and calculate harvest rates. English et al. (2006) describe the methods in more detail. The status of chum stocks the major components of the NCCC region is provided below:

- Queen Charlotte Islands: Escapement in Areas 1 and 2E has generally declined since the 1980s, with a more pronounced drop in Area 1. Escapement in Area 2W increased steadily throughout the 1990s (even years), but dropped sharply for 2004 and 2006, illustrating the pronounced variability in escapements. Area 1 chum escapement estimates have been less than the 25% of MEG line in 6 of the last 10 years. Reconstructed estimates of total escapement to Area 2E and 2W escapement have been consistently above the 25% line except for 2007.

- North Coast (Areas 3 to 6): Reconstructed escapement estimates for Area 3 have been highly variable, but consistently above the 25% line. Escapement for Area 4 was close the 25% line from 1999-2002 and currently suspected to be low but the available data is not adequate to reconstruct a reliable escapement estimates since 2002. Area 5 escapements were low but above the 25% line from 1999-2006. Area 6 escapements have been at or above the MEG for most years since 1985 but escapement in 2008 was the lowest on record since the 1960's.

- Central Coast: Escapements in Areas 7 and 8 increased in the mid-1990's and were close to or above MEG levels from 1995-2005. Reconstructed escapements for Areas 9 and 10 have dropped substantially since 2004 and the 2008 estimates were below the 25% line for both areas. No salmon fisheries have been permitted in Area 9 or 10 since 1998.

In summary, the above information indicate that, for the majority of North and Central coast target stocks, chum salmon escapements have been above their interim LRP (25% of MEG) for at least 3 of the most recent 5 years. The most recent data indicate that chum escapements to most of the North Coast and Central Coast management areas declined to near or below the 25% line in 2008. In Areas 7-10, fisheries were not permitted in 2008. Area 4 chum and the chum returns to the Nass River within Area 3, are the most significant stocks of concerns on the North Coast. Estimated harvest rates for these stocks have been reduced in recent years but they are still in the 20-30% range.

West Coast Vancouver Island

The status of chum returns in 2007 to WCVI populations is low to moderate, depending on location. Observed escapement of chum (i.e. peak live plus dead counts) to most natural systems decreased in 2008 relative to 2007 in the WCVI area The Nitinat (Area 21/22) total return is currently estimated at about 50,000, which is well below average and below escapement targets (Figure A12). The preliminary data suggest escapement in Areas 23 and 25

in 2008 is at or near the 12-year low (Figures A13 and A15). In Areas 24 and 26 chum escapement was relatively good from 2003-07 but escapements to both areas declined substantially in 2008 (Figure A14 and A16).

The majority of West Coast Vancouver Island management areas for chum salmon have been above their interim LRP (25% of MEG) for at least 3 of the most recent 5 years. The recent data indicate that chum escapements to most of these management areas declined to near or below the 25% line in 2008. In the Nitinat areas, harvest rates close to 60% in 2007 and 2008 were a factor in not achieving the MEG in these years. The estimated harvest rates for other WCVI chum fisheries were relatively low in 2008.

Fraser Chum

The total escapement estimate for Fraser River chum stocks has been consistently above the 800,000 MEG line since 1990 and above the 25% MEG line since 1976. Reductions in fishing pressure in the mid-1990s resulted in escapements exceeding 3 M chum in several years (Figure A17).

Inner South Coast Chum

Chum salmon escapement is highly variable from year to year and across systems. Appendix B Figure 3 provides the 1953-2010 escapement time series and 1980-2010 exploitation rate (ER) estimates for the aggregate of all ISC chum stocks (excluding Fraser chum). Escapement estimates for the ISC aggregate have been rarely outside the SEG range and ERs have been consistently less than 40% (Appendix B Figure 3). Figures 4-15 in Appendix B provide similar summaries of escapement and exploitation rate trends for each of the Inner South Coast management areas (including both wild and enhanced fish):

- All management units within Statistical Area 12 (Upper Vancouver Island, Kingcome, Bond/Knight and Johnstone Strait) show a similar pattern; escapement level near or below the lower bound of the SEG range despite very low ERs Appendix B Figures 4-7).
- The two management units associated with Statistical Area 13 and 14 (Loughborough-Bute and Mid-Vancouver Island (MVI) have very different trends and levels of enhancement.
    - The largely wild stocks in Loughborough-Bute have been at or below the lower bound of the SEG range in most years since 1995 while ERs have been in the 20-40% range (Appendix B Fig. 8).
    - The MVI stocks include major hatcheries and escapements tend to be close to the upper bound of the SEG range even with ERs that have been frequently above 40% (Appendix B Fig. 9).
- Escapement estimates for Toba Inlet chum stocks (Area 15) have been at or below the lower SEG bound for most years since 1988 (Appendix B Fig. 10). ERs have been relatively low (<20%) in recent years but higher than those for Area 12 management units.

- Trends for Jervis Inlet chum stocks (Area 16) look similar to those for the MVI chum; however, ERs for the non-enhanced Jervis chum stocks tend to be lower than those for the enhanced MVI stocks (Appendix B Fig. 11).
- Escapement estimates for Lower Vancouver Island (LVI) and Southern Vancouver Island (SVI) chum stocks have been within or above the SEG range in every year since 1976 (Appendix B Fig. 12 and 13). Historically, terminal fisheries for SVI stocks increased total ERs to the 60-80% range while ERs for LVI stocks were in the 40-60% range. ERs for both stocks have dropped into the 20-30% range in recent years.
- Escapement estimates for Southern Vancouver Island chum stocks (Area 18) have been within or above the SEG range in every year since 1976.
- Escapement estimates for the two management units within Area 28 (Howe Sound and Burrard Inlet) have been substantially above the SEG range in recent years while ERs are estimated to be in the 20-30% range (Appendix B Fig. 14 and 15). Historically, the total ERs for these stocks were substantially higher (40-60%).

In summary, the escapement estimates for ISC chum indicate that, for 6 of the 11 MUs, escapements have been above their interim LRP (lower bound of the SEG range) for at least 3 of the 5 most recent years. Four of the MUs (Upper Vancouver Island, Kingcome, Bond-Knight, Johnstone Strait) have been consistently at or below their interim LRP for the past 10 years, however, exploitation rates have been very low (<10%) for these MUs. The fifth MU with recent poor returns (Toba Inlet) had an extended period of poor escapements from 1986-2000 followed by a few years (2001-05) where escapements exceeded the upper bound of the SEG range by a substantial amount.

6.0 MSC PRINCIPLES AND CRITERIA FOR SUSTAINABLE FISHING

At the centre of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which is used as a standard in a third party, independent and voluntary certification programme. These were developed by means of an extensive, international consultative process through which the views of stakeholders in fisheries were gathered.

PRINCIPLE 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery [1]:

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

PRINCIPLE 2:

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

[1] The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The Criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.

2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.

3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

PRINCIPLE 3:

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;

3. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;

4. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;

5. incorporates an appropriate mechanism for the resolution of disputes arising within the system[2];

6. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;

7. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;

8. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;

9. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;

10. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:

    a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
    b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
    c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;

    d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
    e) establishing no-take zones where appropriate;

11. contain appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

[2] Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

B. Operational Criteria

The fishing operation shall:

12. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;

13. implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;

14. not use destructive fishing practices such as fishing with poisons or explosives;

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

16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and

17. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

7.0 FISHERY EVALUATION PROCESS

7.1 Certification Process

Pre-Assessment

The pre-assessment evaluation of the British Columbia commercial salmon fisheries, as required by the MSC program, was conducted by Scientific Certification Systems (SCS) in April 2001. After review of the pre-assessment, the candidate fishery entered full assessment in January 2008. All aspects of the full assessment process were carried out under the management of TAVEL Certification Inc., an accredited MSC certification body, and in direct accordance with MSC requirements (MSC Fisheries Certification Methodology Version 6).

Team Selection

At the first step of the assessment process, TAVEL issued advisories through direct email, listing on email list servers, and posting on select web sites requesting comment on the nominations of persons capable of providing the expertise needed in the assessment. A final team of 3 scientists was chosen to serve as assessment team members. Team members include Dr. Ray Hilborn, Dr. Dana Schmidt, and Mr. Karl English, M.Sc.

Setting Performance Indicators and Scoring Guideposts

As required by the MSC assessment process, the assessment team drafted a set of performance indicators and scoring guideposts (PISGs) to correspond to the MSC Principles and Criteria. The performance indicators and scoring guidelines were defined prior to the development and release of the MSC Fisheries Assessment Methodology default performance indicators.

Through a series of electronic communications during the spring of 2008, the assessment team drafted the PISGs using the MSC standard (Principles and Criteria for Sustainable Fishing). The PISGs for this fishery were adopted from performance indicators and scoring guideposts already used for assessing BC sockeye salmon and in the Alaska salmon recertification.

These were posted for the required 30 day comment period May 23, 2008 to allow stakeholders to provide comments on the performance indicators. TAVEL specifically requested comments from the environmental and conservation stakeholder community as well as from the client and management agency.

PISGs for the BC salmon fisheries were finalized on December 3, 2008. The client submitted written information to the assessment team illustrating the fishery's compliance with the required performance indicators in late May, 2008. To accomplish this activity, the clients contracted a consultant to aid in the preparation of that submission. The client provided most of the information needed prior to the actual interviewing process. However, additional information was provided during the assessment and report preparation phases.

As required by MSC methodology, the team met prior to the fishery visit meetings to conduct a meeting to weight the performance indicators.

Meetings with industry, managers, and stakeholders

The client and DFO prepared extensive information submissions for all units of certification under assessment. As agreed with the client the information submissions were submitted to the MSC for posting on the MSC website, which can be seen at http://www.msc.org/track-a-fishery/in-assessment/pacific/british-columbia-pink-and-chum-salmon/assessment-downloads). TAVEL Certification planned for and conducted meetings with stakeholders, industry, fishery managers, and fishery scientists as required. The meetings were held in Vancouver, British Columbia, between January 20 and 23, 2009.

Scoring fishery

The assessment team scored the fishery using the required MSC methodology and without input from the client group or stakeholders. The initial scoring session was conducted Vancouver, BC on January 23 - 24, 2009. There were subsequent scoring discussions held amongst the certification team members after the client provided additional information for some performance indicators. The team met in June 2009 to conduct a final scoring session based on follow up information provided by the client and DFO.

Drafting report

The assessment team in collaboration with the TAVEL lead auditor, drafted the report in accordance with MSC required process.

Selection of peer reviewers

As required, TAVEL released an announcement of potential peer reviewers soliciting comment from stakeholders on the merit of the selected reviewers. The nominated peer reviewers were Dr. Sean Cox and Dr. Greg Ruggerone, there were no specific concerns related to the experience or acceptability of the proposed peer reviewers, there were concerns raised that there was not a Canadian peer reviewer identified who is more knowledgeable with the Fisheries and Oceans Canada management policies, and as such, there should be a Canadian peer reviewer appointed.

Public Comment Periods on Report

The MSC requirements are that the draft report be made available for public comment for a period of no less than 30 days. Under the MSC Certification Methodology (version 6, September 2006) there is a formal requirement that the public comment period be held after the peer review process. The Draft Certification Report was in the public domain for the period of XXX to XXX, 2012.

7.2 Other Fisheries in the Area

The west coast waters of Canada are biologically complex, productive areas and as such, there is a complex multitude of diverse fisheries for groundfish, pelagic and invertebrate species in the area of certification. Fisheries in the area of operation are conducted using a variety of gear types, in addition to those used in the candidate fishery, longline, trawl pot and trap fisheries are conducted in the waters of British Columbia and the Canadian Pacific EEZ. While the majority of fisheries are managed solely by DFO, there are several fisheries (including hake), which are managed in cooperation with the United States, given the highly migratory nature of the stocks between the two nations. The MSC process considers other fisheries conducted in an area of a candidate fishery primarily to understand the complexity and interdependence of the various commercial and non-target species, the implications of the coinciding management activities and the potential for interactions between various fisheries.

As of December 2011, several British Columbia fisheries have been certified to the MSC standard, including: four BC sockeye salmon fisheries, three BC pink salmon fisheries, Canadian Pacific hake fishery, the Canadian Pacific halibut, BC North Pacific albacore tuna, Canadian sablefish fisheries and BC spiny dogfish fisheries. All these fisheries are within the area of operation of the candidate chum salmon fisheries.

8.0 FISHERY PERFORMANCE

8.1 Interpretation of the MSC Standard

The MSC Principles and Criteria provide the overall requirements necessary for certifying that a fishery meets the Marine Stewardship Council's environmental standard for being well-managed and sustainable.

The certification methodology adopted by the MSC involves the application and interpretation of the Principles and Criteria to the specific fishery undergoing assessment. This is necessary, as the precise assessment of a fishery will vary with the nature of the species, capture method used etc.

Accordingly, in order to carry out the assessment, the assessment team for the British Columbia chum salmon fisheries developed a structured hierarchy of 'Performance Indicators' and 'Scoring Guideposts', based on the MSC Principles and Criteria. Performance indicators represent separate areas of important information (e.g. Indicator 1.1.1.3 requires a sufficient amount of life history information on the target species and stock, 1.1.2.1 requires information on fishing related mortality and so on). These indicators therefore provide a detailed framework of performance attributes necessary to meet the MSC Criteria in the same way as the criteria provide the factors necessary to meet each Principle.

Individual 'Scoring Guideposts' (60, 80 and 100) are identified for each performance indicator. It is at this level that the performance of the fishery is measured. It is important to note that the absolute numeric values assigned to each of these guideposts are not intended to reflect any type of percentile scoring system but were established by the MSC to help the assessment teams facilitate weighting and combining different performance indicators.

8.2 Scoring Methodology

For each Performance Indicator, the fishery's management characteristics are compared with the requirements of the pre-specified attributes for each of three Scoring Guideposts (60, 80, 100) to establish a score. A performance score of at least 60 but less than 80 is intended to reflect 'a pass with condition', a score of 80 but less than 100 represents 'pass without condition', while a 100 score reflects 'perfect performance.' In order for a fishery to be certified it must accomplish three things:

- Achieve a score of 60 or greater for every performance indicator
- Each MSC Principle must achieve an aggregated score of 80, or pass without conditions.
- A contractual commitment to performance improvement for each indicator that has a score less than 80.

In fisheries where any given indicator scores below 60, a fishery cannot pass the evaluation process and be awarded certification until the performance issue (s) identified can be corrected to the satisfaction of the certification body and its expert evaluation team.

The evaluation framework described above is referred to as the fishery assessment tree. It represents a hierarchical application of the Principles and Criteria. The 60, 80, 100 scoring guideposts used to evaluate a fishery's performance for an indicator are meant to be hierarchical in that to meet a particular score, the scoring guideposts of all lower scores should also have been met.

For any given MSC criterion, sub-criteria and performance indicators are identified as appropriate to the nature of the fishery. All sub-criteria and indicators are weighted indicating their relative importance in setting the overall scores for the fishery.

The fisheries certification methods are provided in great detail through documents that can be downloaded from the MSC website (www.msc.org). At present, the Fisheries Certification Methodology is in its 6th version, issued September 2006.

8.3 Submission of Data on the Fishery

The MSC certification process is similar to other certification schemes in that the client must provide objective evidence of their compliance with the standard. What is unique about the MSC certification process over a vast number of other certification schemes is the requirement of the independent certification assessors to analyze and evaluate the objective evidence and confirm that the evidence proves that the fishery performance merits a specific score.

As such, clients of the certification process are required to submit evidence to prove that they meet the standard in all areas of the fishery from the status of stocks, to ecosystem impacts, through management processes and procedures. This evidence may take many different forms including internationally peer-reviewed literature, grey literature, working documents of the scientific and management authorities, policy documents, observations on the part of the assessment team, observations and fact presented in written or oral form from direct and indirect stakeholders, etc.

Under the MSC program, it is the responsibility of certification applicants to provide the objective evidence required by the assessment team. It is also the responsibility of the applicants to ensure that the assessment team has access to any and all scientists, managers, and fishers that the assessment team identifies as necessary to interview in its effort to properly understand the functions associated with the management of the fishery. Last, it is the responsibility of the assessment team to make contact with stakeholders that are known to be interested, or actively engaged in issues associated with fisheries in the same geographic location.

With aid from the Fisheries and Oceans scientific and management personnel, the British Columbia salmon fishery client and their contractors provided a very detailed submission to support their application for certification. The documents; a BC Pink and Chum Management Summary document, individual Certification Unit Profiles for all units of certification, and responses to performance indicators for each unit of certification. The client and DFO also

assisted the assessment team in organizing the fishery assessment visit and arranging meetings with all necessary harvesters, processors, scientists, managers and enforcement officials.

8.4 Performance Evaluations

After completing information reviews and interviews, the assessment team is responsible to use all the information gathered to assess the performance of the fishery. This is done by assigning numerical scores between 0 and 100, using increments of 5 for each performance indicator. The team uses the scoring guideposts to benchmark the performance of the fishery. To practically accomplish the scoring process in a standardize manner between certification bodies, the MSC requires that a decision support software tool, called Expert Choice be used to calculate the scores. A full description of the AHP process can be found on the MSC web site (www.msc.org). In essence, the process requires that all team members work together to discuss and evaluate the information they have received for a given performance indicator and come to a consensus decision on weights and scores. Using the software, scores and weights are then combined to get overall scores for each of the three MSC Principles.

As previously mentioned, each certified fishery must have an aggregated weighted score of 80 or above on each of the three MSC Principles. Individual performance indicators receiving a score of less than 80 must have a 'Condition' established that when met, would bring the fishery's performance for that indicator up to the 80 score representing a well-managed fishery.

9.0 TRACKING, TRACING FISH AND FISH PRODUCTS

The specific scope of this full certification assessment is the BC chum salmon seine, troll, gillnet and beach seine, fish wheels, weirs, dipnets fisheries in the British Columbia coastal and Canadian Pacific EEZ waters. With exception to a small amount of troll-caught salmon that is frozen at sea (bled, dressed and quick frozen), product from the commercial British Columbia salmon fishery is landed and processed in BC coastal ports. Processed fish from the troll sector is also landed in on-shore. Only chum salmon caught Canadian waters and landed in BC would be eligible to be sold as MSC certified fish and fish product.

Moody Marine and the British Columbia salmon certification clients have agreed that the eligibility date for this certification will be six months prior to the publication date of the Public Comment Draft Report. All companies who are registered members of the client association and who wish to sell certified product must have a valid Chain of Custody certification audit conducted in accordance with this the MSC Chain of Custody standard, methodology and relevant Policy Advisories and TAB Directives.

MSC Chain of Custody requirements were only checked as far as product being landed by legally permitted, salmon fishing vessels with valid fishing licenses where the landings can be monitored in accordance with dockside monitoring requirements for the fishery. In this fishery, harvesters target returning chum salmon but often encounter other salmon species in their catch including and sockeye salmon, steelhead trout and less frequently, Chinook or coho salmon. These six related species are very different in appearance, chum salmon is different from the other Pacific salmon species in both physical shape and coloration. There is low risk of certified chum salmon being confused with other salmon bycatch species and being inadvertently sold as MSC certified fish.

In order for subsequent links in the distribution chain to be able to use the MSC logo, chum salmon product must enter into a separate chain of custody certification from the point of landing forward. The subsequent downstream businesses must be able to prove that they can track the salmon product to their supplier, ultimately all the way back to the permitted vessels which landed the product or to the primary processing facility which initially received the product.

Traceability within the Fishery

In the British Columbia commercial salmon fisheries, conditions of licence require licence holders to report all fish caught whether landed or discarded and specify the catch reporting details applicable to each gear type. Logbooks, phone “hail-ins”, and sales slips are mandatory for all commercial salmon fisheries. Commercial salmon landings are verified and reported on sales slips, which are then submitted to DFO and contribute to catch monitoring statistics. The mandatory hail- in program requires individual fishers to phone in weekly to repot commercial catch. Logbooks used in the fishery record location, time, catch (retained and discarded), and length of fishing set.

10.0 CERTIFICATION RECOMMENDATION

The overall performance of the four British Columbia chum salmon units of certification are identified in Table 3 below. The Assessment Team has recommended all four units of certification be certified with conditions as the following performance criteria have been met:

4. Each MSC Principle has an aggregated, weighted score of 80 or higher.
5. No individual performance indicator had a score below 60.
6. The client has agreed to improve the fishery performance for the performance indicators which had scores below 80 and above 60.

Table 3: Final scores awarded to B.C. chum salmon fishery units of certification and number of conditions issued.

Unit of Certification Performance								
MSC Principle	**North Central Coast Chum**	**No. of Conditions Issued**	**West Coast Vancouver Island Chum**	**No. of Conditions Issued**	**Inner South Coast Chum**	**No. of Conditions Issued**	**Fraser River Chum**	**No. of Conditions Issued**
1	80	7	82	6	80	7	82	5
2	85	1	87	1	87	1	85	1
3	86	8	90	3	90	3	89	4

10.1 Conditions

The fishery attained scores below 80 for the following performance indicators. The client has proposed to improve the performance of these indicators by undertaking the actions identified below each condition. The objective of the client action plan is to ensure that the performance of a particular aspect of the fishery management system, as represented by a particular performance indicator, is improved during the five year certification validity and within the time frame identified by the assessment team.

Ultimately, under normal circumstances, the fishery certification client agrees to undertake these actions. The assessment team has reviewed and accepted the proposed action plan. In the instance that the client has attained the support of the management or scientific agency to undertake the actions, the certification body is required to confirm that there are sufficient resources allotted to complete the necessary work. In the instance that the certification body determines that sufficient resources are not available, the certifier is responsible to withhold certification until such assurances are provided by the responsible agency.

The assessment team has consulted with the management agency and has received support of the action plan from Fisheries and Oceans Canada, as detailed in Appendix D

10.2 Principle 1 Conditions

Condition 1-1

Performance Indicator 1.1.2.1	Scoring Guidepost 80
Estimates exist of the removals for each stock unit.	• Catch estimates are available for all target stocks harvested in the fishery. • 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. • Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 5 years.

Condition 1-1: For all UoCs - The reliability of the catch estimates derived from the catch monitoring systems shall be evaluated by the second surveillance audit and the client or management agency shall commit to conducting similar catch monitoring reporting evaluations at a period of not more than every 5 years in order to meet the performance requirement identified by the third scoring element in the 80 scoring guidepost. The management agency must implement catch monitoring systems that will produce scientifically defensible estimates of exploitation rates for Area 4 chum stocks in Area 3-5 salmon fisheries or chum stock composition estimates for Area 3-5 salmon fisheries need to be provided within 2 years to determine the relative magnitude of the harvest/mortality of Area 4 chum stocks in these fisheries, as required in the second 80 SG scoring element. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improve such that the third scoring issue of the SG80 is met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

Under DFO's Pacific Integrated Commercial Fisheries Initiative (PICFI) the Enhanced Accountability element has provided further focus and resources to develop and implement a framework to improve the monitoring and catch reporting in Pacific fisheries. Under this framework fisheries information requirements are categorized as requiring low, moderate or enhanced levels of information according to consistent criteria, largely based on evaluating risk to conservation.

The current and desired monitoring levels for all Pacific salmon fisheries are currently being evaluated utilizing this consistent framework and a report being prepared for release by July 2012. This strategy calls for subsequent updates of the regional evaluation of all salmon fishery monitoring programs every two years.

DFO will provide defensible estimates of exploitation rates for Area 4 chum stocks in Area 3-5 salmon fisheries within 2 years to determine the relative magnitude of the harvest/mortality of Area 4 chum stocks in these fisheries, as required in the second 80 SG scoring element.

Condition 1-2

Performance Indicator 1.1.2.2	**Scoring Guidepost 80**
Estimates exist of the spawning escapement for each stock unit.	• Estimates are available for the annual escapement of each target stock harvested in the fishery. • Fishery independent indicators of abundance are available for the non-target species harvested in the fishery. • In season indicators of escapement are available for the target stocks and are used to regulate the fishery.

Condition 1-2: For NCCC and ISC chum salmon UoCs - For NCC and ISC chum salmon UoCs - An escapement monitoring program that is adequate to estimate the status of target stocks harvested in the NCCC and ISC chum salmon fisheries must be implemented by the second surveillance audit. Fishery independent indicators of abundance for non-target species harvested in these fisheries must be available for each year and area where fisheries are permitted to target chum salmon. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest.

Milestones:

First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of the two fisheries improve such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

As most of the escapement programs for chum are based on visual enumeration in the ISC Chum region, biological sampling for chum is opportunistic. In recent years with the push to improve the genetic baseline for Southern Chum, increased sampling has taken place but not in

a consistent manner.

A report outlining the rationale for the chum salmon escapement monitoring will be developed and it will include how it meets the management needs for NCCC and ISC chum salmon stocks by May 2014. This report will be supported by a companion report that will outline the over all salmon evaluation framework.

Condition 1-3

Performance Indicator 1.1.2.3	**Scoring Guidepost 80**
The age and size of catch and escapement have been considered, especially for the target stocks.	• 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. • 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.

Condition 1-3: For all chum salmon UoCs. By the second surveillance audit, the client or management agency must meet the requirements of the second 80 scoring guideposts. This shall include scientific analysis supporting justification of the existing sampling program.

Team Suggestion The team envisions an evaluation of the issues where size monitoring might be important, for instance declining average size affecting average egg production and changing spawner recruit relationships, and evaluation of the extent to which the existing opportunistic sampling would capture that.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improve such that the second scoring issue of the SG80 is met or

exceeded.
Proposed Client Action Plan The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows. Sampling in the test fisheries, commercial harvest, escapement programs and hatcheries is specifically designed to attempt to capture the stock structure of the chum salmon populations returning to the NCCC, WCVI, ISC and the Fraser River at any given time. These programs have been designed to not only provide information on abundance but collect data on age, sex, stock composition and size distribution. Additional details and justification of the sampling program will be provided by May 2014.

Condition 1-4

Performance Indicator 1.1.3.1	**Scoring Guidepost 80**
Limit Reference Points or operational equivalents have been set and are appropriate to protect the stocks harvested in the fishery.	• 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. • There is no significant scientific disagreement regarding the LRP's used by the management agency to formulate management decision for the fishery.
Condition 1-4: For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish limit reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the LRPs chosen to formulate management decisions for the fisheries. **Milestones:** **First Surveillance Audit** There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit. **Second Surveillance Audit**	

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improve such that the second scoring issue of the SG80 is met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[3] for salmon: the scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied…." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009
Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

[3] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

Condition 1-5

Performance Indicator 1.1.3.2	Scoring Guidepost 80
Target Reference Points (TRPs) or operational equivalent have been set.	• There is no significant scientific disagreement regarding the TRP's used by the management agency to formulate management decision for the fishery. • 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.

Condition 1-5: For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish target reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the TRPs chosen to formulate management decisions for the fisheries.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improve such that the second scoring issue of the SG80 is met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[4] for salmon: the

[4] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied…." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009
Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

Condition 1-6

Performance Indicator 1.2.1	**Scoring Guidepost 80**
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.	• In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks within 3 reproductive cycles. • Stocks are allowed to recover to more than 150% of the LRP for abundance before any fisheries are permitted that target these stocks.
Condition 1-6: For NCC, ISC and WCVI UoCs: By the second surveillance audit, the client or management agency must develop and implement (in the event of severe depletion) recovery	

plans to facilitate the recovery of depleted stocks to the MEG within three cycles given average rate of productivity. It is recognized that if stocks encounter a series of poor productivity years, even with little, if any, exploitation stocks may not recover in three cycles. The recovery plans must be defined to allow the stocks to recover more than 150% of the defined limit reference point prior to allowing any fishery to target the depleted stocks and the stock should be expected to recover to the MEG under the rebuilding plan. A recovery plan template must be developed and submitted for review and approval by the second annual surveillance audit.

T**eam Suggestion**: The team suggests that DFO formally adopt a harvest strategy and provide the scientific evidence to show that this strategy would lead to rebuilding above the 150% LRP mark. The team does not have an expectation that specific "rebuilding plans" for each stock be established however, the Team does expect that scientific review would examine the stocks which have been consistently well below the LRP and make specific comment and evaluation on what measures are necessary to rebuild them.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of the three fisheries improves such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To ensure that fisheries have acceptable harvest limits on non-target stocks and that the management system allows for rebuilding of depleted non-target stocks, DFO will:

- Implement 'Strategy 1' of the WSP: Define lower and upper benchmarks (LRPs and TRPs) for non-target stocks (CUs) and monitor their status. The objective for fishery management shall be to maintain CUs above their lower benchmarks (LRPs) unless otherwise determined by the Minister.
- Implement 'Strategy 4' of the WSP: Create a regional framework for integrated planning that will be used to articulate salmon management choices that consider social, economic

and biological consequences. Consensus based advisory processes will be used to assist in defining these trade-offs and also to assist in developing strategic plans for the management of salmon CUs; including harvest strategies designed to maintain the biodiversity of stocks within the CU. A report will be provided to the certifier by the second audit that chronicles these efforts.

- Benchmarks will be used to guide management response. For example, if a CU is below its lower benchmark and in the 'Red Zone' this will trigger consideration for ways to protect the fish, increase their abundance and reduce the risk for loss. Biological considerations will be the primary consideration for CU below the lower benchmark and in the 'Red Zone'. Page 17 of the WSP identifies additional guidance on how response would be taken for CU between the lower and upper benchmark.
- Implement Strategy 5 of the WSP. Review annual performance against measurable objectives, particularly with regards to stock status and rebuilding objectives.

Specifically, DFO will also define lower benchmarks (LRPs) or their equivalent for NCCC, WCVI, ISC and Fraser River, chum salmon CUs. A rebuilding plan consistent with the WSP will have been developed and implementation initiated within 2 years for stocks harvested in fisheries targeting NCCC, WCVI, ISC, and Fraser River chum salmon that are below their lower benchmarks (LRPs). On the Skeena and Nass Rivers the proposed rebuilding plan will include measures to rebuild chum salmon stocks if they are below their lower benchmark (LRP) contingent upon determining whether harvest pressure is found to have a significant risk for chum rebuilding. This rebuilding plan will demonstrate how the fisheries management strategy will assist in ensuring rebuilding objectives are met. Fishery actions may only be one component of a rebuilding plan and could include enhancement, habitat and other measures to enable rebuilding objectives being met. It must recognize though, that there will be instances that rebuilding is not possible even where the appropriate management actions are implemented. Rebuilding may not be possible due to a variety of events that are beyond our control (e.g. low marine survival, habitat changes, environmental conditions, etc.)

The following table describes milestones for implementing elements of the WSP required to meet the Rebuilding Plan Conditions of Principle 1 and Principle 2 conditions for MSC certification of BC chum fisheries.

Action	Description	Timeline
Define lower benchmarks for non-target stocks (CUs)	Apply criteria and methods of Holt et al. (*in prep*) as well as other approaches under development to specific CUs.	May 2014
Implement WSP Strategy 4: Design and implement a fully integrated planning process for salmon conservation.	Define a regional framework for integrated planning.	May 2014
Implement WSP Strategy 4: Develop fishery-specific integrated management plans.	Initiate integrated strategic planning processes to develop integrated management plans for salmon CUs that will:	NCCC (May 2014) ISC (May 2014) Fraser River Pink

	- Define lower benchmarks for target and non-target stocks - Define precautionary harvest strategies and decision rules - Determine rebuilding strategies - Define performance measures	(May 2014)
Implement WSP Strategy 5: Annual Performance review	Annually review and report on performance of fishery and management system against defined performance measures for salmon conservation.	Starting 2015 for CU status measures and fishery performance review indicators.

Condition 1-7

Performance Indicator 1.2.2	**Scoring Guidepost 80**
Target stocks are not depleted and recent stock sizes are assessed to be above appropriate limit reference points (or equivalents) for the target stocks.	• 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. • 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.

Condition 1-7: For all chum salmon UoCs. By the second annual surveillance audit, the client or management agency must attain general agreement that the methods of estimating escapement and exploitation rates for all target stocks are scientifically defensible and the management agency must formally establish the LRPs, as required under condition 1-4. The status of each target stock should be reviewed, and where the stock is approaching the defined LRP, the exploitation rate on the stock should be estimated. The management agency must report what actions have been taken to reduce fishing as the target stocks approach the LRP and must demonstrate that 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.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or

written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improves such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[5] for salmon: the scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied…." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009

[5] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

10.3 Principle 2 Conditions

Condition 2-1

Performance Indicator 2.3.1	**Scoring Guidepost 80**
Management strategies include provision for restrictions to the fishery to enable recovery of non-target stocks to levels above established LRPs (Limit Reference Points)	• The management system includes assessment of plans for the recovery of non-target stocks to levels above established LRPs. • Objectives for recovery consider historic stock abundance information. • The management system ensures that the fishery is executed such that recovery of depleted non-target stocks is highly likely to occur in a reasonable time period. • Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner whether 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.

Condition 2-1 For all chum salmon UoCs. The proposed recovery plans, including a commitment to stock monitoring and assessment must be developed and implemented by the second surveillance audit. These recovery plans must meet the requirements of the scoring elements under the 80SG scoring guidepost.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improves such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[6] for salmon: the scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied…." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009
Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

[6] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

10.4 Principle 3 Conditions

Conditions 3-1, 3-2, 3-3

Performance Indicator 3.1.1	**Scoring Guidepost 80**
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	• Management objectives are clearly defined for most of the target stocks and are consistent with the MSC Criteria for a well-managed fishery. • Harvest rates and escapement goals are set for target stocks or target species in the fishery, as qualified by relevant environmental factors. • Harvest controls are precise and effective for major target stocks or target species in the fishery. • The management system provides estimates for all major catches, landings, and bycatch.

Condition 3-1. For all chum salmon UoCs - Certification of all chum fisheries will be conditional until management objectives, (e.g. maximum harvest rates, escapement goals) are clearly defined for most of the target chum stocks harvested in these fisheries. Objectives will be provided to the Certification Body by the second surveillance audit.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of all fisheries improves such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[7] for salmon: the scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied..." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009
Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

Condition 3-2. For NCCC chum salmon UoC. - Certification of North-Central Coast chum salmon fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for North-Central Coast chum salmon fisheries. Bycatch estimates will be reported to the certification body by the first surveillance audit.

[7] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

Milestones:
First Surveillance Audit

The condition is due at the first surveillance audit. The objective of the condition is that performance of all fisheries improves such that all scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

The current and desired monitoring levels for all Pacific salmon fisheries are currently being evaluated utilizing this consistent framework and a report being prepared for release by July 2012. This strategy calls for subsequent updates of the regional evaluation of all salmon fishery monitoring programs every two years.

DFO will provide estimates of non target species by-catch for NCC chum fisheries by May 2013.

Condition 3.3. For Fraser chum salmon UoC. - Certification of Fraser chum salmon fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for Fraser chum salmon fisheries. Bycatch estimates will be reported to the certification body by the first surveillance audit.

Milestones:
First Surveillance Audit

The condition is due at the first surveillance audit.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To satisfy this condition DFO will develop a program (e.g. modelling, test fishery expansion, census based and/or observer based) to estimate the impact of Fraser River sockeye, pink and chum fisheries on steelhead and sturgeon beginning in 2012. The need for further work will be assessed according to the results of this program. A report summarizing the work will be completed in May 2013 and provided to the Certifier.

Condition 3-4

Performance Indicator 3.1.5	**Scoring Guidepost 80**
Management response to new information on the fishery and the fish populations is timely and adaptive.	• The management system provides a mechanism for responding to unexpected changes in the fishery. • When new information or findings support altering the management and conservation programs, adjustments are made within 12 months of obtaining the new information.

Condition 3-4 – For the NCC chum salmon UoC. - By the second surveillance audit, DFO must document how it has responded to management and conservation concerns such as estimation of bycatch and development of recovery plans for Area 3 to 4 chum stocks. DFO should provide evidence that they have established an effective process for responding to new information and making necessary changes within 12 months of the information becoming available.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of this fishery improves such that the second scoring issue of the SG80 is met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To ensure that fisheries have acceptable harvest limits on non-target stocks and that the management system allows for rebuilding of depleted non-target stocks, DFO will:

- Implement 'Strategy 1' of the WSP: Define lower and upper benchmarks (LRPs and TRPs) for non-target stocks (CUs) and monitor their status. The objective for fishery management shall be to maintain CUs above their lower benchmarks (LRPs) unless otherwise determined by the Minister.
- Implement 'Strategy 4' of the WSP: Create a regional framework for integrated planning

that will be used to articulate salmon management choices that consider social, economic and biological consequences. Consensus based advisory processes will be used to assist in defining these trade-offs and also to assist in developing strategic plans for the management of salmon CUs; including harvest strategies designed to maintain the biodiversity of stocks within the CU. A report will be provided to the certifier by the second audit that chronicles these efforts.

- Benchmarks will be used to guide management response. For example, if a CU is below its lower benchmark and in the 'Red Zone' this will trigger consideration for ways to protect the fish, increase their abundance and reduce the risk for loss. Biological considerations will be the primary consideration for CU below the lower benchmark and in the 'Red Zone'. Page 17 of the WSP identifies additional guidance on how response would be taken for CU between the lower and upper benchmark.
- Implement Strategy 5 of the WSP. Review annual performance against measurable objectives, particularly with regards to stock status and rebuilding objectives.

Specifically, DFO will also define lower benchmarks (LRPs) or their equivalent for NCCC, WCVI, ISC and Fraser River, chum salmon CUs. A rebuilding plan consistent with the WSP will have been developed and implementation initiated within 2 years for stocks harvested in fisheries targeting NCCC, WCVI, ISC, and Fraser River chum salmon that are below their lower benchmarks (LRPs). On the Skeena and Nass Rivers the proposed rebuilding plan will include measures to rebuild chum salmon stocks if they are below their lower benchmark (LRP) contingent upon determining whether harvest pressure is found to have a significant risk for chum rebuilding. This rebuilding plan will demonstrate how the fisheries management strategy will assist in ensuring rebuilding objectives are met. Fishery actions may only be one component of a rebuilding plan and could include enhancement, habitat and other measures to enable rebuilding objectives being met. It must recognize though, that there will be instances that rebuilding is not possible even where the appropriate management actions are implemented. Rebuilding may not be possible due to a variety of events that are beyond our control (e.g. low marine survival, habitat changes, environmental conditions, etc.)

The following table describes milestones for implementing elements of the WSP required to meet the Rebuilding Plan Conditions of Principle 1 and Principle 2 conditions for MSC certification of BC chum fisheries.

Action	Description	Timeline
Define lower benchmarks for non-target stocks (CUs)	Apply criteria and methods of Holt et al. (*in prep*) as well as other approaches under development to specific CUs.	May 2014
Implement WSP Strategy 4: Design and implement a fully integrated planning process for salmon conservation.	Define a regional framework for integrated planning.	May 2014
Implement WSP Strategy 4: Develop fishery-specific integrated management plans.	Initiate integrated strategic planning processes to develop integrated management plans for salmon CUs that	NCCC (May 2014) ISC (May 2014)

	will: - Define lower benchmarks for target and non-target stocks - Define precautionary harvest strategies and decision rules - Determine rebuilding strategies - Define performance measures	Fraser River Pink (May 2014)
Implement WSP Strategy 5: Annual Performance review	Annually review and report on performance of fishery and management system against defined performance measures for salmon conservation.	Starting 2015 for CU status measures and fishery performance review indicators.

Condition 3-5

Performance Indicator 3.1.8	**Scoring Guidepost 80**
The management system provides for socioeconomic incentives for sustainable fishing.	• 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. • The management system includes a program to create incentives for harvesters to not exceed target catches or exploitation rates. • Evidence demonstrates that the stakeholders in the fishery have used such incentives • 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.
Condition 3-5 For NCC chum salmon UoC. Certification of North-Central Coast chum fisheries will be conditional until DFO provides evidence that DFO has implemented programs in the North-Central coast that create incentives for harvesters not to exceed target catches in chum fisheries and that these incentives are working. If DFO has evidence of implementing these types of fisheries in the past, this evidence should be provided within 1 year. Evidence of new incentives or initiatives implemented on the North-Central coast should be provided by the second surveillance audit.	

Milestones:
First Surveillance Audit

At the first surveillance audit, DFO will provide a report to the certifier defining existing programs to prevent the commercial fishery from exceeding catch limits.

Second Surveillance Audit

The condition is due at the second surveillance audit. The objective of the condition is that performance of this fishery improves such that the second and third scoring issues of the SG80 are met or exceeded.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

DFO will provide a review and provide evidence that DFO has implemented programs in the NCC that create incentives for harvesters not to exceed target catches if there are any fisheries where harvesters exceed target catches.

Condition 3-6

Performance Indicator 3.2.1	**Scoring Guidepost 80**
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.	• 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. • The research plan addresses concerns related to the impact of the fishery on the ecosystem. • The research plan addresses socioeconomic issues that result from the implementation of management. • The research plan is responsive to changes in the fishery. • Funding is adequate to support short-term research needs. • There is progress in understanding the

	impact of the fishery on target and non-target species. • Research results are utilized in forming management strategies. • Research is reviewed by PSARC or PSC, or other appropriate and technically qualified entities.

Condition 3-6 – For all chum salmon UoCs. - Certification of all chum fisheries will be conditional until DFO develops a research plan for chum fisheries which incorporates the existing elements under 80SG and addresses impacts of the fishery on the ecosystem, socioeconomic issues that result from management decisions and is responsive to changes in the fishery. The research plan must also include an evaluation of alternative management approaches to reduce bycatch or determine the survival rate of discarded non-target species for non-retention fisheries. This research plan must be provided to certification body by the second surveillance audit.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

The requirement to include ecosystem values and objectives in planning process is an element of the WSP. Work is currently underway to develop ecosystem objectives and indicators in order to assess the status of salmon ecosystems, as defined under Strategy 3 of the WSP. In addition, Strategy 4 indicates that information on the status of conservation units, habitats, ecosystems and socio-economic values will inform strategic plans for conservation units.

Over the next two-three years, DFO will be implementing the revised format for Integrated Fisheries Management Plans (IFMPs). The revised IFMP template is much more fishery specific and requires elements not included in past IFMPs, such as stock status, a socio-

economic overview and summary of management issues. Implementation of the new IFMP template will require many of the gaps identified in the conditions to be addressed.

To addresses the need to include other objectives (ecosystem, socio-economic) in the planning process and assess performance against these objectives, we will need to re-align our current reporting and/or re-allocate research resources. DFO has developed a Resource Assessment Framework (RAF) for Fraser River sockeye (CSAP review in May 2008) to help guide assessment priorities based on the biological status and knowledge gaps for each CU. Over the next year DFO will be developing a comprehensive salmon RAF. The RAF will serve as a template for all salmon research and stock assessment planning in the Pacific Region.

Condition 3-7

Performance Indicator 3.4.1.1	**Scoring Guidepost 80**
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.	• Harvest rates and/or escapement levels designed to achieve target goals are regularly implemented. • The management system provides for the establishment of closed areas, no-take zones and closed dates and times. • 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. • Measures that limit harvest rates and set escapement goals are implemented when necessary.

Condition 3.7 - For the NCCC chum salmon UoC. - Certification of the NCCC chum fishery will be conditional until DFO implements a recovery plans to restore Area 3 and 4 chum stocks to productive levels and provides evidence that Canadian fisheries are not impeding the recovery of these stocks. Evidence that recovery plans have been implemented to be provided to the certifier by the second surveillance audit.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To ensure that fisheries have acceptable harvest limits on non-target stocks and that the management system allows for rebuilding of depleted non-target stocks, DFO will:

- Implement 'Strategy 1' of the WSP: Define lower and upper benchmarks (LRPs and TRPs) for non-target stocks (CUs) and monitor their status. The objective for fishery management shall be to maintain CUs above their lower benchmarks (LRPs) unless otherwise determined by the Minister.
- Implement 'Strategy 4' of the WSP: Create a regional framework for integrated planning that will be used to articulate salmon management choices that consider social, economic and biological consequences. Consensus based advisory processes will be used to assist in defining these trade-offs and also to assist in developing strategic plans for the management of salmon CUs; including harvest strategies designed to maintain the biodiversity of stocks within the CU. A report will be provided to the certifier by the second audit that chronicles these efforts.
- Benchmarks will be used to guide management response. For example, if a CU is below its lower benchmark and in the 'Red Zone' this will trigger consideration for ways to protect the fish, increase their abundance and reduce the risk for loss. Biological considerations will be the primary consideration for CU below the lower benchmark and in the 'Red Zone'. Page 17 of the WSP identifies additional guidance on how response would be taken for CU between the lower and upper benchmark.
- Implement Strategy 5 of the WSP. Review annual performance against measurable objectives, particularly with regards to stock status and rebuilding objectives.

Specifically, DFO will also define lower benchmarks (LRPs) or their equivalent for NCCC, WCVI, ISC and Fraser River, chum salmon CUs. A rebuilding plan consistent with the WSP will have been developed and implementation initiated within 2 years for stocks harvested in fisheries targeting NCCC, WCVI, ISC, and Fraser River chum salmon that are below their lower benchmarks (LRPs). On the Skeena and Nass Rivers the proposed rebuilding plan will include measures to rebuild chum salmon stocks if they are below their lower benchmark (LRP) contingent upon determining whether harvest pressure is found to have a significant risk for chum rebuilding. This rebuilding plan will demonstrate how the fisheries management strategy will assist in ensuring rebuilding objectives are met. Fishery actions may only be one component of a rebuilding plan and could include enhancement, habitat and other measures to enable rebuilding objectives being met. It must recognize though, that there will be instances that rebuilding is not possible even where the appropriate management actions are implemented. Rebuilding may not be possible due to a variety of events that are beyond our control (e.g. low

marine survival, habitat changes, environmental conditions, etc.)

The following table describes milestones for implementing elements of the WSP required to meet the Rebuilding Plan Conditions of Principle 1 and Principle 2 conditions for MSC certification of BC chum fisheries.

Action	Description	Timeline
Define lower benchmarks for non-target stocks (CUs)	Apply criteria and methods of Holt et al. (*in prep*) as well as other approaches under development to specific CUs.	May 2014
Implement WSP Strategy 4: Design and implement a fully integrated planning process for salmon conservation.	Define a regional framework for integrated planning.	May 2014
Implement WSP Strategy 4: Develop fishery-specific integrated management plans.	Initiate integrated strategic planning processes to develop integrated management plans for salmon CUs that will: - Define lower benchmarks for target and non-target stocks - Define precautionary harvest strategies and decision rules - Determine rebuilding strategies - Define performance measures	NCCC (May 2014) ISC (May 2014) Fraser River Pink (May 2014)
Implement WSP Strategy 5: Annual Performance review	Annually review and report on performance of fishery and management system against defined performance measures for salmon conservation.	Starting 2015 for CU status measures and fishery performance review indicators.

Condition 3-8

Performance Indicator 3.4.1.2	**Scoring Guidepost 80**
Provides for restoring depleted target species to specified levels within specified time frames.	• 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. • A time schedule for restoration, which considers environmental variability, is determined by the management system.
Condition 3.8 - For the NCCC chum salmon UoC. - Certification of the NCCC chum fishery	

will be conditional until l DFO implements a recovery plans to restore Area 3 and 4 chum stocks to productive levels and provides evidence that Canadian fisheries are not impeding the recovery of these stocks, by the second surveillance audit.

Milestones:
First Surveillance Audit

There are no defined deliverables for this surveillance audit. The milestone for this surveillance audit is that the client or management agency will provide verbal testimony or written evidence of progress over the last year and expected forthcoming actions in order that the surveillance team can ascertain whether progress on meeting this condition is ahead, on or behind target. Meeting this milestone requirement would not likely result in a change of score at this surveillance audit.

Second Surveillance Audit

The condition is due at the second surveillance audit.

Proposed Client Action Plan

The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows.

To ensure that fisheries have acceptable harvest limits on non-target stocks and that the management system allows for rebuilding of depleted non-target stocks, DFO will:

- Implement 'Strategy 1' of the WSP: Define lower and upper benchmarks (LRPs and TRPs) for non-target stocks (CUs) and monitor their status. The objective for fishery management shall be to maintain CUs above their lower benchmarks (LRPs) unless otherwise determined by the Minister.
- Implement 'Strategy 4' of the WSP: Create a regional framework for integrated planning that will be used to articulate salmon management choices that consider social, economic and biological consequences. Consensus based advisory processes will be used to assist in defining these trade-offs and also to assist in developing strategic plans for the management of salmon CUs; including harvest strategies designed to maintain the biodiversity of stocks within the CU. A report will be provided to the certifier by the second audit that chronicles these efforts.
- Benchmarks will be used to guide management response. For example, if a CU is below its lower benchmark and in the 'Red Zone' this will trigger consideration for ways to protect the fish, increase their abundance and reduce the risk for loss. Biological considerations will be the primary consideration for CU below the lower benchmark and in the 'Red Zone'. Page 17 of the WSP identifies additional guidance on how response would be taken for CU between the lower and upper benchmark.
- Implement Strategy 5 of the WSP. Review annual performance against measurable

objectives, particularly with regards to stock status and rebuilding objectives.

Specifically, DFO will also define lower benchmarks (LRPs) or their equivalent for NCCC, WCVI, ISC and Fraser River, chum salmon CUs. A rebuilding plan consistent with the WSP will have been developed and implementation initiated within 2 years for stocks harvested in fisheries targeting NCCC, WCVI, ISC, and Fraser River chum salmon that are below their lower benchmarks (LRPs). On the Skeena and Nass Rivers the proposed rebuilding plan will include measures to rebuild chum salmon stocks if they are below their lower benchmark (LRP) contingent upon determining whether harvest pressure is found to have a significant risk for chum rebuilding. This rebuilding plan will demonstrate how the fisheries management strategy will assist in ensuring rebuilding objectives are met. Fishery actions may only be one component of a rebuilding plan and could include enhancement, habitat and other measures to enable rebuilding objectives being met. It must recognize though, that there will be instances that rebuilding is not possible even where the appropriate management actions are implemented. Rebuilding may not be possible due to a variety of events that are beyond our control (e.g. low marine survival, habitat changes, environmental conditions, etc.)

The following table describes milestones for implementing elements of the WSP required to meet the Rebuilding Plan Conditions of Principle 1 and Principle 2 conditions for MSC certification of BC chum fisheries.

Action	Description	Timeline
Define lower benchmarks for non-target stocks (CUs)	Apply criteria and methods of Holt et al. (*in prep*) as well as other approaches under development to specific CUs.	May 2014
Implement WSP Strategy 4: Design and implement a fully integrated planning process for salmon conservation.	Define a regional framework for integrated planning.	May 2014
Implement WSP Strategy 4: Develop fishery-specific integrated management plans.	Initiate integrated strategic planning processes to develop integrated management plans for salmon CUs that will: - Define lower benchmarks for target and non-target stocks - Define precautionary harvest strategies and decision rules - Determine rebuilding strategies - Define performance measures	NCCC (May 2014) ISC (May 2014) Fraser River Pink (May 2014)
Implement WSP Strategy 5: Annual Performance review	Annually review and report on performance of fishery and management system against defined performance measures for salmon conservation.	Starting 2015 for CU status measures and fishery performance review indicators.

Condition 3-9

Performance Indicator 3.5.2	**Scoring Guidepost 80**
There is an effective and timely system for external review of the management system.	• The management system provides for a review of management performance by one or more independent experts at least once every five years. • The format and standards of the review are established within the management system. • Review results are made available to the public.
Condition 3-9 – For all chum salmon UoCs. - Certification of all chum fisheries will be conditional until an external review of chum salmon fisheries management performance is completed and there is commitment to conducting a similar review at least once every five years. The results of the first external review will be provided to the certification body by the second surveillance audit.	
Proposed Client Action Plan The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows. External reviews are conducted on an annual basis through the departments Integrated Harvest Planning Committee. This Committee is comprised of representatives from First Nations, and commercial, recreational and environmental organizations. The Terms of Reference for this Committee require a post-season evaluation be conducted and reported on an annual basis. A report will be provided to the certifier on chum salmon fisheries management.	

Condition 3-10 and 3-11

Performance Indicator 3.7.4	**Scoring Guidepost 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.	• 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.
Condition 3-10. For NCCC chum salmon UoC. Same as Condition 3-2. Certification of North-Central Coast chum fisheries will be conditional until scientifically defensible estimates	

of non-target species bycatch are obtained annually for North-Central Coast chum fisheries. To be provided by the first annual surveillance audit.
Proposed Client Action Plan The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows. The current and desired monitoring levels for all Pacific salmon fisheries are currently being evaluated utilizing this consistent framework and a report being prepared for release by July 2012. This strategy calls for subsequent updates of the regional evaluation of all salmon fishery monitoring programs every two years. DFO will provide estimates of non target species by-catch for NCC chum fisheries by May 2013.
Condition 3.11. For Fraser chum salmon UoC. - Same as Condition 3-3. Certification of Fraser chum fisheries will be conditional until scientifically defensible annual estimates of non-target species bycatch are obtained for Fraser chum fisheries. To be provided by the first annual surveillance audit.
Proposed Client Action Plan The full text of the DFO/ Client action plan can be seen in Appendix D, a summary of the key point addressing this condition follows. To satisfy this condition DFO will develop a program (e.g. modelling, test fishery expansion, census based and/or observer based) to estimate the impact of Fraser River sockeye, pink and chum fisheries on steelhead and sturgeon beginning in 2012. The need for further work will be assessed according to the results of this program. A report summarizing the work will be completed in May 2013 and provided to the Certifier.

11 ASSESSMENT RESULTS

Section 11.1 presents the overall scoring summaries for the four units of certification. Tables 4, 5, and 6, provide the scoring summary for each MSC Principle.

Section 11.2 presents the detailed scoring for Principle 1 performance indicators. Table 7 provides a diagrammatic explanation of the scoring of individual performance indicators for each unit of certification for Principle 1.

Section 11.3 presents the detailed scoring of Principle 2 performance indicators. Table 8 provides a diagrammatic explanation of the scoring of individual performance indicators for each unit of certification for Principle 2.

Section 11.4 presents the detailed scoring of Principle 3 performance indicators. Tables 9 and 10 provides a diagrammatic explanation of the scoring of individual performance indicators for each unit of certification for Principle 3.

11.1 Overall Unit of Certification Scoring Summaries

Table 4: MSC Principle 1 Scoring Summary

Summary for BC Chum Salmon Units of Certification											
		Weighting	NCCC Chum	Weighted Scores	WCVI Chum	Weighted Scores	ISC Chum	Weighted Scores	Fraser Chum	Weighted Scores
PRINCIPLE 1 - Fishery Management for Target Populations		**0.333**		**80**		**82**		**80**		**82**
Criterion 1.1 - Maintain high productivity of target population & associated ecosystem		**0.794**		**81**		**83**		**81**		**83**
Subcriterion 1.1.1 - Stock units		**0.400**		**93**		**93**		**93**		**93**
Indicator 1.1.1.1	Stock management units defined	0.317	100		100		100		100	
Indicator 1.1.1.2	Scientific agreement on units	0.194	100		100		100		100	
Indicator 1.1.1.3	Geographic distribution known	0.108	80		80		80		80	
Indicator 1.1.1.4	Indicator Stocks	0.064	85		85		85		85	
Indicator 1.1.1.5	Enhanced Stocks	0.317	87		87		87		87	
Subcriterion 1.1.2 - Monitoring and assessment		0.400		**74**		**80**		**74**		**80**
Indicator 1.1.2.1	Reliable estimates of removals	0.274	77		77		77		77	
Indicator 1.1.2.2	Reliable estimates of escapement	0.369	70		85		70		85	
Indicator 1.1.2.3	Information on fish age and size	0.112	70		70		70		70	
Indicator 1.1.2.4	Productivity estimates	0.246	80		80		80		80	
Subcriterion 1.1.3 - Management goals		0.2000		**70**		**70**		**70**		**70**
Indicator 1.1.3.1	Limit reference points	0.667	70		70		70		70	
Indicator 1.1.3.2	Target reference points	0.333	70		70		70		70	
Criterion 1.2 - Fishery allows for the recovery of depleted		0.136		**65**		**70**		**65**		**70**
Indicator 1.2.1	Well-defined and effective strategy	0.500	60		70		60		na	
Indicator 1.2.2	Stocks not depleted and harvest rates are sustainable	0.500	70		70		70		70	
Criterion 1.3 - Fishing does not impair reproductive capacity		0.070		**93**		**93**		**93**		**93**
Indicator 1.3.1	Age, sex and genetic structure are monitored	1.000	93		93		93		93	

Table 5: MSC Principle 2 Scoring Summary

Summary for BC Pink Salmon Unit of Certification												
		Weighting	NCCC Chum	Weighted Scores	WCVI Chum	Weighted Scores	ISC Chum	Weighted Scores	Fraser Chum	Weighted Scores
PRINCIPLE 2 - Ecosystem and Non-Target Populations		0.333		**85**		**85**		**85**		**85**
Criterion 2.1 - Maintain natural functional relationships among species		0.500		**92**		**92**		**92**		**92**
Indicator 2.1.1	Impacts on ecosystem processes can be identified	0.286	90		90		90		90	
Indicator 2.1.2	Provisions to reduce ecosystem impacts	0.143	92		92		92		92	
Indicator 2.1.3	Sufficient research on ecosystem impacts	0.143	95		95		95		95	
Indicator 2.1.4	Escapement goals address ecosystem needs	0.143	95		95		95		95	
Indicator 2.1.5	Research on effects of non-fishing activities	0.286	90		90		90		90	
Criterion 2.2 - Fishery minimizes impacts on endangered, threatened or protected species		0.250		**93**		**93**		**93**		**93**
Indicator 2.2.1	Information on biological diversity used by managers	1.000	93		93		93		93	
Criterion 2.3 - Fishery allows for the recovery of depleted stocks (Non-target Stocks)		0.250		**62**		**62**		**62**		**62**
Indicator 2.3.1	Provide for recovery of non-target stocks	1.000	62		62		62		62	

Table 6: MSC Principle 3 Scoring Summary

Summary for BC Chum Salmon Units of Certification			Chum Salmon Units of Certification							
		Weighting	NCCC Chum	Weighted Scores	WCVI Chum	Weighted Scores	ISC Chum	Weighted Scores	Fraser Chum	Weighted Scores
PRINCIPLE 3 - Management and Operational Framework		0.333		**86**		**90**		**90**		**89**
Management Framework										
Criterion 3.1 - Management system consistent with MSC principles and criteria		0.327		**85**		**90**		**90**		**90**
Indicator 3.1.1	Clear and defensible set of objectives	0.111	70		72		72		70	
Indicator 3.1.2	Periodic assessment of biological status	0.111	90		90		90		90	
Indicator 3.1.3	Identify the impact of fishing on the ecosystem	0.111	95		95		95		95	
Indicator 3.1.4	Uses best information and precautionary approach	0.111	90		90		90		90	
Indicator 3.1.5	Responses to new information are timely and adaptive	0.111	75		95		95		95	
Indicator 3.1.6	Responsive to social and economic impact of fishery	0.111	95		95		95		95	
Indicator 3.1.7	Useful and relevant information to decision makers	0.111	92		92		92		92	
Indicator 3.1.8	Socioeconomic incentives for sustainable fishing	0.111	70		94		94		94	
Indicator 3.1.9	Hatchery Managment Issues	0.111	na		90		90		na	
Criterion 3.2 - Framework for research pertinent to management		0.1		**79**		**79**		**79**		**79**
Indicator 3.2.1	Research plan for target and non-target species (**80 & 100 SGs have 7 scoring elements each)	0.667	73		73		73		73	
Indicator 3.2.2	Research is timely, available and reviewed	0.333	90		90		90		90	
Criterion 3.3 - Transparency in operations and consultation process		0.041		**100**		**100**		**100**		**100**
Indicator 3.3.1	Open consultations process	1	100		100		100		100	

Table 6: MSC Principle 3 Scoring Summary cont…

Summary for BC Chum Salmon Units of Certification			Chum Salmon Units of Certification			
Criterion 3.4 - Measure to control levels of harvest		0.179	**82**	**89**	**89**	**89**
Subcriterion 3.4.1 - Catch and exploitation levels		0.5				
Indicator 3.4.1.1	Firshery control systems including no-take zones	0.5	78	96	96	96
Indicator 3.4.1.2	Measures to restore depleted fish populations	0.5	70	80	80	80
Subcriterion 3.4.2 - Ensure that conservation objectives are met.		0.5				
Indicator 3.4.2.1	Compliance provisions (effective enforcement)	0.5	90	90	90	90
Indicator 3.4.2.2	Monitoring provisions	0.5	90	90	90	90
Criterion 3. 5 - Regular and timely review of management system		0.152	**88**	**88**	**88**	**88**
Indicator 3.5.1	Internal review	0.316	100	100	100	100
Indicator 3.5.2	External review	0.258	70	70	70	70
Indicator 3.5.3	Recommendations from reviews incorporated	0.284	85	85	85	85
Indicator 3.5.4	Mechanism for resolving disputes	0.142	97	97	97	97
Criterion 3.6 - Compliance with legal and administrative		0.124	**96**	**96**	**96**	**96**
Indicator 3.6.1	Compliance with international agreements	0.25	100	100	100	100
Indicator 3.6.2	Compliance with domestic laws and regulations	0.375	100	100	100	100
Indicator 3.6.3	Observes legal and customary (First Nation) rights	0.375	90	90	90	90
Fisheries Operational Framework						
Criterion 3.7 - Ecosystem sensitive gear and fishing practices		0.077	**87**	**97**	**97**	**87**
Indicator 3.7.1	Avoid catch and minimize mortality of non-target species	0.277	90	100	100	90
Indicator 3.7.2	No distructive fishing practices	0.139	100	100	100	100
Indicator 3.7.3	Minimize operational waste	0.128	100	100	100	100
Indicator 3.7.4	Cooperation of fishers	0.328	70	90	90	70
Indicator 3.7.5	Fishing methods minimize impacts on habitat	0.128	100	100	100	97

11.2 Principle 1 Scoring Results

Table 7: MSC Principle 1: Individual Performance Indicator Scoring Summary (NCCC and WCVI)

Summary for BC Chum Salmon Units of Certification						Criteria @ 60					Criteria @ 80						Criteria @ 100							Criteria @ 60					Criteria @ 80						Criteria @ 100					
		Weighting	NCCC Chum	Weighted Scores		1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5		WCVI Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5	
PRINCIPLE 1 - Fishery Management for Target Populations		**0.333**		**80**																				**82**																
Criterion 1.1 - Maintain high productivity of target population & associated ecosystem		**0.794**		**81**																				**83**																
Subcriterion 1.1.1 - Stock units		**0.400**		**93**																				**93**																
Indicator 1.1.1.1	Stock management units defined	0.317	100					X	X	X			X	X	X	X			X	X	X		100				X	X	X			X	X	X	X			X	X	X	
Indicator 1.1.1.2	Scientific agreement on units	0.194	100				X	X	X	X			X	X	X	X				X	X		100			X	X	X	X			X	X	X	X				X	X	
Indicator 1.1.1.3	Geographic distribution known	0.108	80				X	X	X	X				X	X	X			X	X	X		80			X	X	X	X				X	X	X			X	X	X	
Indicator 1.1.1.4	Indicator Stocks	0.064	85					X	X	X				X	X	X					X		85				X	X	X				X	X	X					X	
Indicator 1.1.1.5	Enhanced Stocks	0.317	87					X	X	X				X	X	X	P	P		X	X		87				X	X	X				X	X	X	P	P		X	X	
Subcriterion 1.1.2 - Monitoring and assessment		0.400		**74**																				**80**																
Indicator 1.1.2.1	Reliable estimates of removals	0.274	77					X	X			P	X	X	X					X	X		77				X	X			P	X	X	X					X	X	
Indicator 1.1.2.2	Reliable estimates of escapement	0.369	70				X	X	X	P	P	P	X	X	X				X	X	X		85				X	X	X				X	X	X	P		X	X	X	
Indicator 1.1.2.3	Information on fish age and size	0.112	70			X	X	X	X			X	X	X	X			X	X	X	X		70			X	X	X	X			X	X	X	X		X	X	X	X	
Indicator 1.1.2.4	Productivity estimates	0.246	80				X	X	X				X	X	X				X	X	X		80				X	X	X				X	X	X			X	X	X	
Subcriterion 1.1.3 - Management goals		0.2000		**70**																				**70**																
Indicator 1.1.3.1	Limit reference points	0.667	70				X	X	X	X			X	X	X	X				X	X		70				X	X	X				X	X	X				X	X	
Indicator 1.1.3.2	Target reference points	0.333	70						X	X			X	X	X	X				X	X		70					X	X				X	X	X				X	X	
Criterion 1.2 - Fishery allows for the recovery of depleted		0.136		**65**																				**70**																
Indicator 1.2.1	Well-defined and effective strategy	0.500	60					X	X	X			X	X	X	X				X	X		70				X	X	X				X	X	X				X	X	
Indicator 1.2.2	Stocks not depleted and harvest rates are sustainable	0.500	70					X	X	X	P	P	X	X	X	X			X	X	X		70				X	X	X				X	X	X				X	X	
Criterion 1.3 - Fishing does not impair reproductive capacity		0.070		**93**																				**93**																
Indicator 1.3.1	Age, sex and genetic structure are monitored	1.000	93						X	X				X	X	X				X	X		93					X	X				X	X	X				X	X	

Table 7: MSC Principle 1: Individual Performance Indicator Scoring Summary cont…(ISC and Fraser)

Summary for BC Chum Salmon Units of Certification		Weighting	ISC Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100					Fraser Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100				
					1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5			1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5
PRINCIPLE 1 - Fishery Management for Target Populations		**0.333**		**80**																		**82**															
Criterion 1.1 - Maintain high productivity of target population & associated ecosystem		**0.794**		**81**																		**83**															
Subcriterion 1.1.1 - Stock units		**0.400**		**93**																		**93**															
Indicator 1.1.1.1	Stock management units defined	0.317	100				X	X	X			X	X	X	X			X	X	X		100				X	X	X			X	X	X	X			X	X
Indicator 1.1.1.2	Scientific agreement on units	0.194	100			X	X	X	X			X	X	X	X				X	X		100			X	X	X	X			X	X	X	X			X	X
Indicator 1.1.1.3	Geographic distribution known	0.108	80			X	X	X	X				X	X	X			X	X	X		80			X	X	X	X				X	X	X			X	X
Indicator 1.1.1.4	Indicator Stocks	0.064	85				X	X	X			X	X	X	X					X		85				X	X	X			X	X	X	X				X
Indicator 1.1.1.5	Enhanced Stocks	0.317	87				X	X	X			X	X	X	X	P	P		X	X		87				X	X	X			X	X	X	X	P	P		X	X
Subcriterion 1.1.2 - Monitoring and assessment		0.400		**74**																		**80**															
Indicator 1.1.2.1	Reliable estimates of removals	0.274	77					X	X			P	X	X	X				X	X		77					X	X			P	X	X	X				X	X
Indicator 1.1.2.2	Reliable estimates of escapement	0.369	70				X	X	X	P	P	P	X	X	X				X	X		85				X	X	X				X	X	X	P		X	X	X
Indicator 1.1.2.3	Information on fish age and size	0.112	70			X	X	X	X			X	X	X	X			X	X	X		70			X	X	X	X			X	X	X	X			X	X	X
Indicator 1.1.2.4	Productivity estimates	0.246	80				X	X	X				X	X	X				X	X		80				X	X	X				X	X	X			X	X	X
Subcriterion 1.1.3 - Management goals		0.2000		**70**																		**70**															
Indicator 1.1.3.1	Limit reference points	0.667	70			X	X	X	X			X	X	X	X				X	X		70			X	X	X	X			X	X	X	X				X	X
Indicator 1.1.3.2	Target reference points	0.333	70					X	X			X	X	X	X				X	X		70					X	X			X	X	X	X				X	X
Criterion 1.2 - Fishery allows for the recovery of depleted		0.136		**65**																		**70**															
Indicator 1.2.1	Well-defined and effective strategy	0.500	60				X	X	X			X	X	X	X				X	X		na		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Indicator 1.2.2	Stocks not depleted and harvest rates are sustainable	0.500	70				X	X	X	P	P	X	X	X	X				X	X		70				X	X	X	P	P	X	X	X	X			X	X	X
Criterion 1.3 - Fishing does not impair reproductive capacity		0.070		**93**																		**93**															
Indicator 1.3.1	Age, sex and genetic structure are monitored	1.000	93					X	X				X	X	X				X	X		93					X	X				X	X	X				X	X

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

MSC Principle 1	**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.**

Intent	*The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favor of short-term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.* It is recognized that environmental conditions will occasionally cause even well managed stocks to decrease to low abundance and the intent is that the management system will facilitate rapid recovery of such stocks.

Weight	**33**	**Score**	**NCCC Chum: 80** **WCVI Chum: 82** **Inner SC Chum: 80** **Fraser Chum: 82**

1.1 - MSC Criterion 1	**The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.**

Intent	Our interpretation of MSC Criterion 1: The performance indicators listed under criteria 1 focused on the adequacy of the information used to manage the fisheries and stocks. For our assessment, we have organized the performance indicators into the three sub-criteria: 1) the definition of the stock units for each fishery; 2 the information available on the harvests, escapement, biological characteristic, and productivity; and 3) the management goals for each stock unit. As in the evaluations of other fisheries, the effect of the fishery on the associated ecological community will be primarily dealt with under Principle 2. However, the 100% level for indicators related to management goals under Principle 1 cannot be achieved unless information is collected on the associated ecological community and used in setting management goals.

Weight	**79.4**	**Score**	**NCCC Chum: 81** **WCVI Chum: 83** **Inner SC Chum: 81** **Fraser Chum: 83**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

1.1.1 TAVEL Sub-Criterion	Scientifically defensible stock units have been defined and the geographic distribution of these stocks is known.

Intent	The intention of this sub-criterion is to evaluate whether the definition of the stock units are clear and appropriate for each species harvested in the fishery.

Weight	**40**	**Score**	

1.1.1.1	The stock units are well defined for the purposes of conservation, fisheries management and stock assessment.	• The majority of stock units are defined. • The rational for the majority of stock units for the target species is clear with regard to conservation, fisheries management and stock assessment requirements.	• The stock units are well defined and include details on the major component stocks. • The rational for each stock unit for the target species is clear with regard to conservation, fisheries management and stock assessment requirements.	• There is an unambiguous description of each stock unit, including: its geographic location, run timing, details of all the component stocks, and rational for its definition. • The rational for each stock unit is clear with regard to conservation, fisheries management and stock assessment requirements.
Weight			**Score**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**

Client Submission:
The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.2.2 describes the different biological units of Pacific salmon and how they are used in the management system.
- CUP 2.1.1 provides details about the stock units in each area.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

The Wild Salmon Policy (DFO 2005) formally expresses many years of conceptual and practical development in the department's management of Pacific salmon. It serves as a crucial platform for launching and coordinating comprehensive planning processes for the long-term conservation and sustainability of wild Pacific salmon.

Holtby and Ciruna (2007) developed a comprehensive approach for identifying conservation units of anadromous Pacific salmon, based on a combination of the ecological context, the life history of each population, and genetic population structure. They chose to map out Joint Adaptive Zones (JAZ) based on a combination of freshwater characteristics and marine characteristics. Within each JAZ, species were further divided into conservation units based on differences in life history, spawning time, and other ecological characteristics.

Scoring Rationale: The definition of conservation units for each certification unit as provided in the DFO Management Summary (MS) Section 2.2.2 and detailed stock unit definition information provide in the Certification Unit Profiles (CUP) provides clear and unambiguous definitions of the stock units. The procedures and resulting definitions have been peer reviewed through PSARC, as described in the MS Section 2.2.2 and 4.3.5.1. Therefore, all SGs at the 60, 80 and 100 guideposts have been met for all chum salmon fisheries.

1.1.1.2	There is general scientific agreement that the stock units are appropriate.	• There is general agreement among regional fisheries scientists within the management agency that the majority of stock units are appropriate for target species.	• There is general agreement among regional fisheries scientist within the management agency that the stock units are appropriate for target species • There is no significant scientific disagreement regarding the stock units used by the management agency to formulate management decision for the fishery.	• The stock units for target species have been reviewed and found to be scientifically defensible and appropriate by the Pacific Scientific Advise Review Committee (PSARC) or the appropriate Pacific Salmon Commission (PSC) technical committee • There is general agreement among regional fisheries scientist outside the management agency that the stock units are appropriate. • There is general scientific agreement regarding the stock units for non-target species.
Weight			**Score**	**NCCC Chum: 100** **WCVI Chum: 100**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
			Inner SC Chum: 100 **Fraser Chum: 100**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.2.2 describes the different biological units of Pacific salmon and how they are used in the management system.
- CUP 2.1.1 provides details about the stock units in each area for each unit of certification.

Extensive research has been completed to identify the population structure of BC chum salmon. The analyses were peer-reviewed and accepted through the PSARC process, which includes scientists from outside the management agency, and some have been published in peer-reviewed journals:

- Riddell (2004) describes spawning populations of chum salmon on the North and Central Coast.
- Genetic studies by Beacham et al. (1985) and Seeb & Crane (1999) suggest two lineages of North American chum, likely resulting from isolation in separate northern and southern refugia (Bering & Columbia refuges) during the last glaciation.
- Beacham et al. (2008) assess the stock structure of BC chum salmon using microsatellite DNA, which they found to be more informative than other genetics-based methods such as alloyzmes. The study identifies 16 regional stocks based on 14 microsatellites.
- Holtby and Ciruna (2007) document the multi-criteria approach used to delineate conservation units under the Wild Salmon Policy. Their Appendix 8 lists the consultations conducted to develop the initial list of conservation units. Up-to-date materials for continuing public consultations on the definition of conservation units for BC chum salmon are available at

  http://www-comm.pac.dfompo.gc.ca/pages/consultations/wsp/CUs_e.htm.

Scoring Rationale:

All SGs at the 100 SG were met; the client submissions clearly demonstrated that a rigorous process has been used to establish the CUs under the WSP. The stock units for target stocks have been reviewed through PSARC and the review involved outside scientists. Conservation units for all Pacific salmon species have been identified and this covers the definition of stock units for non-target species. The Holtby and Ciruna document describes the stock units for the major salmon species, thus indicating general scientific agreement on stock units for non-target salmon species. Therefore, all SGs at the 60, 80 and 100 guideposts have been met for all chum salmon fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

1.1.1.3	The geographic range for harvest of each stock unit in the fishery is known.	• The information available on the geographic range for harvests of target stocks is sufficient to prevent the over harvesting for the majority of the stocks within each stock unit.	• The geographic range for harvests of target stocks is defined. • The information on the geographic range of harvests of target stocks is sufficient to prevent the over harvesting of these stocks. • The information available on the geographic range for harvest of non-target stocks is sufficient to prevent the over harvesting of these stocks.	• The geographic range for harvests of each stock unit in the fishery is estimated and documented each year. • The information on the geographic range of harvests is monitored during the fishing season and used when making in-season management decisions.
Intent		*The intent is to confirm the geographical range (i.e. location) of fisheries that impact target stocks within stock units.*		
Weight			**Score**	**NCCC Chum: 80** **WCVI Chum: 80** **Inner SC Chum: 80** **Fraser Chum: 80**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- CUP 2.1.2 for each unit of certification describes stock characteristics, including marine distribution.
- CUP 2.3 for each UoC describes the fisheries intercepting each stock unit.

Scoring Rationale:

North and central coast chum are harvested in terminal fisheries. The fisheries usually target returning stock near or adjacent to their rivers of origin. It assumed these terminal fisheries account for all or a significant portion of the total exploitation of these populations. As the fish are not marked there are no data regarding high seas interceptions. While chum are a far north migrating species, in other jurisdictions as well as Canada, north and central coast chum are generally not targeted in offshore feeding grounds.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

NC and CC chum harvests in Canada are monitored by DFO, through planned commercial fishery openings and catch monitoring programs such as logbooks [8]. The locations of the many north and central coast chum fisheries are specifically described in section 4 of the 2008 Northern BC Salmon Integrated Fisheries Management Plan.[9]

Fishery monitoring programs for non-target species are obligatory in all Canadian commercial fisheries, including North and Central coast chum fisheries. Following from the DFO discussion paper Pacific Region Fishery Monitoring and Reporting Framework,[10] mandatory logbooks, frequent phone-in, and sales slip programs are in place for all commercial fisheries.[11] Data on other species of fish, seabirds, and other non-target species, either retained or released, must be recorded.

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

In addition, real-time monitoring is in place where necessary. For example, coho in the north and central coast are being managed to an exploitation rate ceiling. Coho are actively managed during all net fisheries, with coho retention initially not allowed in gillnet and seine fisheries. Fishery managers monitor the encounter rates on a weekly basis and will allow retention of coho if abundance warrants.

From the North and Central Coast Chum CUP Section 2.3

2.3.4.1 Queen Charlotte Islands terminal chum fisheries (Areas 1 & 2)

Terminal commercial net fisheries may target chum salmon when an abundance surplus to a stream's escapement goal has been identified in-season. Generally the required escapement is secured within the streams or behind boundaries near the estuary location before fisheries are allowed to proceed, and fishing locations are usually channels or inlets adjacent to the natal stream of the target stocks. Historically, terminal net fisheries have been implemented in:

[8] See sample logbook: IFMP 2003, Appendix 3.
For more information on the log-book program, see: 2007 South Coast Salmon IFMP, Section 7.5.
[9] Fisheries and Oceans Canada. Pacific Region Integrated Fisheries Management Plan Salmon, Northern BC, June 1, 2008-May 31-2009. http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm
[10] Pacific Region Fishery Monitoring and Reporting Framework, January 2002. http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/reportingframework/monitoringpaper_e.pdf
[11] See sample logbook: IFMP 2003, Appendix 3.
For more information on the log-book program, see: 2007 South Coast Salmon IFMP, Section 7.5.

- Masset Inlet (major systems: Ain and Awun Rivers)

- Cumshewa Inlet (wild chum from Mathers Creek and enhanced chum from Pallant Creek)

- Darwin Sound (Salmon River)

- Skidegate Inlet (Deena River, Lagins Creek, Slatechuck Creek, and Browns Cabin Creek),

- Athlo-Otard (Mace Creek)

- Englefield Bay (Security Inlet Creek)

- Tasu Sound (Botany Inlet Creek)

2.3.4.2 North Coast incidental harvests and terminal chum fisheries (Areas 3 to 6)

Terminal commercial fisheries target salmon in Area 3 (Nass), Area 4 (Skeena), and Areas 5 and 6 (Hecate Strait). There have been no targeted chum fisheries in Areas 3 to 5 for at least a decade due to low abundance concerns. Commercial fisheries targeting other salmon species in Areas 3 to 5 generally operate under chum non-retention provisions, with some variations:

- Seines have non-retention / non-possession regulations for most of the year, except for a few days with very high abundance of sockeye or pink salmon, due to practical constraints on catch sorting.

- Gill-nets have higher release mortality, so the conservation strategy is to reduce encounters by area closures around Whale Island and Pierce Island (Area 3), releasing live chum, and retaining dead chum.

Area 3 fisheries have high encounter rates of enhanced chum from Alaska. These fisheries retain wild chum, but minimize encounters of local Area 3 chum through ribbon boundaries and area closures.

•

The only targeted chum fishery on the North Coast occurs in Area 6 and targets enhanced Kitimat River chum. This fishery has moved from the Gil Island area to more terminal harvests of the enhanced stock in
Kitimat Arm and inner Douglas Channel to more selectively harvest enhanced chum. The terminal fishery encounters very few non-enhanced

chum, because stocks are separated by timing (i.e. Kitimat chums return earlier) and location.

2.3.4.3 Central Coast mixed-stock and terminal fisheries (Areas 7 to 10)
Mixed-stock commercial fisheries may harvest chum in Fisher-Fitz Hugh Channel and Seaforth Channel, but the majority of fishing effort in Areas 7 and 8 has been shifted towards terminal fisheries. There have been no targeted commercial salmon harvests in Area 9 (Rivers Inlet) or Area 10 (Smith Inlet) since the mid- 1990s to protect local salmon populations.
Terminal net fisheries may occur in:
- Mathieson Channel

- Finlayson Channel and Sheep Passage (targeting mainly Mussel River chum)

- Spiller Inlet (Neekas Creek)

- Roscoe Inlet and Johnson Channel (Roscoe and Quartcha systems)

- Burke Channel (Bella Coola River)

- Dean Channel (Kimsquit River)

- Klemtu Pass and Lara Pass (enhanced chum from McLoughlin Bay an Kitasoo Creek)

The area 8 net fishery which targets enhanced Bella Coola chum salmon occurs in the Bella Coola Gillnet Area (Burke Channel) for gillnets and Fisher Channel - Fitz Hugh Sound area for seines and gillnets. Some of the net fishery area occurs as a mixed stock chum fishery; however commercial fishery guidelines attempt to limit impacts on non-target species. Gillnet mesh restrictions, time and area restrictions and seine brailing, sorting and release guidelines attempt to limit impacts on sockeye, coho, chinook and steelhead stocks.
Chum management plans for net harvest of enhanced chum incorporate time, area and gear restrictions as strategies to address potential weak chum stocks of concern.

From the WCVI Chum CUP Section 2.3

Commercial net fisheries target returning WCVI chum in approach areas close to their natal rivers. Commercial licence groups that target WCVI

chum are the Area D and E gillnet fleet and Area B seine fleet.

The two primary fishing areas are offshore of Nitinat Lake and in Nootka Sound. From 1995 to 2007, annual catch off Nitinat Lake averaged approximately 380,000 chum, and Nootka fisheries harvested an average of 73,000 chum. Limited effort assessment fisheries have also occurred in Esperanza Inlet and Barkley Sound since 2004 and in Clayoquot Sound since 2007. Total annual catch in these areas averaged 13,700 pieces since 2004.

From the ISC Chum CUP Section 2.3

2.3.4.1 Johnstone Strait mixed-stock fisheries

Johnstone Strait mixed-stock fisheries target fall run chum, with seine, gill net and troll gear, managed based on a fixed 20% total harvest rate; the commercial fishery is managed to 15%, whereas the remaining 5% are for the recreational, FSC, test fisheries and provide a buffer for uncertainty in the commercial harvest rate.

- Areas 12/13 - Johnstone Strait: The fishery targets chum spawning in Johnstone Strait, the Strait of Georgia, and Fraser River areas, but a small component are bound for Washington State systems. The main components of the harvest are the Mid Vancouver Island (MVI) and Fraser River stock groupings. The majority of chum stocks enter Johnstone Strait from September to November. This fishery also intercepts enhanced chum from Big Qualicum hatchery, Little Qualicum hatchery, Puntledge hatchery, Chehalis hatchery, Chilliwack hatchery, Inch Creek hatchery, and Weaver Creek spawning channel.

2.3.4.2 Johnstone Strait terminal fisheries
Johnstone Strait terminal fisheries targeting chum are managed in-season based on terminal abundance, and harvesting occurs by seine, gill net or troll gear.

- Area 12 – Nimpkish River: Chum openings are confined to a portion of Subareas 12-18 and 12-19 to minimize incidental harvest of other passing chum stocks. If commercial fishing opportunities have been exhausted and surplus stocks are still available, then an ESSR opportunity may be provided.
- Area 13 - Bute Inlet: Openings are confined to Subareas 13-21 and 13-22 to minimize incidental harvest of other passing chum stocks. If commercial fishing opportunities have been exhausted and surplus stocks are still available, then an ESSR opportunity may be provided.

2.3.4.3 Strait of Georgia terminal chum fisheries

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Mid Vancouver Island terminal chum fisheries are managed in-season based on terminal abundance. Chum harvests focus on terminal stocks listed below, but incidentally retain some other minor local stocks in the terminal areas as well. The major systems are:

- Area 14 - Puntledge, Big Qualicum and Little Qualicum: The fishery is directed at the enhanced stocks of three river systems; Puntledge, Little Qualicum and Big Qualicum Rivers. Chum returning to this area have been enhanced since the late 1960s and terminal fisheries have occurred in October and November since the 1970s. ESSR fisheries are possible on enhanced stocks (e.g. Section 4.9 of 2007 IFMP for Southern BC).
- Area 15 – Sliammon: No targeted commercial fisheries for pink or chum
- Area 16 - Jervis Inlet: This terminal fishery targets wild chum stocks returning to river systems in the Jervis Inlet area. The main systems are Tzoonie, Deserted and Skwawka Rivers.
- Area 17 – Nanaimo: This fishery is directed primarily at Nanaimo River stocks. The Nanaimo River chum stocks are supplemented by the Nanaimo River Hatchery on poor return years.
- Area 18 – Cowichan: This fishery is directed primarily at Cowichan River stocks. Cowichan chum and to some extent Goldstream chum are also harvested. Chemainus River stocks are also impacted but likely to a lesser extent.
- Area 19 – Goldstream (Saanich Inlet): ESSR fishery is directed primarily at Goldstream River chum stocks, but some Cowichan River chum are also harvested incidentally.

From the Fraser River Chum CUP Section 2.3

Fraser River stocks are fall run stocks that migrate in from September to December. Fraser chum are intercepted in commercial fisheries that occur in the Johnstone Strait (Canadian Statistical Areas 11 to 13), Strait of Georgia (Canadian Statistical Area 14), Juan de Fuca Strait (Canadian Statistical Area 20 and 21; United States Statistical Area 4B, 5, 6C) and the Fraser River (Canadian Statistical Area 29 and United States Statistical Areas 7 and 7A).

The greatest percentage of Fraser chum are harvested in the Johnstone Strait mixed-stock fisheries, which account for about 50% of the total Fraser chum harvest, and in the Fraser River fisheries, which account for about 26% of the total Fraser chum harvest (Table 4)

The 2008 Certification Unit Profile for Inner South Coast Chum (excluding Fraser) describes the management approach for chum fisheries in Johnstone Strait and Johnstone Strait.

The Area 29 commercial fishery takes place on the Fraser River downstream of Mission, the Fraser estuary, and adjacent waters of Georgia Strait. Targeted chum fisheries occur between Steveston and Mission, targeting enhanced chum from Harrison, Chehalis, Inch, Stave, and Chilliwack / Vedder systems. Section 3.3.1 describes the management approach.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Commercial US fisheries also intercept Fraser River chum salmon. The 2006 Post-Season Report (PSC 2008) provides the details. Briefly:

• The management approach for chum fisheries in the Strait of Juan de Fuca (Areas 4B, 5, 6C) is designed to target Puget Sound stocks with limited total effort (i.e. four US Treaty Indian tribes, gillnet only). Catch levels have been moderate and below historical levels due to low catch rates, low market prices, and inclement weather conditions. Genetic stock identification GSI samples indicate that the majority of the catch is chum salmon of U.S. origin.

• Management of chum fisheries in the San Juan Islands and around Point Roberts (Areas 7/7A) has recently been disconnected from the harvest levels in Johnstone Strait. A harvest limit of 130,000 chum salmon has been set, which is reduced to 20,000 if Canada indicates that abundance is critically low. Fisheries are managed to maintain established catch sharing between Areas 7 and 7A and to avoid concentrations of effort along the international boundary in Area 7A.

Scoring Rationale:

Generally chum salmon in B.C. are managed on a finer scale than the conservation units and the terminal nature of most of the fisheries assures the conservation units will be monitored. Most of the fisheries are managed on the basis of terminal stocks in an inlet or bay. DFO does not have access to Alaskan data on chum catches and thus manages the return to Canada, treating Alaskan catch as a form of unaccounted for mortality. The geographic range of the catch of stocks in Canadian fisheries is well known through genetic analysis.

There is no annual stock reconstruction or stock composition analysis therefore does not meet 100 SG.

Area 3 and 4 chum stocks in the NCCC UoC have been weak and are not recovering and it is unclear to the team if Alaskan interception is the major problem. Because this is not Canadian catch we felt it met the 80% scoring guideline.

1.1.1.4	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.	• There is limited scientific disagreement regarding the indicator stocks used by the management agency to formulate management decisions for the fishery. • There is a scientific basis for the indicator stocks used in the management of the fishery.	• There is general agreement among regional fisheries scientists within the management agency that the status of indicator stocks reflects the status of other stocks within the management unit. • There is no significant scientific disagreement regarding the indicator stocks used by the management agency to formulate	• The status of the indicator stocks is well correlated with the stocks that are most at risk from a conservation point of view, not just correlated with the most productive stocks in the region. • The indicator stocks used have been reviewed and found to be scientifically defensible and

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

			management decisions for the fishery.	appropriate by the PSARC or the appropriate PSC technical committee. • There is general agreement among regional fisheries scientists outside the management agency that the indicator stocks are appropriate. • The relationships between indicator stocks and stocks of interest are assessed every three to five years.
Weight			**Score**	**NCCC Chum: 85** **WCVI Chum: 85** **Inner SC Chum: 85** **Fraser Chum: 85**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- Where applicable, each CUP 2.1.1.4 describes the use of indicator stocks.
- CUP 4.2 for each UoC describes escapement monitoring in each area.

The client submission for 1.1.1.2 above provides a list of relevant publications, which establish that generally accepted stocks have been identified.

From the NCCC Chum CUP

Commercial fisheries targeting North and Central coast chum salmon generally rely on indicator stocks to identify local abundance in-season. Indicator stocks tend to be more intensively surveyed, and provide more accurate estimates of local abundance than the visual surveys used for the majority of chum salmon spawning streams. English et al. (2006) list the indicator stocks and survey methods.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Intensive chum monitoring with counting fences occurs on Pallant Creek and Mathers Creek in Area 2E, the Kincolith River in Area 3, and the Kitwanga River in Area 4.

In addition to intensive surveys in these indicator systems, escapement estimates in each statistical area are compiled for fairly stable set of index streams and a variable set of additional streams. Section 4.1 Of the North and Central coast Chum profile summarizes assessment coverage for North and Central Coast chum salmon. Section 4.3 briefly describes how observed escapements are adjusted to reconstruct run size and calculate harvest rates.

Scoring Rationale:

The use of indicator stocks for managing Pacific salmon is widely accepted. The Core Stock review (English et al, 2006) identifies the indicator stocks for NCC chum fisheries and the CUPs list the indicator stocks for each UoC. The 80 SG scoring elements are met, but only the 3rd 100 SG scoring element is met, leading to a score of 85 for each unit of certification. The correlation between indicator stocks and conservation units does not appear to have been validated; the choice of indicator stocks does not appear to have been reviewed by PSARC, and the relationship between the indicator stocks and conservation units has not been periodically assessed.

1.1.1.5	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 wild stocks.	• There is general scientific agreement within the management agency regarding the impacts of enhanced fish on the resultant harvest rates or escapements of wild (un-enhanced) fish stocks. • Managers have some scientific basis for assuring that harvest rates for enhanced stocks are not adversely affecting the majority of wild (un-enhanced) stocks within each stock unit.	• In fisheries where both enhanced and wild (un-enhanced) stocks are harvested at the same time, the harvest guidelines are based on the goals and objectives established for the wild (un-enhanced) stocks, and there is sufficient information on stock composition (i.e. hatchery and natural fish) to determine whether those goals are met. • There are adequate data and analyses to determine that the presence of enhanced fish in the management units does not adversely impact the wild (un-enhanced) fish stocks.	• Fisheries targeting enhanced stocks are geographically removed from wild (un-enhanced) stocks and separate terminal harvest areas are established for these fisheries. • Times and areas have been identified where the majority of enhanced fish migrate through the general fishery. • There is real time mark recovery program during the prosecution of the fishery that allows determination of harvest rates of the targets and naturally enhanced component of the run and

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

				these data are used in regulation of the fishery.
Weight			**Score**	**NCCC Chum: 87** **WCVI Chum: 87** **Inner SC Chum: 87** **Fraser Chum: 87**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions for each UoC provide evidence specific to this performance indicator.

- MS 2.4.2 describes monitoring and assessment of BC pink and chum, with a specific section for monitoring enhanced fish.
- MS 2.5.2 outlines the general decision guidelines for pink and chum fisheries, including the approach to fisheries that target enhanced fish.
- MS 3.2.5 provides a regional overview of salmon enhancement and restoration activities.
- CUP 2.2 summarizes enhancement efforts in each area.
- CUP 3.2 explains the harvest strategy in each area.
- CUP 3.3 provides the details for each commercial fishery.
- CUP 4.6 describes how stock composition is analyzed in each area.

From NCC chum CUP

Large-scale chum enhancement in the North and Central Coast occurs in Pallant Creek (Area 2 East), Kitimat River (Area 6), Kitasoo Creek (Area 7), McLaughlin Bay Creek (Area 7), and the Bella Coola River (Area 8). In addition to these large hatchery programs, chum are also enhanced through several small-scale programs managed by local groups.

Detailed information about chum enhancement in the North and Central Coast is publicly available, and evaluated regularly:

- Section 3.7.3 of the 2008 North Coast Salmon IMFP lists brood production targets for chum salmon for 2008, and Section 8.7.3 reviews hatchery activities from 2007.
- Riddell (2004) briefly reviews the history of chum enhancement in the North and Central Coast.
- Spilsted (2004) summarizes fry releases for all North Coast and Central Coast chum enhancement operations, including small projects.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Commercial fisheries harvest enhanced chum from Pallant Creek in Cumshewa Inlet (Area 2 East), from Kitimat River in Kitimat Arm (Area 6), from Kitasu Creek in Trout Bay and McLaughlin Bay (Area 7) and from the Bella Coola River in the Bella Coola Gillnet Area (Area 8).

The enhanced Pallant Creek chum stock is managed to a 30,000 fish escapement goal and 25,000 fish for brood stock.[12] Ad hoc fishery openings are based on fish observed to be schooling in front of the river system after at least 75% are secure and beyond the fishery location.[13]

A fishery may occur in the Douglas Channel for enhanced chum returning to the Kitimat hatchery if returns are deemed to be enough to support one.[14]

Klemtu Pass area may be opened to harvest surplus enhanced chum returning to the Kitasoo Creek Hatchery after August 22 if numbers permit.[15]

A Lama Pass fishery may be opened to catch enhanced chum from the McLoughlin Bay Hatchery in mid-August, depending on observed chum abundance.[16]

The Area 8 pink and chum fishery targets enhanced chum from the Bella Coola River and wild Kimsquit River fish based on data collected from assessment fisheries in early July.[17] The fishery is then based on the strength of the component runs.[18]

From WCVI Chum CUP

For the Nitinat and Nootka fisheries, the major components of the target stocks are hatchery origin. The Nootka net fishery in Statistical Area 25 targets chum originating from Conuma Hatchery and Area 25 wild spawning populations. The Nitinat net fishery targets chum originating from Nitinat Hatchery and river.

In the 'outer' portion of the Nootka fishery, the harvest rate is limited to 20%. The 20% exploitation rate limit was chosen as a conservative limit, relative to estimates of sustainable exploitation rate from stock-recruit analysis on southern BC wild chum populations.[19] This approach is

[12] Northern BC Salmon IFMP, Section 4.3.
[13] Ibid.
[14] Ibid, 4.5.6
[15] Ibid, 4.7.1
[16] Ibid, 4.7.4
[17] Ibid, 4.9.3.
[18] Ibid, 4.9.4.

consistent with current management research that suggests fixed harvest rate approaches maximise long-term benefits from fisheries and exploited stocks.[20]

In the more terminal portion of the Nootka fishery (i.e. Tlupana Inlet), the harvest rate is not restricted to 20% as the proportion of un-enhanced fish is assumed to be much lower. However, chum caught in Tlupana area fisheries were sampled in 2003 and 2004 for thermal marks to evaluate the portion of hatchery origin fish after declines were observed in Tlupana Inlet populations. This work suggested the portion of un-enhanced fish in some areas Tlupana Inlet was much higher than assumed. No fisheries have operated in this area since 2004.

The Nitinat fishery targets almost exclusively hatchery fish. Therefore, the proportion of hatchery fish caught in the fishery is higher and a fixed harvest rate strategy is not used. However, there are significant management measures in place to reduce harvest of un-enhanced stocks that are vulnerable to the fishery. These include various time-area closures to protect stocks originating from adjacent systems (such as the Klanawa River) or stocks passing through the fishery in more off-shore areas (e.g. Fraser River or US bound chum). These management measures are detailed in the IFMP and the WCVI chum fishery profile.

The impacts of the fisheries on wild (un-enhanced) target stocks are evaluated annually. The two main assessment criteria are observation of escapement levels and analysis of the fishery harvest rate, considering environmental factors that affect stock productivity. For those fisheries with a fixed harvest rates it is assumed that if the harvest rates are maintained at or below the limit the fishery will not have a negative impact on wild target and non-target stocks. For the Nitinat fishery that operates with an escapement target strategy, management measures are in place to avoid interception of wild stocks. The success of these actions is evaluated by monitoring abundance of the wild stocks through escapement surveys.

From Inner South Coast Chum CUP

Chum salmon enhancement on the Inner South Coast has focused on restoring depressed runs and stabilizing terminal commercial fishing opportunities. Mixed-stock commercial fisheries do not specifically target enhanced chum salmon runs, but do catch them as part of the overall chum harvest strategy for Johnstone Strait, the Strait of Georgia, and the Fraser River.

DFO hatcheries currently supplement chum salmon runs as follows,

- *Big Qualicum River hatchery*: This facility uses a spawning channel as well as active hatchery supplementation for all species of Pacific salmonids, including steelhead and cutthroat trout. The majority of hatchery production is chum salmon. Access to the spawning channel is controlled with a counting fence, limiting the number of spawners at about 100,000 chum, 10,000 coho, and 1,000 chinook. If there are more returning adults, the fence is used to divert them. The release target for chum fry is 54 Million into the channel, with an

[19] Beacham 1984; Myers *et al.* 1999; Ryall *et al.* 1999.
[20] Walters, C.J. & Martell, S.J.D. (2004) *Fisheries Ecology and Management* Princeton University Press.

expected return of 486,000 adults.
- *Little Qualicum River hatchery*: Release target of 28 Million fry, with an expected return of 190,000 adults.
- *Puntledge River hatchery*: This facility was built to support the recovery of Puntledge River chinook, but has also been used to supplement other salmon runs. Target production is 2.7 Million fed fry from Puntledge River broodstock for release in the Puntledge River, with an expected return of about 36,000 adults.

In addition to the above, Inner South Coast chum salmon populations are enhanced in small-scale supplementation programs managed by local groups. These include,

- *Gwa'ni hatchery*: Target is to release 1.8 Million fry from Nimpkish River brood stock in Nimpkish River, for an expected return of about 24,000 adults.
- *Sliammon River hatchery*: Target is to release 1.7 Million fry from Sliammon River brood stock into Sliammon River, for an expected return of about 18,000 adults.
- *Nanaimo River hatchery*: Target is to release about 1 Million fry from Nanaimo River brood stock into Nanaimo River, for an expected return of about 7,500 adults.

A complete list of these small-scale supplementation programs is included in the annual *Integrated Fisheries Management Plan* (IFMP). Note that additional chum eggs are collected by hatcheries beyond their own targets as brood stock for approved transfers to other projects, as listed in the IFMP.

In addition to these active supplementation programs, chum salmon are also enhanced with unmanned spawning channels (e.g. Mashiter, Stawamus, Tiempo, and Wildwood in Howe Sound). Detailed information about chum enhancement on the Inner South Coast is publicly available and evaluated regularly. For example, Section 4.7.4 of the 2008 South Coast Salmon IMFP lists brood production targets for chum salmon for 2008, and Section 9.7.3 reviews enhancement activities from 2007.

From Fraser chum CUP

Estimates of stock composition are required to distinguish harvests of wild chum and enhanced chum, and to identify the presence of weaker stocks in a fishing area. Stock composition is determined by two methods,

- Coastwide Mark-Recovery Program (MRP).
- Genetic Stock Identification (GSI) analysis.

Mark-Recovery Program (MRP)

Chum released from hatcheries are no longer marked in the Fraser River system. It is thus not possible to determine hatchery contribution to returns or to estimate survival, exploitation and distribution parameters. However, this change in monitoring has occurred with increased escapement and reduced exploitation rates as well as reduced enhancement since 1998. Estimates of enhanced chum contributions from major hatchery facilities were based on marking a portion of the fry released with an adipose clip and coded-wire tag (Ad-cwt) or various types of fin clips, and subsequent recovery of these marks. The Johnstone Strait and Fraser River commercial fisheries were then sampled at a rate of approximately 20%, to determine the incidence of marked fish and the age composition in the catch. Escapement assessment for marks in the adult returns was also carried out on each river. Survival rates, exploitation rates and enhanced contribution were all determined from these sampling programs. Marked fry were enumerated individually at marking. Released chum marked with fin clips include the Chilliwack River (1980–1997). Released chum marked with adipose clips (Ad) and coded-wiretags (CWT's) include the Chehalis River (1983–1998), Inch Creek (1978–2001), and Stave River (1982–1997). Unmarked fry represented by the mark are estimated by subtracting egg and fry mortalities from the egg number which is usually calculated using electronic egg counters. Since egg and fry mortality generally is less than 10%, fry enumeration is considered very accurate. Not all release groups are represented by a mark. Contributions for those groups are estimated by associating them with a marked release group with a similar size and release timing.

Genetic Stock Identification (GSI)

GSI is a method of analyzing chum tissue to determine the origin (e.g. Fraser River, U.S., east coast Vancouver Island) of chum caught in major fisheries. GSI sampling is conducted in both the Canadian and U.S. chum fisheries and results are available from 1985. Since 1994, this program has been undertaken irregularly (i.e. 1996, 1998, 2000 and 2001). Coast-wide, a comprehensive GSI program is on-going for BC chum salmon.
GSI data indicate that the proportion of Fraser chum in Johnstone Strait fisheries can be more than 50% and that the year to year variation in the proportion of Fraser fish in the Johnstone Strait catch can vary between 20% and 80%. The reasons are not known. GSI data also indicate that the proportion of Fraser chum caught in Washington State fisheries, especially in area 7 and 7A can be 50% or more[21].

Scoring Rationale:

In all areas outside the Fraser River, harvest of enhanced chums takes place in terminal fisheries targeted on enhanced stocks. Where mixing of wild and enhanced fish does take place in the harvests (including the Fraser River), exploitation rate targets are set low enough to allow for sufficient wild stock escapement.

All 80 SG scoring elements are met for all certification units. The third scoring element of the 100 SG is not met and we judged that the first

[21] http://www-comm.pac.dfo-mpo.gc.ca/publications/speciesbook/Salmon/chum.south.html

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

two 100 SG scoring issues were partially met and thus scored 87%.

1.1.2 TAVEL Sub-Criterion	The monitoring and assessment of fisheries and stocks is adequate for fisheries managers to maintain the high productivity of the target stocks and associated ecological community relative to its potential productivity.		
Intent	The foundation for the management of most salmon fisheries is information on fishery harvest and escapements. Long-term (>10 yrs) monitoring of specific stocks is generally required to compute estimates of productivity. For some target species, additional information on fish size and age is required. The relative importance of each type of information will vary across fisheries and the species harvested.		
Weight	**40**	**Score**	

1.1.2.1	Estimates exist of the removals for each stock unit.	• Catch estimates for the majority of target stocks are available. • Catch estimates are available for non-target stocks where the catch of the non-target stocks may represent a significant component of that stock. • Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 10 years	• Catch estimates are available for all target stocks harvested in the fishery. • 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. • Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 5 years.	• Catch estimates are available for all fisheries in Canadian waters that harvest the target and non-target stocks harvested in the fishery being evaluated. • Mortality rates are available for the fish released or discarded during the fishery. • Catch estimates are available for fisheries outside Canadian waters that harvest the stocks that are the target of the fishery being evaluated.
Weight			**Score**	**NCCC Chum: 77** **WCVI Chum: 77** **Inner SC Chum: 77**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

			Fraser Chum: 77

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.4.2 describes monitoring and assessment of BC pink and chum, with specific sections on monitoring catch and escapement.
- MS 2.4.3 outlines how catch and escapement data are compiled, maintained, and publicly released.
- CUP 4 describes the assessment framework in each area (catch, escapement, exploitation rates).
- CUP 5 reviews the current status of stock units, including trends in escapement, catch, and exploitation rate.

Catch Monitoring

The NCC chum CUP states that catch estimates are available for all target stocks harvested in the fishery. Non-target stocks do not represent a significant component of the stock.

Ocean and terminal fisheries are monitored to estimate both catch and effort. Fisheries may also be sampled to determine the stock and age composition of the catch, either directly from boats in the fishery or from combined catch at processing plants.

Commercial harvest

All commercial harvesters of marine species are licensed under regulations of the Canada Fisheries Act. Commercial harvesters are required as a condition of license to hail-in catches after the fishery closes. They must also record catches in a mandatory log-book program. Harvesters must report all catch, retained and released, including by-catch of other species of fish, seabirds, and other non-target species. Commercial hail-in/logbook data are verified occasionally by on-water inspections of catch by Fishery Officers or Charter Patrols, dock-side monitoring and auditing of sales slip data. Occasionally, observers verify catch reports and sample on board fishing vessels.

Commercial catch and effort data are entered into the regional Fishery Operating System (FOS) 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

First Nation harvest

English et al. (2006) provide the following recommendations: *"The procedures recommended for monitoring annual harvests for First Nation fisheries vary with the size and intensity of the fishery. Monitoring programs within the Nass and Skeena watersheds provide the most reliable and timely harvest data by combining catch per effort from fishermen interviews with effort estimates from net counts and fishermen*

logs (Bocking and English 1996). First Nation terminal harvests of Copper River and Yakoun River sockeye in the Queen Charlotte Islands are also considered reliable. The catch estimates are much more uncertain for First Nation harvests in marine areas. These estimates could be substantially improved ensuring that each First Nation has the technical support required to design and implement more rigorous catch monitoring programs including direct sampling through interview, logbook programs and telephone surveys."

Smaller fisheries are generally not monitored, although as a condition of their communal licences First Nation bands are required to report catch.

Recreational harvest

Chum are generally not targeted by recreational harvesters and harvests are typically small, with total recreational catch of chum salmon for Areas 1 to 10 less than 5,000 annually (i.e. recorded catch in regional database at (http://www.pac.dfo-mpo.gc.ca/sci/sa/Recreational/default_e.htm).

However, all recreational catch is monitored through the regional creel surveys. Creel surveyors gather catch-per-unit-effort data and take biological samples from boat landing sites. These data are augmented by logbook and manifest records of catch and effort submitted by lodges operating guided trips. Effort is determined through periodic aerial surveys of fishing areas. These data are compiled and analyzed to produce catch and effort statistics by area and species.

English et al. (2006) provide the following recommendations: *"The primary tools for monitoring North and Central coast recreational fisheries are creel surveys and lodge logbooks. Annual creel surveys are required for the recreational fisheries in Area 1-2 because these fisheries catch and release large numbers of salmon. Periodic creel surveys should be adequate to track harvest trends for the other significant marine fisheries (Area 3, 4, 6) and freshwater fisheries (Nass and Skeena). The bulk of the recreational harvests in Area 7-9 are based out of lodges so the most effective means of obtaining harvest data is through annual logbook programs. As these recreational fisheries increase in size over time, the frequencies of creel surveys should be revisited."*

Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 5 years.

In 2002, the Pacific Region Fishery Monitoring and Reporting Framework paper was released.[22] This document outlines the strategies and programs for regional catch monitoring based on an evaluation of the existing systems. This framework is currently being updated through the Pacific Fisheries Reform initiative of 2005 (PICFI). Through a consultative and collaborative process, the PICFI process is addressing all aspects of catch monitoring of salmon fisheries in the Pacific region including monitoring, reporting, validation, traceability and information

[22] Pacific Region Fishery Monitoring and Reporting Framework, January 2002. Page 3. http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/reportingframework/monitoringpaper_e.pdf

management.

In the meantime, accuracy of catch reporting (i.e. as collected through the hail-in/logbook program) is determined through a number of mechanisms. These include periodic observer programs; charter patrols; compliance patrols; PAL Surveillance over-flights; dockside sampling and monitoring and processing plant sampling and monitoring.

Several new programs should aid the accuracy of catch reporting. Independent observers from environmental organizations have recently begun monitoring by-catch in some salmon fisheries as part of collaborative initiatives.[23] In 2007, a pilot reporting program using an electronic logbook system was used for the third consecutive season. The ultimate goal of this new initiative is to improve the efficiency and compliance of catch reporting.[24]

Accuracy of catch reporting (i.e. as assessed through the hail-in/logbook program) is determined through a number of mechanisms. These include:

- Observer programs;
- Charter Patrols;
- Compliance Patrols;
- PAL Surveillance Over-flights;
- Dockside sampling or monitoring;
- Processing plant sampling or monitoring.

Scoring Rationale:

All certification units meet the 60 level SGs. The basic sales slip and logbook data (Management summary 2.4.3.2) respond to the first SG at the 60 level. Historical tagging data and more recently genetic stock identification provide estimates of non-target stocks of chums (Management summary and CUP's) to meeting the second 60SG. The continued revision of methods and application of new approaches are sufficient to meet the third 60 SG.

All certification units meet the first 80SG scoring element through the basic catch information system described under the 60SG. All certification units partially meet the third 80 SG scoring element because reviews have taken place, but fail to fully meet it because there is no program of systematic review of the catch monitoring system. The WCVI, ISC and Fraser CU meet the 2nd 80SG through the tagging and GSI work that has been done (see the CUP's for each). Until recently there were no estimates of Area 4 chum catch in the Area 3 chum

[23] A sample report from the Fraser River chum fishery is available at http://www.watershed-watch.org/news/item.html?nid=157
[24] DFO, 2007 South Coast IFMP. Page 94.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

fishery available and this by-catch of Area 4 chums could constitute a significant fraction of the stock of Area 4 chums entering Canadian waters. However, the November 2011 report by LGL Ltd. "Review of North and Central Coast Salmon Indicator Streams and Estimating Escapement, Catch and Run Size for each Salmon Conservation Unit" provides such estimates and thus the quality of data for the NCC is comparable to the other CU's and we have scored the NCC the same as the other CU's.

In summary, all UoC meet the first and second 80 scoring issues, and partially meet the third scoring issue. None of the UoCs score at the 100SG level. A score of 77 is awarded for all UoCs.

Condition 1-1: For all UoCs - The reliability of the catch estimates derived from the catch monitoring systems shall be evaluated by the second surveillance audit and the client or management agency shall commit to conducting similar catch monitoring reporting evaluations at a period of not more than every 5 years in order to meet the performance requirement identified by the third scoring element in the 80 scoring guidepost. The management agency must implement catch monitoring systems that will produce scientifically defensible estimates of exploitation rates for Area 4 chum stocks in Area 3-5 salmon fisheries or chum stock composition estimates for Area 3-5 salmon fisheries need to be provided within 2 years to determine the relative magnitude of the harvest/mortality of Area 4 chum stocks in these fisheries, as required in the second 80 SG scoring element. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest.

1.1.2.2	Estimates exist of the spawning escapement for each stock unit.	• Escapement estimates for target stocks are available, where escapement estimates are necessary to protect the target stock from overexploitation. • 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.	• Estimates are available for the annual escapement of each target stock harvested in the fishery. • Fishery independent indicators of abundance are available for the non-target species harvested in the fishery. • In season indicators of escapement are available for the target stocks and are used to regulate the fishery.	• Estimates are available for the annual escapement for each stock unit harvested in the fishery. • In season indicators of escapement are available for all stock units (e.g. target stocks and non-target stocks) and are used to regulate the fishery.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Weight		Score	NCCC Chum: 70 WCVI Chum: 85 Inner SC Chum: 70 Fraser Chum: 85

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- CUP 4 describes the assessment framework in each area (catch, escapement, exploitation rates).
- CUP 5 reviews the current status of stock units, including trends in escapement, catch, and exploitation rate.

From NCC response summary

Escapement

North and Central Coast chum escapement is monitored in-season by charter patrol boats and by stream walks in representative streams (English et al. 2006). Stream inspections are conducted annually by DFO staff, contracted charter patrols, First Nations assessment staff, and various nongovernmental community groups. Information for a small number of streams is obtained from either over-flights or fence programs. Daily inspection data from escapement surveys is recorded in a database program used by field staff. The annual estimates of total returns to streams are calculated using an 'area-under-the-curve' calculation. All assumptions within this calculation are documented within the database. Escapement data are fully documented and publicly available (DFO 2008a)

Key streams for salmon monitoring were chosen using the following criteria (English et al. 2006):

- High potential to obtain reliable stream counts (e.g. water clarity, accessibility, flow rates)
- Similarity to other streams in terms of geographic area, genetics, migration timing, and similar vulnerability to fishing effort.
- Equal coverage of large, medium or small-size streams.
- Sufficient coverage identified as important to commercial and First Nation interests.

Chum assessment information for large river systems is recorded using a tributary stream hierarchy system which follows the BC Provincial stream naming and numbering system. Large river systems may have several orders of tributary levels found within a watershed. Large rivers with tributary stream data include the Nass (Area 3), Khutzeymateen (Area 3), Kitsault (Area 3), Skeena (Area 4), Kitimat (Area 6),

Kemano (Area 6) and Bella Coola (Area 8) watersheds. Implementation of the stock assessment framework has been consistent since 2004 (Table 8). Over 3,500 stream inspections for chum salmon escapement were conducted over a 4 year period, with a total of 432 streams surveyed at least once, and key streams surveyed multiple times each year.

In addition DFO develops *Annual Field Assessment Plans* for north and central coast salmon based on the recommendations in English et al. (2006), and tracks annual performance relative to the recommended coverage in *Annual Stream Inspection Logs*. Actual survey coverage each year is influenced by local conditions and regional budget priorities. *Annual Field Assessment Plans* and *Stream Inspection Logs* are available upon request from the North Coast DFO office in Prince Rupert.

Test Fishery

Test fisheries apply a standardized fishing procedure using a commercial vessel under contract. The purpose is to develop abundance indices and collect additional information , such as run timing, stock composition, and fish condition.

The Tyee Test Fishery (Skeena River, Area 4) is the main in-season stock assessment tool for estimating an abundance index of Skeena River salmon and steelhead through the use of a multi-panel gill net with varying mesh sizes (Cox-Rogers and Jantz 1993). In addition, daily in-season escapements and total run size are estimated for sockeye. Estimates are subject to error as the catchability of salmon by the test fishery net varies from year to year due to varying environmental conditions (including water level, clarity and temperature, weather conditions and tide). More information about the test fishery, including daily in-season salmon indices, is available at http://www.pac.dfo-mpo.gc.ca/northcoast/skeena/tyeetest.htm.

Assessment Fisheries

Assessment fisheries are regular commercial fisheries, but with a strict effort limitation (e.g. number of vessels, short opening). The purpose is to collect abundance information and provide low-impact fisheries. Assessment fisheries may be implemented in terminal areas where local surplus abundance of chum is expected. For example:

- *Area 1:* Catches in early assessment fisheries for gill nets in the western portion of McIntyre Bay, outside Masset Sound, are generally a reliable indicator of run size.
- *Area 6*: Terminal assessment fisheries in Kitimat Arm only, to determine hatchery returns.
- *Area 7*: One-day assessment fisheries for 2008 are under consideration for lower Finlayson, lower Mathieson, Sheep Pass and the eastern portion of Seaforth Channel.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Counting Fences
Salmon counting fences are used throughout the North and Central Coast. The following fence enumeration facilities currently collect chum data:

- *Pallant Creek fence* (Area 2E)
- *Kincolith River fence* (Area 3): Video-counting facility is jointly operated by Nisga'a and DFO.
- *Kitwanga River fence* (Area 4): This facility is jointly operated by the Gitanyow Fisheries Authority, DFO, and the BC Ministry of Water, Land and Air Protection. More information, including weekly in-season counts, is available at www.pac.dfo-mpo.gc.ca/northcoast/counts/kitwanga/kitwanga.htm.
- *West Arm Creek fence* (Area 6): The primary focus of this fence operated by DFO is to assess coho, but it counts chum and pink as well.
- Nisga'a Fishwheel Program conducted at test-fishing sites near Gitwinksihlkw on the Nass River.
- Radio telemetry study on Kincolith River chums was initiated in 2008.

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

The north and central coast IFMP (section 4) contains a synopsis of management activities. Escapement data is used pre-season to predict run sizes and plan salmon fisheries throughout the province. In-season, escapement data is used to regulate the Cumshewa Inlet, Nass, Kitimat, Kemano and Quaal rivers as well as Johnson Channel, and Roscoe Inlet chum fisheries.[25]

Scoring Rationale:

The escapement monitoring system relies primarily on stream inspections, augmented in some places with weirs and for the Skeena River a test fishery. These methods are documented in the client management summary and in the individual CUP's. As a general concern, the number of streams visited and the frequency of visits has been declining due to DFO budgetary limitations, and there is no documentation of what level of coverage (% of streams, number of visits) is adequate. The team identified a number of problems with chum salmon. Escapement of lower-Nass chums are not monitored. The very weak non-target area 4 stocks are not monitored by stream inspection, but only indexed through the Tyee test fishery. In the absence of this test fishery there would be no monitoring of area 4 chum.

Inner SC Chums have weak stocks (Burrard Inlet, Howe Sound, Sunshine coast) which are not monitored. While the conservation unit that contains these stocks appears to be stable, the inner S.C. chum CUP states "Howe and Burrard are also demonstrating improvements over the time series, however the escapement coverage in these areas is not consistent and these trends should be interpreted with caution"

[25] DFO, 2008 Northern BC Salmon IFMP, Section 4.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

All certification units meet the 60 SG scoring elements through the basic stream monitoring systems and the additional weir and test fisheries that are conducted. The team noted above concerns about the trend in monitoring effort and lack of evaluation of levels of escapement effort necessary for adequate monitoring but the team was satisfied that the current levels meet the 60SG.

The WCVI and Fraser Stocks meet the 80 SG scoring elements because of their intensity of escapement monitoring and the existing in season estimates (described throughout the appropriate CUP's). Management of WCVI and Fraser UoCs also goes part way towards meeting the first scoring element under the 100 SG. The lack of regular stock identification in-season means that many of the in-season indices do not apply to specific stocks to meet the 100 level SGs.

The lack of escapement estimates for some target stocks such as lower Nass chums means that the NCC fails to fully meet the first element of the 80SG. The lack of stream inspections for Area 4 chums means that the NCC fails to fully meet the 2nd 80SG scoring elements. In-season estimates of abundance are generally not available for NCC chum stocks and are not used in the north coast to regulate the fishery, thus the NCC fails to fully meet the 3rd 80SG. The irregular and declining escapement coverage of some inner South Coast stocks means that this certification unit fails to fully meet any of the 80 SG scoring elements, partial score is awarded.

Condition 1-2: For NCC and ISC chum salmon UoCs - An escapement monitoring program that is adequate to estimate the status of target stocks harvested in the NCCC and ISC chum salmon fisheries must be implemented by the second surveillance audit. Fishery independent indicators of abundance for non-target species harvested in these fisheries must be available for each year and area where fisheries are permitted to target chum salmon. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest.

1.1.2.3	The age and size of catch and escapement have been considered, especially for the target stocks.	• 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. *[For example: information on the age distribution of pink salmon harvests would not be considered important for stock assessment or*	• 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. • 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	• 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.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

		fisheries management decisions where as age information would be important for the assessment and management related to most chinook and sockeye fisheries. Monitoring programs should be in place to detect changes in the size of the fish harvested for each salmon species.]	these data.	
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 70** **Inner SC Chum: 70** **Fraser Chum: 70**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.5.2 outlines the general decision guidelines for pink and chum fisheries and illustrates how annual fisheries respond to available information.
- MS 3.2.3 outlines research priorities and summarizes some research efforts directly relevant to the management of salmon fisheries (e.g. enumeration methods, stock identification).
- MS 3.3 summarizes DFO's approach to integrated management and lists on-going initiatives.
- MS 4.2.1.1 describes how the annual planning cycle for BC salmon fisheries uses collaborative planning and public review to identify emerging concerns and develop management responses.
- CUP 3.2 explains the harvest strategy in each area.
- CUP 3.3 provides the details for each commercial fishery.
- CUP 5 reviews the current status of stock units, including trends in escapement, catch, exploitation rate, and size.
- CUP 6 describes the resulting conservation and recovery efforts.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

From NCC response master

Size and age of catch data are collected annually in all test fisheries. In commercial fisheries, size of catch information is collected through the sales slip program and periodically through fishery observer programs. Age of catch data are collected periodically through fishery observer programs. By-catch of non-target stocks and species is generally very low relative to target catch. However, information regarding catch and size of by-catch is also collected periodically through fishery observer sampling.

Age and size of escapement data are collected annually through sampling programs at the hatcheries (Kitimat and Snootli). Age data are also sampled annually from fish in rivers that are monitored for escapement. Age data are used for pre-season forecasting. Biological data are reported in pre-season forecasts and periodic stock status reviews.

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.

Sampling requirements for the test fisheries and the observer programs are determined based on statistical direction from DFO Science (Stock Assessment Division). Similarly, sampling requirements for age and size at age data from hatcheries returns are determined annually based on statistical direction from DFO Science Sampling of wild stocks assessed annually through the 'extensive' escapement program tends to be opportunistic with surveys crews sampling as many fish as possible. Periodically, a dedicated mark-recapture program is in place and field crews will biologically sample the population according to a sample plan

Sampling of wild stocks assessed annually through the 'extensive' escapement program tends to be opportunistic with surveys crews sampling as many fish as possible. Periodically, a dedicated mark-recapture program is in place and field crews will biologically sample the population according to a sample plan

Scoring Rationale:

The age/size sampling program is largely opportunistic and does not appear to be designed or evaluated. The age distribution is needed to build brood tables, and no evidence is presented that the sampling program is adequate for that task. The opportunistic sampling program in test fisheries etc. is sufficient to pass each certification unit at 60%, and the sampling programs meet the first 80 SG. However the lack of a documented, scientific design for the program mean that no certification units pass the second 80 SG.

Condition 1-3: For all chum salmon UoCs - By the second surveillance audit, the client or management agency must meet the requirements of the second 80 scoring guideposts. This shall include scientific analysis supporting justification of the existing sampling program.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
1.1.2.4	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.	• 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. • 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.	• There is adequate information to identify the harvest limitations and production strategies required to maintain the high productivity of the target stocks. • 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. • The harvest limitations for target stocks take into consideration the impacts on non-target stocks and the uncertainty of the productivity for these stocks.	• 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. • 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.
Weight		**Score**	**NCCC Chum: 80** **WCVI Chum: 80** **Inner SC Chum: 80** **Fraser Chum: 80**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.5.2 outlines the general decision guidelines for pink and chum fisheries and illustrates how annual fisheries respond to available information.
- MS 3.2.3 outlines research priorities and summarizes some research efforts directly relevant to the management of salmon fisheries (e.g. enumeration methods, stock identification).
- MS 3.3 summarizes DFO's approach to integrated management and lists on-going initiatives.

- MS 4.2.1.1 describes how the annual planning cycle for BC salmon fisheries uses collaborative planning and public review to identify emerging concerns and develop management responses.
- CUP 3.2 explains the harvest strategy in each area, and CUP 3.3 provides the details for each commercial fishery. CUP 5 reviews the current status of stock units, including trends in escapement, catch, exploitation rate, and size. CUP 6 describes the resulting conservation and recovery efforts.

From NCC response master: similar text in all CU

Annual escapement is the main performance measure for statistical areas, and for the index streams within each area … However, operational *Management Escapement Goals* (MEG) have been identified for many individual streams with regular observations of spawning chum and aggregated for statistical areas or major watersheds. These operational equivalents were developed by interviewing DFO managers, biologists and contract field enumeration staff who had considerable years of local knowledge of particular streams and corresponding escapements of salmonids. The MEG represent the best estimate by these local experts and are used in a non-technical way as the operational equivalent for long-term benchmarks reflecting highly productive stocks (i.e. high sustainable yields). The *Certification Unit Profiles* list escapement targets for major systems in each area.

Performance relative to genetic diversity objectives is measured in terms of the distribution across spawning sites in the CU, as well as the proportion of returns from wild and enhanced populations.

Decision guidelines for all BC pink and chum fisheries have some basic elements in common:

- Low-impact fisheries are generally implemented 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.
- Terminal fisheries are managed in-season based on estimated surplus to the escapement goal, with a precautionary buffer applied in both the abundance estimate and the timing of the fishery. Generally the required escapement is secured within the stream(s) and/or behind boundaries near the estuary location(s) before fisheries are allowed to proceed.
- Pre-season fishing plans use available data from previous years to anticipate stock levels returning in any given year. These pre-season plans are established through consultation with Departmental managers, biologists and scientists as well as industry and First Nations representatives. Fisheries commence each year using the established pre-season plan. As in-season catch and escapement data become available through the season, fishing plans are adjusted on a daily or weekly basis to reflect this ‘real-time’ data.
- Stock recovery strategies are reflected in the decision guidelines. These take the form of reduced harvests at low abundance of target stocks and selective fishing measures to reduce impacts on non-target stocks or species. In-season information may not provide a clear-cut indication of run status. In this case, management actions use a precautionary approach on stocks of concern.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

If stocks of concern cannot be monitored or selectively protected, broader area and time closures are specified pre-season

Scoring Rationale:

The MEG's combine with the in-season regulation to restrict harvest so that MEG's are obtained is a system that will assure stocks maintain any potential productivity. While there is little formal analysis of spawner-recruit data, the high variability in chum salmon rates of return will generally mean that there is a considerable range of stock sizes that assure productivity. Where non-target stocks are captured exploitation rates are kept low to reduce impact. All certification units meet the 60 SG and 80 SG scoring elements, but none meet the 100 SGs.

1.1.3 TAVEL Sub-Criterion	Management goals have been set and are appropriate to protect the stocks from decline to their Limit Reference Point or operationally equivalent undesirable low level of abundance.		
Weight		**Score**	

1.1.3.1	Limit Reference Points or operational equivalents have been set and are appropriate to protect the stocks harvested in the fishery.	• 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.	• 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. • There is no significant scientific disagreement regarding the LRP's used by the management agency to formulate management decision for the fishery.	• The Limit Reference Point for target stocks have been reviewed and found to be scientifically defensible and appropriate by the PSARC or the appropriate PSC technical committee. • There is general agreement among regional fisheries scientist outside the management agency that the LRP's are appropriate. • There is general scientific agreement regarding the LRP's for non-target species.
Intent		The Limit Reference Point (LRP) or operational equivalent set by the management agency has been defined above as "the state of a fishery and/or a resource, which is not considered desirable. Fishery harvests		

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

	should be stopped before reaching it. If a LRP is inadvertently reached, management action should severely curtail or stop the fishery, as appropriate, and corrective action should be taken. Stock rehabilitation programs should consider an LRP as a very minimum rebuilding target to be reached before the rebuilding measures are relaxed or the fishery is re-opened."		
Weight		**Score**	**NCCC Chum: 70** **WCVI Chum: 70** **Inner SC Chum: 70** **Fraser Chum: 70**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.3 provides a comprehensive inventory of goals and targets for BC pink and chum, including an explanation of management reference points currently in place, and formal benchmarks under development as part of the Wild Salmon Policy implementation.
- CUP 2.4 lists specific objectives and management reference points for each stock unit.

Scoring Rationale: Our interpretation of the existing BC chum management system in the context of the MSC target and limit criteria is that the management escapement goal is the target, and 25% of the MEG is the effective limit. The text of the outlook document indicates that management actions around the target and 25% of the target act much as other fisheries do with respect to targets and limits. This interpretation was confirmed by DFO staff. Thus the managers and biologists have agreed on MEG's and thus LRPs. There is some scientific basis for both the MEG's as escapement levels that have produced sustainable production and the LRPs at 25% are justifiable based upon general salmon biology. Thus the LRP's meet the first 80 SG. However, it is not accurate to say that there is no scientific disagreement about the levels chosen for LRPs and thus the certification units fail to meet the 2nd 80% scoring guideline.

Condition 1-4: For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish limit reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the LRPs chosen to formulate management decisions for the fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

1.1.3.2	Target Reference Points (TRPs) or operational equivalent have been set.	• There is general agreement among fisheries scientist within the management agency that the TRP's are appropriate for the target stocks. • 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. • The management agency has taken into account the relative productivity of the non-target stocks when setting the TRP's for the majority of target stocks.	• There is no significant scientific disagreement regarding the TRP's used by the management agency to formulate management decision for the fishery. • 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.	• The Target Reference Point (TRP) for target stocks have been reviewed and found to be defensible and appropriate by the PSARC or the appropriate PSC technical committee. • 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.
Intent		The Target Reference Point (TRP) or operational equivalent set by the management agency has been defined above as "the state of a fishery and/or a resource, which is considered desirable. Management action, whether during a fishery development or stock rebuilding process, should aim at maintaining the fishery system at its level."		
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 70** **Inner SC Chum: 70** **Fraser Chum: 70**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.3 provides a comprehensive inventory of goals and targets for BC pink and chum, including an explanation of management reference points currently in place, and formal benchmarks under development as part of the Wild Salmon Policy implementation.

- CUP 2.4 lists specific objectives and management reference points for each stock unit.

From NCC regional profile

However, operational *Management Escapement Goals* (MEG) have been identified for each of the over 500 streams with regular observations of spawning chum (Table 1), and aggregated for statistical areas. These operational equivalents were developed by interviewing DFO managers, biologists and contract field enumeration staff who had considerable years of local knowledge of particular streams and corresponding escapements of salmonids. The MEG represent the best estimate by these local experts and are used in a non-technical way as the operational equivalent for long-term benchmarks reflecting highly productive stocks (i.e. high sustainable yields).

Scoring Rationale:

Within the DFO Pacific Region, the Management Escapement Goals are the operational equivalent of TRPs, but these have not been reviewed either internally or externally. All certification units pass at 60 SG and meet the first scoring criterion for 80 SG, but do not meet the 2nd scoring criterion under the 80 SG.

Condition 1-5: For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish target reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the TRPs chosen to formulate management decisions for the fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

1.2 - MSC Criterion 2	**Where the exploited populations are depleted, the fisheries will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.**

Scoring Intent	The MSC Technical Advisory Board directs that this Criterion is only **Score**d in the instance that the candidate fishery stock is determined to be in a depleted state hence a recovery plan is already in action. The decision whether the fishery is in a depleted state will be made at the beginning of the Fishery Assessment process.
Team Intent	*Our interpretation of MSC Criterion 1.2: This criterion refers to "populations" where our indicators and evaluation criteria refer to stocks or stock units. The evaluation under this criterion will assess the degree to which the management strategy is designed to keep targeted stocks from becoming depleted, and to promote recovery if they become depleted. Note that this has already been partially assessed under Subcriterion 1.1.3.*

Weight	**13.6**	**Score**	**NCCC Chum: 65** **WCVI Chum: 70** **Inner SC Chum: 65** **Fraser Chum: 70**

1.2.1	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.	• In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks within 5 reproductive cycles • Stocks are allowed to recover to more than 125% of the LRP for abundance before any fisheries are permitted that target these stocks.	• In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks within 3 reproductive cycles. • Stocks are allowed to recover to more than 150% of the LRP for abundance before any fisheries are permitted that target these stocks.	• There are comprehensive and pre-agreed responses to low stock size that utilize a range of management measures to ensure rapid recovery. • Stocks are allowed to recover to the TRP before commercial fisheries are permitted that target these stocks. • The management agency does not use artificial propagation as a substitute

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

				for maintaining or recovering wild stocks.
Weight			**Score**	**NCCC Chum: 60** **WCVI Chum: 70** **Inner SC Chum: 60** **Fraser Chum: na**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 3.2.1 summarizes the processes for identifying species at risk and developing recovery plans. This covers all Canadian wildlife species.
- MS 3.2.2 describes the development and implementation of the *Wild Salmon Policy*, which focused on conservation and recovery planning for functionally distinct group of wild Pacific Salmon, called *Conservation Units*.
- MS 3.4 includes an inventory of major conservation and recovery efforts, including links to completed recovery plans. Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).

- CUP 3.3 for each fishery contains decision guidelines which outline how fisheries adapt to variations in abundance
- CUP 6 highlights specific conservation measures in each area.

The fundamental conservation objectives for Pacific salmon contained in national legislation and regional policies can be summarized as follows:

- Maintain healthy and diverse populations by conserving functionally distinct groups of salmon, called *Conservation Units*.
- Protect the integrity of each conservation unit by ensuring sufficient escapement for component populations.
- Monitor the status of conservation units relative to formal benchmarks for conservation and long term production.

DFO has established a comprehensive assessment and management system to work towards these objectives through close monitoring, adaptive management, habitat protection, and enforcement. For North and Central coast chum salmon, these fundamental objectives

translate into a cautionary approach to fisheries management, with a focus of identifying fishing opportunities in terminal areas based on in-season abundance estimates and observed escapements into the natal streams.

While Central Coast and Kitimat hatchery chum salmon stocks are reasonably healthy, other North Coast chum stocks have been either declining or in a depressed, but stable, state in recent years. The overall conservation objective for wild chum salmon in Areas 3 to 6 is to minimize fishery impacts to the greatest degree possible while still maintaining fisheries targeting other species.

Information provided in a March 2011 assessment report for ISC chum (DFO 2011) indicates that the exploitation rates for Area 12 chum stocks within the ISC UoC have been very low during the period when the escapements for these stocks have below their LRPs. The low returns for Area 12 chum stocks is a continued concern but the ISC chum fishery does not appear to be a significant factor affecting the rebuilding the Area 12.

Scoring Rationale:

This criterion is only applicable when stocks have been depleted. The Fraser chum fishery does not have any depleted stocks so it was not scored for this indicator.

We have scored MSC criteria 1.2 for each of the other CUPs because they include some stocks that have experienced depletion in the last 10 years (See the escapement figures in Appendix A, Figures A1 to A11 for NCCC, Figures A12 - A16 for WCVI, Figure A17 for Fraser River and Appendix B Figures 1-15 for ISC chum management units).

The management system focused on the MEG provides the basic system for management of the stocks, and as seen in the outlook document cited earlier under PI 1.1.3.1, fisheries are reduced when stocks fall below MEGs and dramatically reduced when escapements fall well below MEGs. So a system built around an escapement target with reduced fishing effort as MEGs are approached has a natural rebuilding plan. Because the management strategy is not explicitly stated, and no specific analysis was provided to demonstrate the relationship between escapement and exploitation rate, the team found it difficult to relate the MEG and associated limits to the specific criteria of this PI.

The team concluded that all certification units pass at 60 SG. Area 4 chums in the NCC appear to have been well below the LRP, but all targeted fisheries on wild stocks have been closed for a decade. Overall the basic approach of reducing harvest dramatically when the stock falls well below the MEG meets the 60 SGs. However, we note that there are considerable differences in overall performance by CU. The team concluded that none of the CUs meet the 80 SGs because the recovery strategy is not well formulated and described clearly to meet the 80 SGs. In practice, it appears that the strategy is generally preventing stocks from severe depletion but some stocks have remained well below the MEGs for a considerable period of time.

The Inner South Coast scored 60 because of the persistent low escapements in Upper Vancouver Island, Johnstone Strait, Kingcome, Bond

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

to Knight, Loughborough to Bute. While there is a rebuilding plan built into the overall framework, it is not working for these areas. Their continued low escapement appears to be largely due to environmental conditions because the data provided by DFO April 2011 shows current exploitation rates on these stocks in the range of 10%. .

In the North and Central Coast escapements for most areas in most years are well below the MEG despite the lack of targeted fisheries but most of the conservation units have been above the LRP. Figure 1-5 of the NCC CUP shows that areas 1 to 5 have averaged far below the MEG. Based on information collected through the Nisga'a fishwheel test fishing program, the Lower Nass chum stock has been severely depleted for some time. To date, no specific recovery plan has been formulated for lower Nass Chum stocks and therefore, the NCC did not meet any of the 80 SGs. A score of 60 was awarded to the NCC UoC because directed fishing on Lower Nass chum has been stopped for a decade.

Condition 1-6: For NCC, ISC and WCVI UoCs: By the second surveillance audit, the client or management agency must develop and implement (in the event of severe depletion) recovery plans to facilitate the recovery of depleted stocks to the MEG within three cycles given average rate of productivity. It is recognized that if stocks encounter a series of poor productivity years, even with little, if any, exploitation stocks may not recover in three cycles. The recovery plans must be defined to allow the stocks to recover more than 150% of the defined limit reference point prior to allowing any fishery to target the depleted stocks and the stock should be expected to recover to the MEG under the rebuilding plan. A recovery plan template must be developed and submitted for review and approval by the second annual surveillance audit.

1.2.2	Target stocks are not depleted and recent stock sizes are assessed to be above appropriate limit reference points (or equivalents) for the target stocks.	• 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. • Management actions have reduced fishing as the target stocks approach the LRP and fisheries have only resulted in escapements that approach or are	• 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. • 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	• 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. • Management actions have reduced fishing as the target stocks approach the LRP and fisheries have only resulted in escapements that approach or are

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

		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.	escapement goal in one year in a period of the most recent 5 consecutive years, for any of the target stocks.	below the LRP escapement goal in one year in a period of the most recent 10 consecutive years, for any of the target stocks.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 70** **Inner SC Chum: 70** **Fraser Chum: 70**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- Chapter 5 of each certification unit profile describes the status of target stocks in each area.

From NCC Chum CUP Chapter 5

Target stocks of the North and Central coast chum fisheries are not in a depleted state; although there is some need to adjust stock specific harvest strategies in recent years due to low abundances. In most cases, over the recent period of record there is no evidence that over-harvesting and under-escapement led to subsequent poor returns in these chum populations. The major driver of recently observed declines appears to be related to marine productivity driven by large-scale climatic change, such as El Nino events.[26] For example, the 2005 sea-entry year was apparently universally unfavorable for all salmon. Poor marine survival from the 2004 brood resulted in extremely few 3-year-old and 4-year-old chum in 2007 and 2008, respectively, and low expectations for 5-year old return in 2009.

[26] Beamish, R.J., D. Noakes, G. McFarlane, W. Pinnix, R. Sweeting, J. King and M. Folkes. 1998. Trends in coho marine survival in relation to the regime concept. Canadian Stock Assessment Secretariat research document; 98/171, 26p.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

From the WCVI Chum CUP Chapter 5

5.2.1 Conservation priorities
Currently, WCVI chum populations are healthy enough not to warrant a legislated level of protection. The major factor contributing to low production in recent years is low marine productivity. Even with low productivity, the persistence of WCVI chum populations is not immediately threatened. However, if the conservation unit declined to a point where its persistence was threatened, the Canada Species at Risk Act (SARA) provides a legislative and policy framework for recovery.

Deserted River chum have been identified as a conservation priority, and local measures have been implemented in Nootka fisheries (Section 3.3.2).

5.2.2 Production objectives
Chum production is generally quite variable. Productivity of the WCVI aggregate has been average to above average in recent years (2001 to 2006); although 2007 and 2008 returns suggest a downturn in productivity most likely related to lower than normal marine survival rates. Marine conditions in 2005 appear to have been particularly poor for juvenile chum and other salmonids. Recent fisheries management has responded appropriately to fluctuations in productivity: in years of low returns, fishing mortality has been constrained (e.g. 2000, 2008; Table 8)

5.2.3 Trends

5.2.3.1 Abundance
Annual returns of WCVI chum are summarised in Table 3. Average total estimated return for the period 1995 to 2008 is 1.11 million chum (range: 220,000 – 2.25 million; Table 3). Area 21/22 (Nitinat) returns are the largest, averaging about 60% of the annual WCVI chum return over the 1995 to 2008 period. Area 25 (Nootka) is about 20% of the annual return and populations originating from other areas contribute less than 10%. Correlations between adult chum returns and conditions during the early marine phase of the life history (e.g. sea surface temperature, euphausiid density) have been identified, but no formal analysis has been published.

From the ISC Chum Chapter 5

5.2.1 Conservation priorities

Currently, Inner South Coast chum populations are healthy enough not to warrant a legislated level of protection. The major factor

contributing to low production in recent years is low marine productivity. Even with low productivity, the persistence of Inner South Coast chum populations is not immediately threatened. However, if any of the conservation units declined to a point where its persistence was threatened, the Species at Risk Act (SARA) provides a legislative and policy framework for recovery.

5.2.2 Production objectives
Chum production is generally quite variable. Productivity of the Inner South Coast chum aggregate has been average to below average in recent years, most likely related to lower than normal marine survival rates. Marine conditions in 2005 appear to have been particularly poor for juvenile chum and other salmonids. Recent fisheries management has responded appropriately to fluctuations in productivity: in years of low returns, fishing mortality has been constrained.

From Fraser River Chum Chapter 5

5.2.1 Conservation priorities
Currently, Fraser chum populations are healthy enough not to warrant a legislated level of protection.

Fraser chum escapements have tripled compared to the historical average, from a 600,000 average over 1953-2000 to a 2 Million average over 2001-2007. Fraser chum populations have remained strong in recent years despite the low marine productivity that has affected other species and populations of Pacific salmon. If the conservation units in the Fraser watershed did decline to a point where their persistence was threatened, the Canada Species at Risk Act (SARA) provides a legislative and policy framework for recovery.

5.2.2 Production
Chum production is generally quite variable and low relative to other species (Ryall et a. 1999). Productivity of the Fraser chum conservation unit has been average to above average in recent years (2001 to 2007), with no evidence for a drastic downturn in productivity in 2007 as other stocks have experienced. Marine conditions were particularly poor in 2005 resulting in relatively poor survivals for other species and populations of salmon that migrated to the ocean in 2005. This could result in poorer productivity for Fraser chum returning in 2008 when most of these fish (41 fish) migrated to the ocean.

5.3 Trends
5.3.1 Abundance

Estimates of total run size for Fraser River chum salmon averaged 2.3 Million over the period 1995 to 2007, ranging from 800,000 to 3.9 Million.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Scoring Rationale:

Information on stock status for the four units of certification can be found in Section 5 above and trend summary graphs are located in Appendix A and B. Data from the indicator stream assessment programs in all certification units indicate that the escapement and exploitation rate estimation methodologies are scientifically defensible for the majority of target chum stocks.

There are persistent escapements below the LRP in Area 3 and Area 4 of the NCC, but these do not constitute a majority of the conservation units within this certification unit. Thus the NCC unit of certification meets the second 60SG scoring element, but does not meet the second 80SG.

Information provided in a March 2011 assessment report for ISC chum (DFO 2011) and the CUP's for NCCC, WCVI and Fraser chum (Appendix A) suggests that both 60SGs have been met for each UoC. However, each UoC includes at least one target stock that has been below its defined LRP at least once in the last 5 years, so none of the UoC meet the 2nd 80 SG.

For the Inner South Coast chums, there are a number of management units with escapements that have been consistently below the interim LRPs for these management units. DFO (2011) set the interim LRPs at 25% of the Sustainable Escapement Goal (SEG) (Appendix A). This recent assessment also provided evidence that exploitation rates on the management units of concern have been reduced to very low levels. Five of the 11 areas within ISC do not meet the 2nd 60 SG criteria of being above the LRP for 3 of 5 recent years. However, it is important to note that the fishery has been almost completely curtailed in response to low population status for these subareas. Howe Sound was of major concern during the team's initial evaluations because of the lack of escapement monitoring by DFO in this area. However, DFO (2011) included additional escapement data for Howe Sound chum from First Nation monitoring programs. These data indicate that observed escapements in recent years (2007-09) have been close to the upper end of the SEG range proposed for Howe Sound chum. The escapement estimates expanded to account for unmonitored streams in Howe Sound have exceeded the SEG range in most years since 2004.

Management actions have clearly reduced fishing effort as LRPs are approached, thus 60 scoring guideposts are met. However in each certification unit there are questions about individual stocks which results in the first and second scoring elements of the 80SG only being partially met.

Condition 1-7: For all chum salmon UoCs. By the second annual surveillance audit, the client or management agency must attain general agreement that the methods of estimating escapement and exploitation rates for all target stocks are scientifically defensible and the management agency must formally establish the LRPs, as required under condition 1-4. The status of each target stock should be reviewed, and where the stock is approaching the defined LRP, the exploitation rate on the stock should be estimated. The management agency must report what actions have been taken to reduce fishing as the target stocks approach the LRP and must demonstrate that

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

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.

1.3 - MSC Criterion 3	**Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.**		
Intent	Our interpretation of MSC Criterion 1.3: The effects of fishing on the "reproductive capacity" of the target stocks have already been partially assessed under criterion 1.1 and 1.2. Criterion 1.3 considers specific concerns about impacts of fishing on age, size, sex and genetic structure of (target) stocks. Because genetic structure is very difficult to determine in most exploited fish stocks, impacts on component stocks (i.e. the stocks that comprise a stock unit) are used as a proxy at the 80 scoring level. Also included in this indicator is an assessment of the management agency's ability to identify and manage the potential impact of enhanced stocks on wild stocks.		
Weight	**7**	**Score**	**NCCC Chum: 93** **WCVI Chum: 93** **Inner SC Chum: 93** **Fraser Chum: 93**

1.3.1	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.	• 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. • 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. • The management system	• 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. • 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. • The management system includes provisions to minimize any adverse	• 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. • Management actions are consistent with maintaining healthy target stocks relative to biological characteristics such as age, size, sex and genetic

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
		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.	impacts to the genetic structure of un-enhanced stocks that may be due to the enhancement of other stocks.	structure of all target stocks. • Enhanced fish are identified and managed as separate target stocks.
Weight		**Score**		**NCCC Chum: 93** **WCVI Chum: 93** **Inner SC Chum: 93** **Fraser Chum: 93**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 3.2.2.4 summarizes the comprehensive approach developed for identifying conservation units of the five Pacific salmon species under federal responsibility, based on a combination of the ecological context, the life history of each population, and genetic population structure.
- Table 1 of each unit profile compares the conservation units to management areas, and lists the component populations.
- CUP 2.1 describes the stocks units and population characteristics for pink and chum salmon in each area.

Information is collected annually on the age, size and sex of the catch and escapement of North and Central coast chum stocks. These data are collected though directed sampling programs. Catch is biologically sampled annually in various test fisheries and periodically from commercial fisheries through observer programs. Full bio-sampling of the Snootli and Kitimat hatchery returns is conducted annually (i.e. sex, age, size, fecundity). As well, wild escapement is sampled annually for age and sex in rivers that are surveyed for abundance.

The objective of Canada's Wild Salmon Policy is to maintain the biodiversity of salmon stocks. Standardized statistics to monitor and report performance of the management system to achieve this objective are being developed. They will be implemented over the next few years for North and Central coast salmon stocks.

In the meantime, there is no evidence to suggest that fisheries are selecting for altered age composition of the target stocks. The proportion of the three predominant adult age classes of returning chum is variable from year to year; there does not seem to be any deterministic trend

over time. As well, the sex and size compositions have remained fairly constant over time.

Stock enhancement plans are reviewed annually by biological staff of the Salmon Enhancement Program (SEP). They ensure that broodstock collection and release targets and consistent with the SEP guidelines. Among other things, these detailed guidelines specify maximum allowable portions of enhanced return. They were designed to minimize adverse impacts to the genetic structure of un-enhanced stocks that may be due to the stock enhancement.

Scoring Rationale:

The long experience with Pacific salmon in B.C. and elsewhere suggest that the major threats to age, genetic and sex structure of populations would come from either highly selective fishing practice or interaction between wild and hatchery fish. Since chum salmon are captured as they return to spawn in we expect little impact on age at maturity and any sex specific selective pressure would not have long term consequences unless the fishery was highly selective of females and the actual escapement was dominated by males. The majority of fish are captured by purse seine which is not a selective gear.

The major potential area of concern is therefore associated with hatchery impacts on wild stocks, and in all certification units except the Fraser the scale of enhanced return to wild return is significant reaching over 50% for some areas. There is monitoring of size and age in most of these highly enhanced areas, and the SEP operates with brood stock guidelines designed to minimize the impacts of enhanced stocks on wild stocks. The 60 SG scoring elements are met by the monitoring systems in place. We did not feel that the knowledge is comprehensive and thus all units failed to meet the first 100% scoring guideline.

11.3 Principle 2 Scoring Results

Table 8: MSC Principle 2: Individual Performance Indicator Scoring Summary (NCCC and WCVI)

Summary for BC Chum Salmon Units of Certification		Weighting	NCCC Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100					WCVI Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100				
					1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5			1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5
PRINCIPLE 2 - Ecosystem and Non-Target Populations		0.333		**85**																		**85**															
Criterion 2.1 - Maintain natural functional relationships among species		0.500		**92**																		**92**															
Indicator 2.1.1	Impacts on ecosystem processes can be identified	0.286	90					X	X				X	X	X				X	X		90				X	X				X	X	X				X	X
Indicator 2.1.2	Provisions to reduce ecosystem impacts	0.143	92				X	X	X				X	X	X							92			X	X	X				X	X	X					
Indicator 2.1.3	Sufficient research on ecosystem impacts	0.143	95					X	X				X	X	X					X		95					X				X	X	X					X
Indicator 2.1.4	Escapement goals address ecosystem needs	0.143	95			X	X	X	X			X	X	X	X	P			X	X	X	95		X	X	X	X			X	X	X	X	P		X	X	X
Indicator 2.1.5	Research on effects of non-fishing activities	0.286	90					X	X				X	X	X	P	P	P	X	X		90				X	X				X	X	X	P	P	P	X	X
Criterion 2.2 - Fishery minimizes impacts on endangered, threatened or protected species		0.250		**93**																		**93**															
Indicator 2.2.1	Information on biological diversity used by managers	1.000	93					X	X				X	X	X			P		X		93				X	X				X	X	X			P		X
Criterion 2.3 - Fishery allows for the recovery of depleted stocks (Non-target Stocks)		0.250		**62**																		**62**															
Indicator 2.3.1	Provide for recovery of non-target stocks	1.000	62					X	X				P					P				62				X	X				P					P		

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Table 8: MSC Principle 2: Individual Performance Indicator Scoring Summary cont…(ISC and Fraser)

Summary for BC Chum Salmon Units of Certification		Weighting	ISC Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100					Fraser Chum	Weighted Scores	Criteria @ 60					Criteria @ 80						Criteria @ 100				
					1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5			1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5
PRINCIPLE 2 - Ecosystem and Non-Target Populations		0.333		**85**																		**85**														
Criterion 2.1 - Maintain natural functional relationships among species		0.500		**92**																		**92**														
Indicator 2.1.1	Impacts on ecosystem processes can be identified	0.286	90					X	X				X	X	X					X	X	90				X	X				X	X	X				X	X
Indicator 2.1.2	Provisions to reduce ecosystem impacts	0.143	92				X	X	X				X	X	X							92			X	X	X				X	X	X					
Indicator 2.1.3	Sufficient research on ecosystem impacts	0.143	95					X	X				X	X	X						X	95				X	X				X	X	X					X
Indicator 2.1.4	Escapement goals address ecosystem needs	0.143	95			X	X	X	X			X	X	X	X	P			X	X	X	95		X	X	X	X			X	X	X	P		X	X	X
Indicator 2.1.5	Research on effects of non-fishing activities	0.286	90					X	X				X	X	X	P	P	P	X	X		90				X	X				X	X	X	P	P	P	X	X
Criterion 2.2 - Fishery minimizes impacts on endangered, threatened or protected species		0.250		**93**																		**93**														
Indicator 2.2.1	Information on biological diversity used by managers	1.000	93					X	X				X	X	X			P		X		93				X	X				X	X	X			P		X
Criterion 2.3 - Fishery allows for the recovery of depleted stocks (Non-target Stocks)		0.250		**62**																		**62**														
Indicator 2.3.1	Provide for recovery of non-target stocks	1.000	62					X	X				P					P				62				X	X				P					P		

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

MSC Principle 2	**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.**

MSC Intent	*The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.*
Team Intent	The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem. The criteria and indicators developed are limited to the impacts of fishing operations and the response and effectiveness of the regulatory system to impacts external to the commercial fishing operations, such as other harvests, climate change, and habitat degradation. We acknowledge that forces other than commercial fishing may result in a fishery being unsustainable, and that these may be anthropogenic or natural forces. This certification process addresses the impact of commercial fishing on the harvested stocks and the ecosystem, and the response of fishers and managers to changes in external environmental factors.

Weight	**33**	**Score**	**NCCC Chum: 85** **WCVI Chum: 85** **Inner SC Chum: 85** **Fraser Chum: 85**

2.1 - MSC P2 Criterion 1	**The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to tropic cascades or ecosystem state changes.**
Intent	The performance indicators listed under criteria 1 evaluate impacts on marine systems (bycatch and biomass removal) and on freshwater systems (adequacy of escapements in maintaining the ecosystem and integrity of watersheds). These indicators are: 1) the adequacy of management plans, data collection and monitoring of directed marine fisheries on by-catch; 2) the adequacy of escapement objectives to address the freshwater ecosystem concerns. The degree to which the information is collected in the management of the fisheries under Principle 1 will apply for determining if this criterion is adequately addressed and will influence the evaluation scores.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Weight	**50**	**Score**	**NCCC Chum: 92** **WCVI Chum: 92** **Inner SC Chum: 92** **Fraser Chum: 92**

2.1.1	The management plan for the prosecution of the fisheries provides a high confidence that direct impacts on non-target species are identified.	• Data on bycatch in the majority of the fisheries are available to determine impacts on non-target species.	• A monitoring program exists that provides estimates of bycatch. • In known problem areas of high bycatch, there is an ongoing monitoring program.	• 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.
Intent		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		
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum fisheries are subject to extensive monitoring, assessment, and reporting requirements for target and non-target species.

- MS 1.2.7.4 briefly describes the selective fishing policy.
- MS 3.2.4 recounts the development and implementation of selective fishing measures in BC salmon fisheries, and includes links to mortality studies from different fisheries.
- MS 1.2.9 describes collaborative initiatives related to the changing structure of Pacific salmon fisheries, which include strong elements of enhanced monitoring and reporting.
- MS 2.4 describes the current monitoring and assessment approach, and more specifically;
- MS 2.4.2.5 discusses catch monitoring programs in the different fisheries, including provisions for reporting any harvest of non-target species.
- MS 2.5.4.3 describes measures that have been implemented to control incidental harvest of non-target stocks and by-catch of non-target species.
- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for selective fishing and by-catch reporting.
- MS 3.4 includes an inventory of major conservation and recovery efforts, including measures to reduce by-catch of particular stocks or species of concern.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).
- Decision guidelines for each fishery in CUP 3.3 outline measures to reduce by-catch of non- target species. CUP 6 highlights specific conservation measures in each area.

In January 2001, the Department released *A Policy for Selective Fishing in Canada's Pacific Fisheries*. The policy lays out the department's objectives and principles for selective fishing as part of a long-term strategy for conservation and sustainable use. The policy outlines the responsibilities of harvesters for continuous development and implementation of new selective techniques and practices. The policy was based on the results of the intensive 4-year *Selective Fisheries Program* (Section 3.2.4.2), in which DFO researchers and harvester groups experimented with a variety of methods to reduce the impact of fisheries on non-target species, with a number of measures reaching implementation in fisheries. The policy defines selective fishing *a*s the ability to *" avoid non-target fish, invertebrates, seabirds, and marine mammals or, if encountered, to release them alive and unharmed"*.

The *Selective Fishing Policy* clearly identifies the need for continuous improvement of gear and practices, and establishes strong incentives by linking that continuous improvement to future fishing opportunities. The policy lists an overarching objective and five principles. The full text of the *Selective Fishing Policy* is available at http://www-comm.pac.dfompo.gc.ca/publications/selectivep_e.pdf

The objective is to ensure that selective fishing technology and practices are adopted where appropriate in all fisheries in the Pacific Region, and that there are continuing improvements in harvesting gear and related practices. Selective fishing is a requisite element of conservation-

based fisheries. In meeting conservation objectives, fishing opportunities and resource allocations will be shaped by the ability of all harvesters – First Nations, commercial and recreational anglers – to fish selectively.

Implementation of the *Selective Fishing Policy* focuses on two priorities:

- Avoidance of non-target species is the best possible option in selective fishing. Test harvests on stock abundance, timing, and migration routes can supply valuable data to help develop fishing strategies that avoid non-target species or stocks of concern. Licensed harvesters can also play a role by informing the Department if stocks of concern are encountered. This may require improved communications and a shift in the practices of licensed harvesters who may be accustomed to keeping such information confidential.
- The next best option involves releasing non-target fish, invertebrates, seabirds, and marine mammals encountered (and captured) alive and unharmed, or in the best possible condition, to maximize survival. Fish released that would not likely survive long enough to reproduce should be counted as mortalities, along with all retained fish. Fisheries and Oceans Canada is interested in developing ways of estimating spawning success of released fish.

Section 2.5.4 of the Management Summary describes general conservation measures in BC pink and chum fisheries. Section 3.2.4 of the Management Summary recounts the development and implementation of selective fishing measures in BC salmon fisheries.

Scoring Rationale:

Based on the client submittal, there are extensive monitoring programs and reporting requirements, often by logbooks, for all of the fisheries. Consequently the fishery passed on the first scoring element one under the 60 SGs and the first and second scoring elements under the 80SG scoring SGs. The definition of bycatch is the harvest of non-target species or stocks, therefore, the catch data do not include statistics for non-target species which are released as a condition on license and where logbooks are required, the rigor and cross checking of data are limited with test fisheries or other observer programs essential to provide reliable estimates of fish caught and discarded.

Under the 100SG scoring issues, the first was not met, while the second was, all available data is readily available and summarized for stakeholder groups and external reviewers. Therefore, merit was awarded for the second scoring element under the 100SG. Through testimony provided during the fishery visits and through the client submission, the team had no evidence that gear loss was considered significant for chum fisheries. As it has not been considered as an issue, we have considered it not to be applicable and have not scored this scoring element. Consequently based on one of two of the bullets being met under the 100 SG, we scored this component at 90 for all of the chum fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

2.1.2	The management system includes measures to reduce marine ecosystem impacts	• 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 mortality problems and has procedures that are followed to limit bycatch.	• 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.	• 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.
Intent		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.		
Weight			**Score**	**NCCC Chum: 92** **WCVI Chum: 92** **Inner SC Chum: 92** **Fraser Chum: 92**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- BC pink and chum fisheries are continuously adapted to reduce marine ecosystem impacts.
- MS 3.3 describes integrated management projects, and;
- MS 3.2.3.7 summarizes research into Pacific salmon and their ecosystem.
- MS 2.5.4.4 outlines measures and initiatives in place to control marine ecosystem impacts.

- CUP 5 includes details about stock status and key indicators related to ecosystem impacts (e.g. long-term trends in abundance, exploitation rate, and stock composition)

Also refer to relevant sections for MSC Indicator 2.1.1

Scoring Rationale:

Chum salmon fisheries are highly focused in space/ time and do not have a reputation for impacting marine mammals or seabird bycatch. Historical log book data have not identified problems on ecosystem impacts. The primary impact would be competition for adult salmon from piscivorous marine mammals that are competing for the same resources. DFO provided in their response the actions taken and research on marine ecosystem impacts related to these fisheries. The first and second scoring elements of the 60SG level were met and the material provided suggested a robust process to address these impacts if problems do arise (80SG scoring elements one, two, and three) so the 80 SG was judged to have been met. Under the 100 SG scoring SGs, there apparently has been no risk assessment nor has the impact of the fishery on the marine ecosystem been explicitly addressed in the fisheries management plan as required under the first and second scoring elements (bullets one and two). The remaining three scoring elements were considered to be met as the process is available, along with monitoring data if marine ecosystem issues arise in the future. As three of five scoring elements were met under the 100SG, a score of 92 was assigned for all of the chum fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

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 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.	• 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.	• 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 mortality problems arise. • The management agency has supported the development of more selective fishing practices.
Intent		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.		
Weight			**Score**	**NCCC Chum: 95** **WCVI Chum: 95** **Inner SC Chum: 95** **Fraser Chum: 95**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- Refer to MSC Indicator 3.1.5 for an overview management responses to new information.

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- Refer to MSC Indicator 3.2.1 and 3.2.2 for information about research and assessment programs.
- MS 3.2.3 summarizes salmon research priorities, describes the 5- year research agenda, and includes links to relevant research organized by topic area (e.g. salmon and their ecosystem).
- MSC Indicator 3.4.2.1 for the process of identifying conservation concerns and developing recovery initiatives.
- Good illustrations of collaborative research and implementation are the Selective Fisheries Program (MS 3.2.4), the Wild Salmon Policy (MS 3.2.2), recovery strategies for endangered or threatened species listed under the Species at Risk Act (MS 3.4), and integrated management initiatives, which support research into large-scale, long-term impacts of human activities in marine and coastal ecosystems (MS 3.3).

BC pink and chum fisheries are managed to address time- and area-specific concerns over incidental harvests and by-catch through restrictions on location, timing, gear, and retention for net and troll fisheries.

- MS 3.4 includes a comprehensive inventory of conservation objectives and resulting recovery initiatives.
- MS 2.5.4 summarizes specific conservation measures implemented in pink and chum fisheries.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).

Scoring Rationale:

The agency has a very lengthy history and reputation as a research organization that have addressed ecosystem related problems related to salmon fisheries. DFO has a history and procedures as identified in their submittal of collecting data on bycatch, incorporating this information into management actions and responding to data provided outside of their agency. Consequently all of the 60SG scoring guidelines were met. The identification of new problems, such as the coho fishery, have resulted in major changes and responses in management and there are continual active ongoing between season processes addressing new findings and altering fisheries management plans, hence all of the 80 scoring guidelines were met. At the 100SG, there does not appear to be a detailed understanding or ongoing research on the impacts of the fishery on marine ecosystem impacts, although this is driven by lack of any apparent problem or viable hypotheses where ecosystem impacts are considered to be likely. The agency has a history of actions related to new information, including mandating selective fisheries and fisheries closures, resulting in 3 of the four scoring elements at the 100% scoring level being met with a resulting score of 95 for all of the chum fisheries.

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2.1.4	The management system supports research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs.	• The management system supports research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs.	• Ongoing research is supported to determine the impacts of carcass on freshwater ecosystem processes and identify any 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.	• 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.
Intent		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 aquatic system nutrient requirements and piscivore food requirements are incorporated into the management system.		
Weight			**Score**	**NCCC Chum: 95** **WCVI Chum: 95** **Inner SC Chum: 95** **Fraser Chum: 95**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- Refer to MSC Indicator 3.1.5 for an overview management responses to new information.
- Refer to MSC Indicator 3.2.1 and 3.2.2 for information about research and assessment programs.
- MS 3.2.3 summarizes salmon research priorities, describes the 5- year research agenda, and includes links to relevant research organized by topic area (e.g. salmon and their ecosystem).
- Refer to MSC Indicator 3.4.2. for the process of identifying conservation concerns and developing recovery initiatives.

- Good illustrations of collaborative research and implementation are the Selective Fisheries Program (MS 3.2.4), the Wild Salmon Policy (MS 3.2.2), recovery strategies for endangered or threatened species listed under the Species at Risk Act (MS 3.4), and integrated management

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

initiatives, which support research into large-scale, long-term impacts of human activities in marine and coastal ecosystems (MS 3.3).

BC pink and chum fisheries are managed to address time- and area-specific concerns over incidental harvests and by-catch through restrictions on location, timing, gear, and retention for net and troll fisheries.

- MS 3.4 includes a comprehensive inventory of conservation objectives and resulting recovery initiatives.
- MS 2.5.4 summarizes specific conservation measures implemented in pink and chum fisheries.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).

Scoring Rationale:

DFO has conducted research on ecosystem needs of salmon escapement, such as use of salmon runs by bears and nutrient loading related to salmon carcasses. In general with chum salmon fisheries, these needs are provided if sufficient fish escape to provide for recruitment for the next generation of salmon. There is continual research on this subject and ongoing research results are continually being brought into the management system. Consequently the 60 and 80 SGs are met. Although there is research ongoing, the tradeoffs for meeting ecosystem needs for chum fisheries has not explicitly been expressed in the research so a partial credit is given for the first scoring element under the 100SG and full credit for the second scoring element for a score of 95.

2.1.5	The management system supports research efforts to understand human caused impacts on the environment caused by non-fishing activities (e.g., aquaculture, climate change, water removal, water quality, timber harvests, agriculture, etc.); the effect of these impacts on salmon production and incorporates this information into harvest management plans and escapement goals.	• There is some information on the effects of human caused environmental impacts on natural salmon productivity and capacity and the general magnitude of impacts is known. • Management attempts to minimize or mitigate impacts of some human caused impacts on the environment. • Non-fishing related human caused impacts on the environment are considered when	• Management has some research to evaluate effects of major environmental impacts on natural salmon productivity and capacity, though quantitative estimates not always available. • Management has track record for attempting to minimize or mitigate impacts of human caused environmental impacts. • Results and conclusions from research are made available to stakeholders and there are on-going efforts to incorporate this information	• Management has research program to evaluate effects of human impacts on the environment, including cumulative effects of smaller impacts, on natural salmon productivity and capacity. • Management has a track record for implementing research findings to minimize or mitigate impacts of human caused environmental change. • Results and conclusions from

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		developing harvest plans and escapement goals, if necessary.	when developing harvest plans and escapement goals, if necessary.	research are made available to stakeholders and findings of lost production are used to re-evaluate harvest plans and escapement goals, if necessary.
Intent		The intent of this indicator is to encourage the collection of data in freshwater, estuarine and the marine environment that can be used to evaluate changes in salmon survival and the capacity of the habitat to support salmon so that changes in harvests or escapement goals can be made, if necessary, to sustain natural populations.		
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- Refer to MSC Indicator 3.1.5 for an overview management responses to new information.
- Refer to MSC Indicator 3.2.1 and 3.2.2 for information about research and assessment programs. In particular, MS 3.2.3 summarizes salmon research priorities, describes the 5- year research agenda, and includes links to relevant research organized by topic area (e.g. salmon and their ecosystem).
- Refer to MSC Indicator 3.4.2.1 for the process of identifying conservation concerns and developing recovery initiatives.
- Good illustrations of collaborative research and implementation are the Selective Fisheries Program (MS 3.2.4), the Wild Salmon Policy (MS 3.2.2), recovery strategies for endangered or threatened species listed under the Species at Risk Act (MS 3.4), and integrated management initiatives, which support research into large-scale, long-term impacts of human activities in marine and coastal ecosystems (MS 3.3).

BC pink and chum fisheries are managed to address time- and area-specific concerns over incidental harvests and by-catch through restrictions on location, timing, gear, and retention for net and troll fisheries.

- MS 3.4 includes a comprehensive inventory of conservation objectives and resulting recovery initiatives.
- MS 2.5.4 summarizes specific conservation

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- measures implemented in pink and chum fisheries.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).

Scoring Rationale:

As chum salmon fisheries are based on real time assessments and abundance, the fishery is adjusted to accommodate decreased runs from all causes, including those related to habitat destruction, global warming, or fish farming. There are ongoing research programs to help define these and other causes for fisheries declines and active program in DFO for reducing and mitigating man-made impacts on the freshwater and marine environments. This is manifest in the Fisheries Act and the recent Wild Salmon Policy. Consequently, all of the SGs at the 60 and 80 level have been met. At the 100 level, there is partial addressing of the overall impact of human environmental reduced changes but the understanding of cumulative long term large scale development on the future of salmon fisheries is limited and the ability of the management agency to address those changes to truly limit fisheries reductions in heavily developed or populated areas is difficult to address or answer. Although the results from research are readily available, with chum fisheries there appears to be limited formal adjustment of harvest plans or escapement goals based on this information alone. Therefore we assigned a partial score for all of the scoring elements under the 100SG resulting in a score of 90%.

2.2 - MSC P2 Criterion 2	**The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels, and avoids or minimizes mortality of, or injuries to endangered, threatened, or protected species.**		
Intent	This criterion focuses on direct impact of the fishery on non-target species and the adequacy of fisheries management for the target species to ensure significant sub-components of the target species are adequately protected such that they contribute to the genetic diversity of the target population. The impacted species of concern include icon species, such as marine mammals, bears, coastal wolves, and eagles. We also address the issue of harvests of fish stocks that have been created or enhanced through fisheries enhancement activities, such as fish hatcheries and spawning channels. Our concern is that the 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.		
Weight	**25**	**Score**	**NCCC Chum: 93** **WCVI Chum: 93** **Inner SC Chum: 93** **Fraser Chum: 93**

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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.	• 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.	• 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 harvest reduction when biodiversity concerns are identified for target or non-target species.	• 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 components, of the targeted species.
Weight		**Score**	**NCCC Chum: 93** **WCVI Chum: 93** **Inner SC Chum: 93** **Fraser Chum: 93**

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Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum fisheries are managed based a comprehensive suite of objectives, including the conservation of biological diversity.

- Refer to MSC Indicator 3.1.1 for a detailed inventory of objectives.

- The legal basis for conserving biological diversity in Canada is the Species at Risk Act (MS 1.1.2.4)

- The policy framework for conserving the biological diversity of wild salmon is mapped out in the Wild Salmon Policy (MS 3.2.2)

- MS 1.2.7.4 briefly describes the selective fishing policy.
- MS 3.2.4 recounts the development and implementation of selective fishing measures in BC salmon fisheries, and includes links to mortality studies from different fisheries.
- MS 1.2.9 describes collaborative initiatives related to the changing structure of Pacific salmon fisheries, which include strong elements of enhanced monitoring and reporting.
- MS 2.4 describes the current monitoring and assessment approach, and more specifically,
- MS 2.4.2.5 discusses catch monitoring programs in the different fisheries, including provisions for reporting any harvest of non-target species.
- MS 2.5.4.3 describes measures that have been implemented to control incidental harvest of non-target stocks and by-catch of non-target species.
- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for selective fishing and by-catch reporting.
- MS 3.4 includes an inventory of major conservation and recovery efforts, including measures to reduce by-catch of particular stocks or species of concern (i.e. marine species listed as threatened or endangered under the Species at Risk Act).
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).
- Decision guidelines for each fishery in CUP 3.3 outline measures to reduce by-catch of non- target species.
- CUP 6 highlights specific conservation measures in each area.

Scoring Rationale:

Chum fisheries have been examined in the conservation stock units for management under the Wild Salmon Policy for aggregations that can be

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

identified to maintain the genetic integrity of the fisheries. Specific research and management actions are designed to identify threats to biodiversity of the target fisheries or of the non-targeted depleted subcomponents of these fisheries. In general, these management units for monitoring and adjusting terminal fisheries are below the Conservation Unit level. The fisheries have minimal icon or endangered species bycatch so it is unlikely that these fisheries will be impacting endangered or icon species although improved monitoring of white sturgeon and steelhead bycatch in selected areas needs to be implemented. Consequently, all scoring elements at the 60 and 80 SGs have been assessed as being met. At the 100 level, there has not been a formal risk assessment (scoring element 1) nor are the migration and timing of substocks (scoring element 3) well known so partial credit only is given for this scoring element. There is a general understanding of stock composition and of the likelihood of encountering endangered or other highly protected or icon species and the management system contains provisions to address problems of harvesting these protected components should they arrive. Consequently a score of 93 was established based on partial credit on third scoring element and full credit on scoring elements 2 and 4 at the 100 level.

2.3 - MSC P2 Criterion 3	**Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.**		
MSC Scoring Intent	The MSC Technical Advisory Board directs that this Criterion is only Scored in the instance that non target species are determined to be in a depleted state hence a recovery plan is already in action. The decision whether the non target species are in a depleted state will be made at the beginning of the Fishery Assessment process.		
Team Intent	Are reductions in fish abundance caused by human activity, unrelated to the directed harvest, considered in the management plan and in the establishment of escapement goals? If so, is the management system sufficiently robust to accommodate the long term recovery of depleted populations and ensure that directed or by-catch harvests, including harvests on enhanced fisheries, do not present significant risks to the long term sustainability of these populations.		
Weight	**25**	**Score**	**NCCC Chum: 62** **WCVI Chum: 62** **Inner SC Chum: 62** **Fraser Chum: 62**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
2.3.1	Management strategies include provision for restrictions to the fishery to enable recovery of non-target stocks to levels above established LRPs (Limit Reference Points)	• 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 ensures that the fishery is executed such that the recovery of depleted non-target stocks is likely to occur in a reasonable time period. • 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.	• The management system includes assessment of plans for the recovery of non-target stocks to levels above established LRPs. • Objectives for recovery consider historic stock abundance information. • The management system ensures that the fishery is executed such that recovery of depleted non-target stocks is highly likely to occur in a reasonable time period. • Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely manner whether 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.	• The management plans and escapement goals have been shown to have a high degree of certainty 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 whether recovery is occurring. • Proposed management strategies have been reviewed and found to be scientifically defensible and appropriate by the PSARC or the appropriate PSC 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.
Weight		**Score**	**NCCC Chum: 62**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
			WCVI Chum: 62 **Inner SC Chum: 62** **Fraser Chum: 62**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum fisheries are managed based a comprehensive suite of objectives, including the conservation of biological diversity.

Refer to MSC Indicator 3.1.1 for a detailed inventory of objectives.

- The legal basis for conserving biological diversity in Canada is the Species at Risk Act (MS 1.1.2.4)

- The policy framework for conserving the biological diversity of wild salmon is mapped out in the Wild Salmon Policy (MS 3.2.2)

- MS 1.2.7.4 briefly describes the selective fishing policy.
- MS 3.2.4 recounts the development and implementation of selective fishing measures in BC salmon fisheries, and includes links to mortality studies from different fisheries.
- MS 1.2.9 describes collaborative initiatives related to the changing structure of Pacific salmon fisheries, which include strong elements of enhanced monitoring and reporting.
- MS 2.4 describes the current monitoring and assessment approach, and more specifically,
- MS 2.4.2.5 discusses catch monitoring programs in the different fisheries, including provisions for reporting any harvest of non-target species.

- MS 2.5.4.3 describes measures that have been implemented to control incidental harvest of non-target stocks and by-catch of non-target species.

- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for selective fishing and by-catch reporting.

- MS 3.4 includes an inventory of major conservation and recovery efforts, including measures to reduce by-catch of particular stocks or

species of concern (i.e. marine species listed as threatened or endangered under the Species at Risk Act).

- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).
- Decision guidelines for each fishery in CUP 3.3 outline measures to reduce by-catch of non- target species. CUP 6 highlights specific conservation measures in each area.

Scoring Rationale:

The state of many of the chum fisheries in British Columbia has been in decline and there are conservation issues with a variety of other species such as the late Fraser sockeye, (including Cultus sockeye), Sakinaw sockeye, interior Fraser coho, steelhead, WCVI Chinook, Lower Georgia Strait chinook, and coho.

The current non-target chum stocks of the North Coast are of concern and directed fisheries have been terminated. This criterion requires a significant investment by the management agency to enable the recovery of depleted non-targeted fish stocks to the LRP's. Although the management system has provisions for recovery of the stocks through the Wild Salmon Policy and passes the 60SG scoring elements, the more stringent provisions of the scoring elements of 80SG and 100SG have not been met based on information provided.

The client submissions for each of the UoC lack evidence of recovery plans for depleted non-target stocks that have been identified by DFO as impacted by the chum fisheries in the various districts. Specifically, the management system lacks elements of a recovery plan such as; the objectives for recovery consider historic stock abundance information (second scoring issue), and analysis to ensure that the fishery is executed such that recovery of depleted non-target stocks is highly likely to occur in a reasonable time period (third scoring issue). Also lacking is assurances that would be contained in a recovery plan that monitoring and assessment programs have been established to determine, with a high degree of confidence and in a timely manner that recovery is occurring. A recovery plan is specifically needed for the Skeena and the Nass for chum recovery.

All of the fisheries have been given partial credit for element 4 because of existing monitoring programs but we note the trend of monitoring has been consistently downward over the past decade. All of the other SG80 scoring issues (1,2,3,5,6) refer to recovery plans that have not been prepared for non-target stocks that are well below their LRP's and intercepted in the chum fisheries. The team has awarded a score of 62 for all units of certification, based on partially meeting the fourth scoring issue.

Condition 2-1: For all chum salmon UoCs. The proposed recovery plans, including a commitment to stock monitoring and assessment must be developed and implemented by the second surveillance audit. These recovery plans must meet the requirements of the scoring elements under the 80SG scoring guidepost.

11.4 Principle 3 Scoring Results

Table 9: MSC Principle 3: Individual Performance Indicator Scoring Summary (NCCC and WCVI)

Summary for BC Chum Salmon Units of Certification

NCCC

Item	Description	Weighting	NCCC Chum	Weighted Scores	Criteria @ 60: 1	2	3	4	5	Criteria @ 80: 1	2	3	4	5	6	Criteria @ 100: 1	2	3	4	5
PRINCIPLE 3 - Management and Operational Framework		0.333		**86**																
Management Framework																				
Criterion 3.1 - Management system consistent with MSC principles and criteria		0.327		**85**																
Indicator 3.1.1	Clear and defensible set of objectives	0.111	70					X	X	P	P	P	P	X	X					
Indicator 3.1.2	Periodic assessment of biological status	0.111	90					X	X				X	X	X			P	X	X
Indicator 3.1.3	Identify the impact of fishing on the ecosystem	0.111	95			X	X	X	X			X	X	X	X	P			P	X
Indicator 3.1.4	Uses best information and precautionary approach	0.111	90				X	X	X					X	X					X
Indicator 3.1.5	Responses to new information are timely and adaptive	0.111	75			X	X	X	X		P	X	X	X	X		P	X	X	X
Indicator 3.1.6	Responsive to social and economic impact of fishery	0.111	95						X					X	X					X
Indicator 3.1.7	Useful and relevant information to decision makers	0.111	92				X	X	X			X	X	X	X				X	X
Indicator 3.1.8	Socioeconomic incentives for sustainable fishing	0.111	70				X	X	X					X	X		P	P	P	
Indicator 3.1.9	Hatchery Managment Issues	0.111	na		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Criterion 3.2 - Framework for research pertinent to management		0.1		**79**																
Indicator 3.2.1	Research plan for target and non-target species	0.667	73				X	X	X											
	(**80 & 100 SGs have 7 scoring elements each)				X	X	X	X	X			X	X	X				X	X	X
Indicator 3.2.2	Research is timely, available and reviewed	0.333	90					X	X				X	X	X					X
Criterion 3.3 - Transparency in operations and consultation process		0.041		**100**																
Indicator 3.3.1	Open consultations process	1	100			X	X	X	X				X	X	X					X

WCVI

Item	WCVI Chum	Weighted Scores	Criteria @ 60: 1	2	3	4	5	Criteria @ 80: 1	2	3	4	5	6	Criteria @ 100: 1	2	3	4	5
PRINCIPLE 3 - Management and Operational Framework		**90**																
Management Framework																		
Criterion 3.1 - Management system consistent with MSC principles and criteria		**90**																
Indicator 3.1.1	72					X	X	P	P	P		X	X					
Indicator 3.1.2	90					X	X				X	X	X			P	X	X
Indicator 3.1.3	95			X	X	X	X			X	X	X	X	P			P	X
Indicator 3.1.4	90				X	X	X					X	X					X
Indicator 3.1.5	95			X	X	X	X			X	X	X	X		P	X	X	X
Indicator 3.1.6	95						X					X	X					X
Indicator 3.1.7	92				X	X	X			X	X	X	X				X	X
Indicator 3.1.8	94				X	X	X					X	X		P	P	P	
Indicator 3.1.9	90				X	X	X			X	X	X	X			X	X	X
Criterion 3.2 - Framework for research pertinent to management		**79**																
Indicator 3.2.1	73				X	X	X											
(**80 & 100 SGs have 7 scoring elements each)			X	X	X	X	X			X	X	X				X	X	X
Indicator 3.2.2	90					X	X				X	X	X					X
Criterion 3.3 - Transparency in operations and consultation process		**100**																
Indicator 3.3.1	100			X	X	X	X				X	X	X					X

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Table 9: MSC Principle 3: Individual Performance Indicator Scoring Summary cont (NCCC and WCVI)

Summary for BC Chum Salmon Units of Certification					Criteria @ 60					Criteria @ 80						Criteria @ 100							Criteria @ 60					Criteria @ 80						Criteria @ 100					
		Weighting	NCCC Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5	6		WCVI Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5	6
Criterion 3.4 - Measure to control levels of harvest		0.179		82																				89																	
Subcriterion 3.4.1 - Catch and exploitation levels		0.5																																							
Indicator 3.4.1.1	Firshery control systems including no-take zones	0.5	78				X	X	X			P		X	X								96				X	X					X	X						
Indicator 3.4.1.2	Measures to restore depleted fish populations	0.5	70			X	X	X	X	P	P	X	X	X	X			X	X	X			80			X	X	X	X			X	X	X	X			X	X	X
Subcriterion 3.4.2 - Ensure that conservation objectives are met.		0.5																																					
Indicator 3.4.2.1	Compliance provisions (effective enforcement)	0.5	90			X	X	X	X			X	X	X	X		P	P		X			90			X	X	X	X			X	X	X	X		P	P		X
Indicator 3.4.2.2	Monitoring provisions	0.5	90			X	X	X	X			X	X	X	X	P	P	P	X	X			90			X	X	X	X			X	X	X	X	P	P	P	X	X
Criterion 3. 5 - Regular and timely review of management system		0.152		88																				88																	
Indicator 3.5.1	Internal review	0.316	100			X	X	X	X			X	X	X	X			X	X	X			100			X	X	X	X			X	X	X	X			X	X	X
Indicator 3.5.2	External review	0.258	70			X	X	X	X		P		X	X	X				X	X			70			X	X	X	X		P		X	X	X				X	X
Indicator 3.5.3	Recommendations from reviews incorporated	0.284	85			X	X	X	X		X	X	X	X	X		P	X	X	X			85			X	X	X	X		X	X	X	X	X		P	X	X	X
Indicator 3.5.4	Mechanism for resolving disputes	0.142	97			X	X	X	X				X	X	X				P	X	X		97			X	X	X	X				X	X	X				P	X	X
Criterion 3.6 - Compliance with legal and administrative		0.124		96																				96																	
Indicator 3.6.1	Compliance with international agreements	0.25	100			X	X	X	X				X	X	X					X	X		100			X	X	X	X				X	X	X					X	X
Indicator 3.6.2	Compliance with domestic laws and regulations	0.375	100			X	X	X	X		X	X	X	X	X			X	X	X	X		100			X	X	X	X		X	X	X	X	X			X	X	X
Indicator 3.6.3	Observes legal and customary (First Nation) rights	0.375	90			X	X	X	X		X	X	X	X	X	P	X	X	X	X			90			X	X	X	X		X	X	X	X	X	P	X	X	X	X
Fisheries Operational Framework																																								
Criterion 3.7 - Ecosystem sensitive gear and fishing practices		0.077		87																				97																	
Indicator 3.7.1	Avoid catch and minimize mortality of non-target species	0.277	90			X	X	X	X				X	X	X				P	X	X		100			X	X	X	X				X	X	X					X	X
Indicator 3.7.2	No distructive fishing practices	0.139	100			X	X	X	X		X	X	X	X	X				X	X	X		100			X	X	X	X			X	X	X	X				X	X
Indicator 3.7.3	Minimize operational waste	0.128	100			X	X	X	X		X	X	X	X	X					X	X		100			X	X	X	X		X	X	X	X	X				X	X
Indicator 3.7.4	Cooperation of fishers	0.328	70			X	X	X	X	P	X	X	X	X	X				X	X	X		90			X	X	X	X		X	X	X	X	X			X	X	X
Indicator 3.7.5	Fishing methods minimize impacts on habitat	0.128	100			X	X	X	X			X	X	X	X					X	X		100			X	X	X	X			X	X	X	X				X	X

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Table 10: MSC Principle 3: Individual Performance Indicator Scoring Summary cont (ISC and Fraser)

Summary for BC Chum Salmon Units of Certification					Criteria @ 60					Criteria @ 80						Criteria @ 100					Criteria @ 60					Criteria @ 80						Criteria @ 100				
		Weighting	ISC Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5	Fraser Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5
PRINCIPLE 3 - Management and Operational Framework		0.333		**90**																		**89**															
Management Framework																																					
Criterion 3.1 - Management system consistent with MSC principles and criteria		0.327		**90**																		**90**															
Indicator 3.1.1	Clear and defensible set of objectives	0.111	72					X	X	P	P	P		X	X						70					X	X	P	P	P	P	X	X				
Indicator 3.1.2	Periodic assessment of biological status	0.111	90					X	X				X	X	X			P	X	X	90					X	X				X	X	X			P	X	X
Indicator 3.1.3	Identify the impact of fishing on the ecosystem	0.111	95			X	X	X	X			X	X	X	X	P			P	X	95			X	X	X	X			X	X	X	X	P			P	X
Indicator 3.1.4	Uses best information and precautionary approach	0.111	90				X	X	X					X	X					X	90				X	X	X					X	X					X
Indicator 3.1.5	Responses to new information are timely and adaptive	0.111	95			X	X	X	X			X	X	X	X		P	X	X	X	95			X	X	X	X			X	X	X	X		P	X	X	X
Indicator 3.1.6	Responsive to social and economic impact of fishery	0.111	95						X					X	X					X	95					X						X	X					X
Indicator 3.1.7	Useful and relevant information to decision makers	0.111	92				X	X	X			X	X	X	X				X	X	92				X	X	X			X	X	X	X				X	X
Indicator 3.1.8	Socioeconomic incentives for sustainable fishing	0.111	94				X	X	X					X	X		P	P	P		94				X	X	X					X	X		P	P	P	
Indicator 3.1.9	Hatchery Managment Issues	0.111	90				X	X	X			X	X	X	X			X	X	X	na		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Criterion 3.2 - Framework for research pertinent to management		0.1		**79**																		**79**															
Indicator 3.2.1	Research plan for target and non-target species	0.667	73					X	X												73					X	X											
	(**80 & 100 SGs have 7 scoring elements each)				X	X	X	X	X			X	X	X					X	X	X			X	X	X	X	X			X	X	X				X	X	X
Indicator 3.2.2	Research is timely, available and reviewed	0.333	90					X	X				X	X	X						X	90					X	X				X	X	X				X	X
Criterion 3.3 - Transparency in operations and consultation process		0.041		**100**																		**100**															
Indicator 3.3.1	Open consultations process	1	100			X	X	X	X				X	X	X						X	100		X	X	X	X				X	X	X					X

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Table 10: MSC Principle 3: Individual Performance Indicator Scoring Summary cont (ISC and Fraser UoCs)

Summary for BC Chum Salmon Units of Certification					Criteria @ 60					Criteria @ 80						Criteria @ 100								Criteria @ 60					Criteria @ 80						Criteria @ 100					
		Weighting	ISC Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5		Fraser Chum	Weighted Scores	1	2	3	4	5	1	2	3	4	5	6	1	2	3	4	5	
Criterion 3.4 - Measure to control levels of harvest		0.179		**89**																			**89**																
Subcriterion 3.4.1 - Catch and exploitation levels		0.5																																						
Indicator 3.4.1.1	Firshery control systems including no-take zones	0.5	96				X	X	X					X	X							96				X	X	X					X	X						
Indicator 3.4.1.2	Measures to restore depleted fish populations	0.5	80			X	X	X	X			X	X	X	X			X	X	X		80			X	X	X	X			X	X	X	X			X	X	X	
Subcriterion 3.4.2 - Ensure that conservation objectives are met.		0.5																																						
Indicator 3.4.2.1	Compliance provisions (effective enforcement)	0.5	90			X	X	X	X			X	X	X	X		P	P		X		90			X	X	X	X			X	X	X	X		P	P		X	
Indicator 3.4.2.2	Monitoring provisions	0.5	90			X	X	X	X			X	X	X	X	P	P	P	X	X		90			X	X	X	X			X	X	X	X	P	P	P	X	X	
Criterion 3. 5 - Regular and timely review of management system		0.152		**88**																			**88**																
Indicator 3.5.1	Internal review	0.316	100			X	X	X	X			X	X	X	X			X	X	X		100			X	X	X	X			X	X	X	X			X	X	X	
Indicator 3.5.2	External review	0.258	70			X	X	X	X		P		X	X	X				X	X		70			X	X	X	X		P		X	X	X				X	X	
Indicator 3.5.3	Recommendations from reviews incorporated	0.284	85			X	X	X	X		X	X	X	X	X		P	X	X	X		85			X	X	X	X		X	X	X	X	X		P	X	X	X	
Indicator 3.5.4	Mechanism for resolving disputes	0.142	97			X	X	X	X			X	X	X	X			P	X	X		97			X	X	X	X			X	X	X	X			P	X	X	
Criterion 3.6 - Compliance with legal and administrative		0.124		**96**																			**96**																
Indicator 3.6.1	Compliance with international agreements	0.25	100			X	X	X	X				X	X	X				X	X		100			X	X	X	X				X	X	X				X	X	
Indicator 3.6.2	Compliance with domestic laws and regulations	0.375	100			X	X	X	X		X	X	X	X	X		X	X	X	X		100			X	X	X	X		X	X	X	X	X		X	X	X	X	
Indicator 3.6.3	Observes legal and customary (First Nation) rights	0.375	90			X	X	X	X		X	X	X	X	X	P	X	X	X	X		90			X	X	X	X		X	X	X	X	X	P	X	X	X	X	
Fisheries Operational Framework																																								
Criterion 3.7 - Ecosystem sensitive gear and fishing practices		0.077		**97**																			**87**																
Indicator 3.7.1	Avoid catch and minimize mortality of non-target species	0.277	100			X	X	X	X				X	X	X				X	X		90			X	X	X	X				X	X	X			P	X	X	
Indicator 3.7.2	No distructive fishing practices	0.139	100			X	X	X	X		X	X	X	X	X			X	X	X		100			X	X	X	X		X	X	X	X	X			X	X	X	
Indicator 3.7.3	Minimize operational waste	0.128	100			X	X	X	X		X	X	X	X	X				X	X		100			X	X	X	X		X	X	X	X	X				X	X	
Indicator 3.7.4	Cooperation of fishers	0.328	90			X	X	X	X		X	X	X	X	X			X	X	X		70			X	X	X	X	P	X	X	X	X	X			X	X	X	
Indicator 3.7.5	Fishing methods minimize impacts on habitat	0.128	100			X	X	X	X			X	X	X	X				X	X		97			X	X	X	X			X	X	X	X	P			X	X	

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

MSC Principle 3	**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**		
MSC Scoring Intent	MSC Intent: The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.		
Intent	For the purposes of this section, the management system is defined to mean all public sector entities with responsibility for managing salmon in British Columbia, including Fisheries and Oceans Canada (DFO), the Pacific Salmon Treaty (PST), and Pacific Salmon Commission (PSC), in addition to scientific assessment groups such as PSARC (PSARC) and other governmental entities that provide advice to mangers. Some indicators under Principle 3 appear to overlap with indicators under Principles 1 and 2, however, Principles 1 and 2 are concerned with the outcomes of a management system respecting the fact that the resources are maintained at the desired levels of abundance, while Principle 3 is concerned with evaluating whether all of the processes for reaching management objectives are in place.		
Weight	**33**	**Score**	**NCCC Chum: 86** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 89**
Management System Criteria			
3.1 – MSC P3 Criterion 1	**The management system has a strategy for management that clearly defines long-term objectives for managing the impact of fishing on target species, non-target species and the ecosystem; the objectives are consistent with a well- managed fishery and MSC Principles and Criteria; and the management strategy includes provision for the effective implementation of measures to attain these objectives.**		
Intent	The objective regarding this criterion dealing with Management Systems is to compare the Fisheries and Oceans Canada management system for British Columbia salmon, as detailed in the Integrated Fisheries Management Plan for British Columbia Salmon, and elsewhere, with the standards for a well-managed fishery as defined in the MSC Principles and Criteria for Sustainable Fishing. Particularly important is whether the management system has clearly defined objectives and goals that incorporate currently evolving standards for responsible fisheries management with respect to conservation of the species, regard for the ecosystem to which they belong, transparency of the management process and recognition of the impact of the fishery on social, cultural and economic issues.		

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	Throughout this section the term "impact on the ecosystem" is taken to mean the degree to which fishing alters the ecosystem relative to its non-fished state.

3.1.1	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.	• Management objectives are clearly defined and consistent with MSC Criteria for a well-managed fishery for the majority of target stocks. • Harvest controls are effective for the majority of the fisheries on target stocks. • The management system provides for the estimation of catch, landing, and bycatch for the majority of the fisheries.	• Management objectives are clearly defined for most of the target stocks and are consistent with the MSC Criteria for a well-managed fishery. • Harvest rates and escapement goals are set for target stocks or target species in the fishery, as qualified by relevant environmental factors. • Harvest controls are precise and effective for major target stocks or target species in the fishery. • The management system provides estimates for all major catches, landings, and bycatch.	• Management objectives are clearly defined for all of the target stocks and are consistent with the MSC Criteria for a well-managed fishery. • Harvest rates and escapement goals are precisely set for each target stock unit in the fishery, as qualified by relevant environmental factors. • Target Reference Points and Limit Reference Points are clearly defined and documented for each target stock unit in the fishery. • Harvest controls are effective with respect to the attainment of management objectives for each target stock unit in the fishery. • The management system provides estimates for all catches, landings and bycatch.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 72** **Inner SC Chum: 72** **Fraser Chum: 70**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum are managed in a comprehensive legal and policy setting that identifies broad long-term objectives as well as specific annual objectives for each stock and fishery.

- MS 1.1 summarizes the legal context for Pacific salmon fisheries, including the Fisheries Act, the Oceans Act, and the Species at Risk Act. The provisions of these acts establish clear objectives for the conservation and sustainable harvest of BC pink and chum salmon.
- MS 1.2 reviews policy developments for Pacific salmon fisheries over the last 15 years, including the Wild Salmon Policy, the Allocation Policy, and the Selective Fishing Policy. Specific examples and links to additional information are included throughout.
- MS 1.3 includes an overview of social and economic objectives, how they are incorporated into fisheries management (e.g. allocation), and how they are considered in on-going policy initiatives (e.g. Wild Salmon Policy, Pacific Integrated Commercial Fisheries Initiative).
- MS 2.3 includes an inventory of general goals and targets, a summary of long-term objectives derived from the legal and policy context summarized in MS 1.1 and MS 1.2, as well as a discussion of different reference points in place and under development for Pacific Salmon.
- Decision Guidelines have been developed for pink and chum fisheries, and are publicly reviewed each year as part of the Integrated Fisheries Management Plan (MS 4.2.1.2).
- MS 2.5.2 summarizes general decision guidelines, and
- CUP 3.3 includes detailed decision guidelines for each fishery.

BC pink and chum fisheries are managed to address time- and area-specific concerns over incidental harvests and by-catch through restrictions on location, timing, gear, and retention for net and troll fisheries.

- MS 3.4 includes a comprehensive inventory of conservation objectives and resulting recovery initiatives.
- MS 2.5.4 summarizes specific conservation measures implemented in pink and chum fisheries.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).
- CUP 2.4 describes conservation and management objectives for each area, and briefly introduces the main performance measures used for

planning, implementation, and review.

- CUP 3.3 contains a detailed description of each fishery, including management reference points (i.e. escapement targets, exploitation rate limits).

Long Term Objectives

The long-term objectives contained in the above laws and policies are summarized in the following excerpts from the 2007 *Integrated Fisheries Management Plan* for salmon:

- *Conservation Objectives*: Conservation of Pacific salmon is the primary objective and takes precedence in managing the resource. DFO manages fisheries with the objective of ensuring that salmon stocks return at sustainable levels. When returns decline below sustainable levels, management actions are taken which may include reducing targeted and incidental harvest of specific stocks, strategic enhancement, and habitat restoration. The objective of implementing conservation measures in particular fisheries is to reduce the impact of harvest and increase the level of escapement to the stock of concern. These conservation measures shape all Pacific Region fisheries, as illustrated by the overview of recovery initiatives in Section 3.4 and the inventory of conservation measures applied in BC salmon fisheries in Appendix 1.
- *First Nations Objectives:* The objective is to manage fisheries to ensure that, subject to conservation needs, first priority is accorded to First Nations for opportunities to harvest fish for FSC purposes and any treaty obligations. Feedback from consultation sessions is relied on to measure the performance of providing first priority to First Nations for opportunities to catch fish for FSC purposes and any treaty obligations.
- *Recreational and Commercial Fisheries Objectives*: The objective is to manage fisheries for sustainable benefits consistent with the *Wild Salmon Policy* (Section 3.2.2). A primary objective in the recreational fishery is maintaining the expectation and opportunity to catch fish in a stable manner. In the commercial fishery, the objective is to improve the economic performance of fisheries so that they can reach their full potential, to provide certainty to participants, and to optimize harvest opportunities. However, stocks of concern constrain opportunities in many areas resulting in less than optimal opportunities. Both fisheries are increased where possible in accordance with allocation policies.

Reference Points

BC pink and chum fisheries are currently planned and implemented using 4 types of management reference points:

- *Escapement goals* are in place for target stocks. Pink and chum escapement goals have been generally based on experience and judgment (e.g. past escapements, habitat capacity). The *Certification Unit Profiles* list escapement goals for each of the actively

managed pink and chum stocks. For example, management escapement goals have been set for all streams identified in the *North and Central Coast Core Stock Assessment Program for Salmon* by English, Spilsted, and Peacock (2006). Annual fishing plans, covering all harvests, are designed to achieve escapement targets with an acceptable risk tolerance.

- *Exploitation rate ceilings* are in place for many stocks of concern to support recovery efforts. This includes any incidental harvest or by-catch in fisheries targeting other stocks and species, and fisheries are shaped to balance economic constraints on fisheries targeting other stocks against cumulative fishing impacts on the stock of concern. For example, the Canadian fishery exploitation rate for Interior Fraser coho is limited to 3% (Section 3.4.2.1).
- *Fixed harvest rates* are in place for several mixed-stock fisheries to minimize long-term impacts on component stocks. For example, Johnstone Strait mixed-stock chum fisheries are constrained to 20%, while terminal fisheries harvest local abundances where they exceed the escapement goals.
- *Allocation targets* describe either a target amount (FSC fisheries), a target opportunity (recreational fishery), or a target share (commercial gear types). Allocation targets are generally defined by species, not by stock, but in practical implementation allocations tend to be area-specific. Section 1.3.2 describes the allocation principles.

DFO incorporates escapement goals into annual planning and implementation as follows:

- Fisheries are designed to achieve escapement goals, and any excess abundance becomes available for terminal harvests for ESSR fisheries if there are no other constraints, such as by-catch concerns.
- Escapement goals are intended to ensure future production, not identify the minimum abundance that is likely to persist over time. Accordingly, occasional shortfalls should not pose serious risks of extirpation, especially if the escapement goals are set for components of a larger conservation unit.
- Any consistent shortfall from the escapement goals triggers corrective actions to build stocks back up to the target abundance (Section 3.4.2) The Wild Salmon Policy (Section 3.2.2) introduced two additional reference points, which are currently under development:
- *Lower benchmarks* intended to delineate an undesirable level of abundance, but with a substantial buffer above the level that would cause it to be considered at risk of extinction under the *Species at Risk Act*.
- *Upper benchmarks* intended to identify whether abundance is sufficient to provide maximum levels of catch, on average.

Lower and upper benchmarks under the WSP will be identified for conservation units (CU) rather than the stock groupings currently used for fisheries management (Section 2.2.2).

Scoring Rationale:

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The lack of clearly defined LRPs for most target stocks harvested in pink and chum fisheries resulted in the partial scoring of three of the four scoring issues at the SG80 level for all chum fisheries. North-Central Coast and Fraser chum fisheries also received partial rating for the forth SGs at the 80 level because estimates of bycatch for Skeena steelhead and Fraser steelhead and sturgeon are lacking for these fisheries.

Condition 3-1. For all chum salmon UoCs - Certification of all chum fisheries will be conditional until management objectives, (e.g. maximum harvest rates, escapement goals) are clearly defined for most of the target chum stocks harvested in these fisheries. Objectives will be provided to the Certification Body by the second surveillance audit.

Condition 3-2. For NCCC chum salmon UoC. - Certification of North-Central Coast chum salmon fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for North-Central Coast chum salmon fisheries. Bycatch estimates will be reported to the certification body by the first surveillance audit.

Condition 3.3. For Fraser chum salmon UoC. - Certification of Fraser chum salmon fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for Fraser chum salmon fisheries. Bycatch estimates will be reported to the certification body by the first surveillance audit.

3.1.2	The management system provides for periodic assessment of the biological status of the target species and the impact of fishing.	• 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. • Results of assessment or updates of the status of the stocks are made available to stakeholders. • Technical analysis and methodologies used for the assessments are published or distributed to stakeholders.	• 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. • Results of assessment and updates of the status of the stocks are made available to stakeholders in a timely fashion. • 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.	• There is an annual assessment or update of the status of stocks for each major target stock unit in the fishery. • 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. • Reports on the methodologies used for the assessments are

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				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.
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum are assessed annually. Assessment information is publicly distributed and incorporated into the annual planning cycle.

- MS 2.4.1 outlines the stock assessment program for Pacific salmon and provides an overview of different publications (e.g. Science Advisory Reports, Stock Status Reports, info bulletins)
- MS 2.4.2 summarizes monitoring and assessment activities for BC pink and chum salmon (e.g. escapement surveys, test fisheries, catch monitoring). MS 2.7 summarizes DFO's toolkit for monitoring and assessment.
- MS 3.2.3.5 lists available stock status reports for BC pink and chum salmon.
- An extensive network of processes is in place to assess the status of BC pink and chum stocks, including the annual post-season review (MSC 4.2.1.1) and formal external reviews (MS 4.3.5)
- CUP 4 details the assessment programs for each area.
- CUP 5 describes the status of target stocks in each area.

Stock Assessment Program

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Organization

Fisheries and Oceans Canada Science Directorate includes the *Stock Assessment Division* and the *Pacific Scientific Advice Review Committee* (PSARC). PSARC serves as an efficient peer-review process for stock assessment work (e.g. survey methodology, stock status reports). Section 4.3.5 describes PSARC and other review processes.

A summary of stock assessment activities, with links to data bulletins is available at http://wwwops2. pac.dfo-mpo.gc.ca/xnet/content/salmon/stock.htm

Note that assessment activities described in the sections below may also be organized and implemented through DFO's Fisheries Management Branch (e.g. test fisheries on the Lower Fraser).

Types of Data Collection Activities

DFO has established an extensive monitoring and assessment structure for Pacific salmon and the fisheries targeting them. Data collection activities can be grouped into 3 categories:

- ***Stock assessment***: collects abundance data, escapement data, and biological data needed to manage stocks and monitor their status. (Section 2.4.2).
- ***Research***: collects data to address fundamental knowledge gaps and improve our understanding of BC fish stocks and their ecosystem (Section 3.2.2.5).
- ***Fishery monitoring and reporting****:* collects information about harvesters, fishery openings, and catch (Section 2.4.2.5)

This information is collected through a combination of:

- Fishery-independent data collection (i.e. does not require a fishery opening). This includes departmental escapement surveys (e.g. mark-recapture programs, over-flights), test fisheries, and tagging programs.
- Collaborative data collection in commercial fisheries. This includes reporting provisions identified in the licence conditions, assessment fisheries, charter patrols, observers, and dock-side monitoring.
- Collaborative data collection through co-management and capacity building arrangements. This includes joint escapement surveys, fishwheels, and aboriginal guardians.
- Information exchange between DFO, other agencies, and stakeholders though an extensive network of collaborative, advisory, and consultative processes (Section 4).

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Section 2.7 summarizes DFO's toolkit for assessment, monitoring, and enforcement.

Publications

DFO publicly distributes all stock assessment information as it becomes available, and regularly provides peer-reviewed analyses of the available data:

- Test fishing data is published on-line daily (Section 2.4.2.2).

Scoring Rationale:

DFOs periodic assessment efforts were found to be sufficient to pass all SGs at the 60 and 80 levels. At the 100 level, the first SG was not met because stock status assessment are not conducted annually; the second scoring element was met because assessment results are provided to stakeholders; and the third SG was partially met because reports on methodologies are rarely published in peer-reviewed journals or PSC technical reports.

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3.1.3	The management system includes a mechanism to identify and manage the impact of fishing on the ecosystem.	• 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.	• The management system includes mechanisms to identify and evaluate the impact of fishing on the ecosystem. • Control mechanisms are used to minimize impacts of fishing on the ecosystem.	• Monitoring systems are in place to detect the impact of fishing on the ecosystem. • 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. • Control mechanisms are used to minimize impacts of fishing on the ecosystem. • There is sufficient evidence to indicate that when used, control mechanisms are adequate for meeting the management objectives.
Weight		**Score**	**NCCC Chum: 95** **WCVI Chum: 95** **Inner SC Chum: 95** **Fraser Chum: 95**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Canada's Oceans Strategy sets out the policy direction for the management of estuarine coastal and marine ecosystems in Canada. The *Fisheries Act* is the primary legislative basis for fisheries management in Canada and authorizes the Minister of Fisheries and Oceans to make decisions about the conservation and management of fisheries resources and habitat. These combined with several BC Provincial government

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Acts provide the mechanism to identify and manage the impact of fishing on the ecosystem.

In addition to the research programs, integrated management initiatives, and impact-reduction measures listed for MSC Indicator 2.1.2 above, the management system includes an extensive network of collaborative and consultative processes, described below under MSC Indicator 3.3.1, which is used to bring any ecosystem-related concerns into annual fisheries planning, policy implementation, and the development of research priorities, as described below under MSC Indicator 3.2.1.

Scoring Rationale:
All scoring elements at the 60 and 80 SG levels were met because the methods used by commercial fishers to harvest chum salmon in commercial fisheries generally have minimal impact on the ecosystem and control mechanisms are in place to remove fishing gear that is lost, discarded or deployed in times or areas where fisheries are closed. The first and last scoring elements under the 100 SG were only partially met because current monitoring systems are only partially adequate to detect the impact of fishing on the ecosystem and the evidence of the application of control mechanism to minimize the impact of fishing on the ecosystem are adequate (short nets, short sets, recovery boxes, coloured floats).

3.1.4	When dealing with uncertainty, the management system provides for utilizing the best scientific information available to manage the fishery, while employing a precautionary approach.	• The management system for the majority of newly developing fisheries is consistent with a precautionary approach. • The management system considers the effect of implementation uncertainty on the effectiveness of the majority of the proposed management actions.	• 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. • 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. • In most cases where there are newly developing fisheries, the	• 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. • The management system implements research efforts to address data gaps. • For newly developing fisheries for which there is very limited data and information, the management system implements controls on the

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			management system implements controls on the development of the fishery that are precautionary in nature. • The management system considers the effect of implementation uncertainty on the effectiveness of most of the proposed management actions.	development of the fishery that are precautionary in nature. • 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.
Intent		Uncertainty always exists in estimates of the status of a stock, and technically it is not generally possible to determine the accuracy of the assessments. This uncertainty results from sampling and measurement error, limited understanding of the biology of the fish being modeled, error in model assumptions, and an inability to model all of the important processes that affect the dynamics of the stock. It can also arise as a result of changing fishing technology. However, some idea of the uncertainty can be detected or measured through sampling theory, by lack of fit of the model being used, or by sensitivity analysis.		
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Fisheries and Oceans Canada has formally adopted the precautionary approach to fisheries management, and the federal government has established a more general framework for applying precaution in science-based decision making.

- The management system operates under a comprehensive legal and policy framework (MS 1.1 and 1.2) that explicitly mandates a precautionary approach to dealing with uncertainty (e.g. Species at Risk Act, Wild Salmon Policy)

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- MS 1.2.2.2 briefly describes the on-going development of a formal policy framework for incorporating the precautionary approach into fisheries management.
- MS 1.2.2.3 retraces research and policy development related to DFO's implementation of the precautionary approach, and lists examples of precautionary practices.
- CUP 3.3 contains a detailed description of each fishery, including decision guidelines that explain anticipated responses to different possible scenarios and the use of in-season information.

Scoring Rationale

All SGs at the 60 and 80 levels were met because the management of chum fisheries generally recognizes the uncertainty in the available data, use the best scientific information available and is consistent with a precautionary approach. The first and fourth SGs at the 100 level was not met because assessments of uncertainty in catch and escapement estimates are not routine and the management system does not always evaluate the effect of implementation uncertainty.

3.1.5	Management response to new information on the fishery and the fish populations is timely and adaptive.	• 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.	• The management system provides a mechanism for responding to unexpected changes in the fishery. • When new information or findings support altering the management and conservation programs, adjustments are made within 12 months of obtaining the new information.	• The management system provides a mechanism for rapid adjustments to be made to its management programs. • 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.
Intent		The management system should be timely and adaptive i.e., new information used by the management system to initiate new management measures or to update and/or improve current management measures in a timely fashion, because characteristics of the fishery can change and/or the natural system can show reduced or increased productivity over time.		

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Weight		Score	NCCC Chum: 75 WCVI Chum: 95 Inner SC Chum: 95 Fraser Chum: 95

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Management of BC pink and chum fisheries responds to in-season information (e.g. test fishery results), annual post-season reviews (e.g. escapement relative to target), and long-term patterns (e.g. recovery initiatives):

- MS 4.2.1.1 describes the annual planning cycle.
- MS 2.5.2 outlines the general decision guidelines for pink and chum fisheries and illustrates how annual fisheries respond to available information.
- CUP 3.2 explains the harvest strategy in each area, and
- CUP 3.3 provides the details for each commercial fishery and identifies specific pre-season and in-season information used for decision-making.

Refer to MSC Indicator 3.4.1.2 below for additional details

Pacific salmon fisheries are managed in a regular annual cycle of pre-season planning, in-season implementation, and post-season review. Each phase of this cycle incorporates extensive levels of public participation:

- Pre-season planning centers on the development and broad public review of *Integrated Fisheries Management Plans* (MS Section 4.2.1.2). These management plans include general decision guidelines for each fishery (MS Section 2.5.2), expectations for the upcoming year, anticipated fishing plans, and a detailed review of the previous year.
- In-season management is subject to rapidly changing, uncertain information. The department works with stakeholder representatives to develop appropriate responses to these changing circumstances, adhering to the general decision guidelines and annual fishing plans documented in the IFMP except in very unusual circumstances.
- Post-season review meetings in the Fall provide a broad public forum to share information about the stocks and fisheries, to review management actions, and to identify opportunities for future improvements. The review process seamlessly moves into pre-season planning, and culminates in the draft IFMP for the next year. DFO distributes comprehensive information about each fishing season as part of the post-season review. Pre-season forecasts and plans are compared with in-season estimates of run-size, management

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actions, and final catches and escapements

Scoring Rationale:
The in-season monitoring systems for chum were found to be adequate for all fisheries to meet the single scoring SG at the 60 level and the first SG at the 80 level. The NCCC chum fishery only partially met the second scoring issue of the 80 SG because management adjustment clearly needed for the conservation of Area 3 and 4 chum salmon were not implemented within 12 months of the information being available. The second SG at the 100 level was partially met for all fisheries because some, but not all, adjustments are made within 6 months.

Condition 3.4 – For the NCC chum salmon UoC. - By the second surveillance audit, DFO must document how it has responded to management and conservation concerns such as estimation of bycatch and development of recovery plans for Area 3 to 4 chum stocks. DFO should provide evidence that they have established an effective process for responding to new information and making necessary changes within 12 months of the information becoming available.

3.1.6	The management system provides a process for considering the social and economic impacts of the fishery.	• 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. • More often than not the management system considers the impact of the fishery on coastal communities that are closely tied to the fishery. • For the majority of the fisheries there are no subsidies that threaten sustainable fishing. • More often than not, the input of stakeholders is sought by the management system.	• The management system regularly undertakes to consider the views, customs and interests of indigenous peoples whose livelihood or food are dependent on the fishery. • The management system regularly takes into consideration the impact of the fishery on coastal communities that are closely tied to the fishery. • There are no subsidies to the fishing industry that would lead to unsustainable fishing or ecosystem degradation. • The management system regularly undertakes measures to understand the socioeconomic impacts resulting from the management of the fishery.	• 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. • 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. • There are no direct subsidies to the fishing industry. • The management system regularly seeks and considers input from stakeholders in an effort to understand and address socioeconomic issues related to the

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				fishery.
Weight		**Score**		**NCCC Chum: 95** **WCVI Chum: 95** **Inner SC Chum: 95** **Fraser Chum: 95**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Extensive collaboration and public participation ensure that social and economic considerations are brought into annual and long-term planning processes.

- MS 1.3 includes an overview of social and economic objectives, how they are incorporated into fisheries management (e.g. allocation), and how they are considered in on-going policy initiatives (e.g. Wild Salmon Policy, Pacific Integrated Commercial Fisheries Initiative).
- MS 4.2 outlines the departmental support structures for enabling participation.
- MS 4.3 describes the different types of participatory processes, with and inventory of examples for each, explains the departmental approach to major policy initiatives, and summarizes procedures for internal and external review.

The following sections are taken from the Management Summary Submission, all references within specify sections found within that document.

1.3.1 Social and Economic Considerations in Current Policy Initiatives

1.3.1.1 Balancing Biological, Social, and Economic Considerations

Biological objectives of conservation and recovery are the main policy drivers in Pacific Salmon management. The relevant laws and policies are outlined above, and the initiatives designed to achieve them are described in Section 3.

However, in the practical setting of salmon fisheries these biological objectives are balanced with social and economic objectives. The primary mechanism for sharing the social and economic benefits of Pacific salmon is through formalized allocations (Section 1.3.2). In addition, all of the major policy initiatives have strong social and economic components, and an extensive network of advisory and consultative forums has been established to bring diverse views into the process of planning and implementing fisheries (Section 4).

1.3.1.2 Incorporating Social and Economic Considerations

Fisheries managers receive advice on socio-economic values and issues formally though established advisory and consultative processes (Section 4) and informally through direct interaction with harvesters and other interested groups. For example, the Canadian Section of the Fraser Panel (Section 1.1.4.4) is comprised of members of the commercial, recreational and First Nations fishing community who identify socio-economic issues to be considered in the management of the fishery. In addition, representatives of the Province of B.C. raise socio-economic issues that have been identified by the industry and communities.

Fisheries and Oceans Canada also employs formal analyses of social and economic impacts in the implementation of conservation and recovery policies. Recent examples include:

- *Species at Risk Act:* Implementation of the act includes a formal evaluation of economic impacts associated with listing a species under *SARA.* Section 1.1.2.4 describes the act. Section 3.4 lists assessments and recovery efforts for species listed as threatened or endangered under Schedule 1 of SARA.
- *Wild Salmon Policy:* The policy outlines an integrated planning process for bringing cultural, social and economic values into the conservation and sustainable management of Pacific salmon. DFO is working with First Nations, partners and stakeholders on shaping the necessary collaborative processes. Section 3.3.2.5 describes an implementation pilot for Barkley Sound. A central element of the policy are benchmarks to be defined for each Conservation Unit (CU). The emphasis of the benchmarks shifts from conservation (lower benchmark) to long-term benefits (upper benchmark) as CU status improves. Section 3.2.2 describes the policy, its development, and its on-going implementation including the CU benchmarks.
- *Selective Fishing and Effort Reduction*: In 1998, when selective fishing was introduced into the salmon fishery to protect threatened stocks of coho, considerable effort was expended to assess the socio-economic impacts of the proposed changes. A contract was let solely for the purpose of assessing the socio-economic impacts of the proposed fishing plan. $200 million was subsequently spent on licence retirements. Section 2.5.3.4 includes an overview of commercial licencing, and Section 1.2.6 summarizes the restructuring program.

4.3 Types of Participatory Processes

4.3.1 Network of Participatory Processes

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

A comprehensive network of planning and advisory processes has evolved to deal with BC salmon, their ecosystem, and the fisheries targeting them. Processes with public participation operate at different scales of geographic reach and participation:

- *Major policy consultations* are usually region-wide efforts involving fisheries managers, scientists, and stakeholders over several years (Section 4.3.2.1).
- *Community Dialogues* are coordinated through the Consultation Secretariat and bring information about regional DFO initiatives to local communities. Discussions range from broad policy feedback to the specifics of local implementation (Section 4.3.2.2).
- *Local Integrated Advisory and Planning Processes*, such as community roundtables, emphasize structured and on-going collaboration on local operational details (e.g. selective fishing measures, water use). DFO actively participates in most local processes dealing with fisheries issues and provides funding support for many of them (Section 4.3.3.1).
- *Regional Integrated Advisory and Planning Processes* are generally set up to tackle specific issues on a larger geographic scale, such as enhancement strategies (Section 4.3.3.2).
- *Consultation and Collaboration with First Nations* takes place locally, in technical forums, and through formal bilateral consultation (Section 4.3.4.1).
- *Harvester Advisory Processes* include commercial representative groups for each gear type and licence area, as well as the Sport Fishing Advisory Board, its sub-committees, and its community based advisory committees (Section 4.3.4.2).
- *Collaborative Agreements* are used to implement formal co-management arrangements with a clearly specified group of representatives. A recent court decision regarding DFO's Use-of-Fish policies has triggered a transition in funding approaches for work under collaborative agreements. (Section 4.3.4.4).
- Joint federal-provincial and international decision processes (e.g. Fraser River panel of the Pacific Salmon Commission) typically include representatives from regional stakeholder organizations (Sections 1.1.3.1 and 1.1.4.4).

The *Consultation Secretariat* (Section 4.2.2.2) maintains an up-to-date inventory of consultation mechanisms, which is available upon request.

Scoring Rationale:

The information provided by DFO for the management of chum fisheries was sufficient to meet all the scoring SGs at the 60 and 80 levels. The third SG at the 100 level was not met because the existence of extensive employment insurance (EI) benefits for fishers that achieve sales of more than the defined annual limit, are eligible for benefits, which is clearly a direct subsidy to the fishing industry.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.1.7	The management system provides decision makers with useful and relevant information and advice for managing the fishery.	• The majority of management decisions rely on data, useful and relevant information or advice provided through the management system. • Risk assessments are considered in formulating important management decisions.	• The management system provides managers with a range of alternatives for management. • 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.	• The management system provides decision makers with a range of alternatives for achieving the objectives of management, including risk assessments for each alternative. • All management decisions are based on useful and relevant information and advice that is provided through the management system. • 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.
Weight		**Score**	**NCCC Chum: 92** **WCVI Chum: 92** **Inner SC Chum: 92** **Fraser Chum: 92**	

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Management of BC pink and chum fisheries draws on many sources of information and advice:

An extensive information base has been developed through on-going stock assessment, research, and fishery monitoring. Refer to relevant sections above for MSC Indicator 2.1.1 and 2.1.2 for details about the monitoring and assessment framework. Refer to MSC Indicator 3.2.1 and 3.2.2 for details about the research program and current priorities.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Scientific advice is formally developed and publicly released through the Pacific Science Advice Review Committee, which serves as one of several internal review processes (MS 4.3.5.1).

An extensive network of processes is in place to compile advice on BC pink and chum fisheries, including a public review of the annual Integrated Fisheries Management Plan (MS 4.2.1.2), annual post-season reviews (MSC 4.2.1.1), internal and external reviews (MS 4.3.5), and the other processes describes in MS 4.

MS 2.5.2 outlines the general decision guidelines for pink and chum fisheries and illustrates how annual fisheries respond to available information. CUP 3.2 explains the harvest strategy in each area, and CUP 3.3 provides the details for each commercial fishery and identifies specific pre-season and in-season information used for decision making.

Scoring Rationale: The information provided by DFO for the management of chum fisheries was sufficient to meet all the SGs at the 60 and 80 levels. The first SG at the 100 level was not met because risk assessment are not provided for each alternative for achieving the management objectives.

3.1.8	The management system provides for socioeconomic incentives for sustainable fishing.	• The management system provides for the use of social or economic incentives to ensure sustainable fishing. • 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.	• 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. • The management system includes a program to create incentives for harvesters to not exceed target catches or exploitation rates. • Evidence demonstrates that the stakeholders in the fishery have used such incentives. • The management system attempts	• 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. • The management system creates strong incentives for harvesters to not exceed target catches or exploitation rates • The stakeholders in the fishery regularly avail themselves of the opportunity to utilize these

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

			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.	incentives. • Evidence provided by the management system demonstrates that such incentives have contributed to improved conservation. • 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.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 94** **Inner SC Chum: 94** **Fraser Chum: 94**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

The management system creates strong incentives for participation in sustainable fishing initiatives:

- MS 1.2.9 describes incentives for participating in enhanced accountability initiatives based on the expectation of more reliable fishing opportunities (e.g. fixed share of TAC). MS 1.2.9.5 summarizes pilot projects.
- MS 3.4 includes a comprehensive inventory of conservation initiatives in the Pacific Region, and
- Appendix 1 lists specific conservation measures implemented in salmon fisheries by gear- type and statistical area. These precedents establish a strong incentive for collaborative improvement of strategies for selective fishing and effort control (Section 3.2.4).
- One outcome of the Selective Fisheries Program (MS 3.2.4.2) is a momentum of close collaboration between the department and harvesters

on selective fishing issues, with clear incentives for on-going improvement. This momentum is reflected in on-going collaborative projects and the Codes of Conduct developed by the commercial and recreational sectors (see Sections 3.2.4.3 and 3.2.4.4)

- MS 2.6.1 explains that incentives are an important element of DFO's compliance strategy, supplemented by extensive monitoring and enforcement programs. Specific examples of compliance incentives are included in Sections 2.5.4, 3.2.4, and 3.4.

The *Pacific Integrated Commercial Fisheries Initiative* (PICFI) is a 5-year initiative announced in July 2007. PICFI builds on work done so far under *Pacific Fisheries Reform* and subsequent discussions in the different collaborative, advisory, and consultation processes (Section 4). The full press release is available at http://www.dfo-mpo.gc.ca/media/npress-communique/2007/hq-ac38-eng.htm. Up-to-date information on PICFI and its implementation can be found at http://www.pac.dfompo.gc.ca/ops/fm/PICFI/default_e.htm.

PICFI encompasses work on four distinct elements:

- Enhanced Accountability Measures covering catch monitoring, traceability, and compliance.
- Acquiring Commercial Fisheries Access for First Nations. This is a significant supplement to the Allocation Transfer Program (Section 1.2.4.3)
- Capacity Building for managing fisheries, accessing fishing opportunities, and developing technical support.
- Co-management, among First Nations, and among all harvesters.

PICFI is designed around social and economic incentives for participation in the process, particularly increased reliability of allocations as a mechanism for increased accountability in monitoring and compliance. The process emphasizes clear business plans for future fisheries and encourages local cooperation (e.g. among First Nations, across harvest sectors).

2.6.1 Incentives and the National Compliance Framework

DFO uses a full spectrum of complementary compliance mechanisms to achieve conservation and sustainability objectives. These mechanisms can be broadly categorized into incentives, and the application of principles, tools and approaches forming a comprehensive national Compliance
Framework.

2.6.1.1 Incentives

Incentives are used to increase compliance and collaboration in the long-term. For example, commercial openings in low abundance years are tied to proven selective fishing methods and a demonstrated ability to control effort within a fleet. Several on-going policy initiatives include provisions for improved monitoring and effort control, but these are balanced against increased efficiency, predictability, and stability of harvests.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

A good illustration of compliance incentives in the management system are collaborative projects related to the *Selective Fishing Program* (Section 3.2.4). Priority access is given to those who have demonstrated the ability to meet or exceed selective fishing standards. DFO encourages the incorporation of selective fishing experiments into regular fisheries, where appropriate, to realize cost savings.

Another good illustration of compliance incentives in the management system are the initiatives related to *Pacific Fisheries Reform* and the *Pacific Integrated Commercial Fisheries Initiative* (Section 1.2.9). For example, there are three different types of incentives built into the development of improved monitoring standards:
- *Risk matrix:* Fisheries will be categorized based on the status of target stocks and gear/effort/harvest. Each category will then be linked to a required level of monitoring. Harvester groups have to balance access to marginal opportunities and the structure of their fishery against the associated increase in monitoring requirements.
- *Predictability and Stability:* Clearly defined shares reduce the "race to fish" and improve the implementation of selective fishing technologies.
- *Harvester involvement:* Harvesters are closely involved in developing and testing the operational details of the *Enhanced Accountability* measures and *Monitoring Standards.* Pilot projects help refine the logistics of the program, build a momentum of support within the fleets, and enhance compliance through peer-pressure. Specific examples of compliance incentives are included in Sections 1.2.9, 2.5.4, 3.2.4, and 3.4.

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Scoring Rationale:

Evidence provided for some socioeconomic incentives for sustainable fishing was sufficient for all chum fisheries to pass the SGs at the 60 level and two of the SGs at the 80 and 100 levels.

The WCV, Inside and Fraser chum fisheries passed all SGs at the 80 level due to the recent implementation of small bite fisheries. The NCCC chum fisheries did not pass the second and third SG at the 80 level because no evidence of small bite fisheries or similar incentives was provided. The primary function of small bite fisheries is to ensure that catches are within or close to defined sustainable levels and these tend to have longer openings and greater opportunity for using selective fishing techniques than the larger "full-fleet" fisheries. Thus, small bite fisheries do create an opportunity for fishers to implement more sustainable fishing techniques.

Condition 3.5 - For NCC chum salmon UoC. Certification of North-Central Coast chum fisheries will be conditional until DFO provides evidence that DFO has implemented programs in the North-Central coast that create incentives for harvesters not to exceed target catches in chum fisheries and that these incentives are working. If DFO has evidence of implementing these types of fisheries in the past, this evidence should be provided within 1 year. Evidence of new incentives or initiatives implemented on the North-Central coast should be provided by the second surveillance audit.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.1.9	The hatcheries are subjected to regulations that ensure harvest management practices and protocols that sustain the genetic structure and productivity of the natural spawning population are followed and there is coordination between hatchery programs from different agencies/operators.	• The management agency regulates the hatchery programs so that the hatchery related harvest management practices and protocols do not have substantial negative effects on the genetic structure and productivity of the natural stocks. • The management agencies can determine hatchery contribution from the majority of production with coded-wire-tags (CWTs) other suitable marks, or other scientifically defensible methods, such that the proportion of hatchery produced fish can be (estimated in the catch and escapement.	• The management agencies have an agreement that establishes harvest management practices and protocols for all hatchery programs with respect to practices that sustain the genetic structure and productivity of the natural stocks. • The hatcheries mark a sufficient proportion of production with coded-wire-tags (CWTs) or use other suitable methods such that reliable and meaningful estimates of hatchery composition of the catch and escapement can be estimated.	• The management agencies have a peer reviewed written plan that establishes harvest management practices and protocols for all hatchery programs with respect to practices that sustain the genetic structure and productivity of the natural stocks. • The hatcheries mark all production with coded-wire-tags (CWTs) or other suitable methods such that reliable and meaningful estimates of hatchery composition of the catch and escapement can be computed.
Weight		**Score**	**NCCC Chum: NA** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: NA**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Current chum hatchery programs are substantial for WCVI and Inside chum fisheries and marking programs are sufficient for management fisheries that target these enhanced stocks. Hatchery production of chum for the NCCC and Fraser has been substantially reduced in recent years and is no longer a major component of these fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Hatchery programs for BC pink and chum salmon are fully coordinated through DFO, in a combination of federally-operated facilities and volunteer-run community facilities. Provincial hatcheries raise different species, and in the few cases where federally operated hatcheries raise species under provincial jurisdiction are jointly managed under close collaboration:

- MS 2.2.3 summarizes fisheries targeting BC pink and chum, and identifies those fisheries that target hatchery fish.

- MS 3.2.5 describes the regional approach to salmon enhancement and restoration, provides a brief history of the Salmon Enhancement Program (SEP), and includes an inventory of current enhancement and restoration activities for BC pink and chum. Links to up-to-date release information are included for each facility.

- MS 4.3.3.2 introduces the Salmon Enhancement and Habitat Advisory Board (SEHAB) and links to additional information.

- CUP 2.2 describes pink and chum enhancement activities in eac**h** area.
- CUP 3 describes the specific harvest strategies in place for those fisheries that target hatchery fish.

The *Salmonid Enhancement Program* (Section 3.2.5.2) also implements and supports non-hatchery activities designed to increase the productivity of populations, such as lake enrichment, controlled flow regimes, fishways, and habitat restoration. However, since the reproduction of these fish has not been altered, they are deemed wild under the definition of the *Wild Salmon Policy*. Section 3.3.1.3 summarizes habitat protection and restoration measures. SEP also supports stewardship and education opportunities.

Each hatchery program is carefully adapted to local circumstances and objectives, but they are all consistent with the following general implementation approach:

- Hatchery programs are fully coordinated through DFO, in a combination of federally-operated and contracted facilities as well as volunteer-run community facilities. Provincial hatcheries raise different species, and in the few cases where federally-operated hatcheries raise species under provincial jurisdiction, these species are jointly managed in close collaboration with the Province.
- Hatchery programs are implemented based on *Genetic Guidelines and Protocols*, These guidelines were first documented in 1985, and have been updated regularly since then. An up-to-date version of the guidelines and protocols is available from DFO upon request.
- All hatchery releases are counted and made publicly available through the facility descriptions on the SEP website at http://www.pac.dfo-mpo.gc.ca/sep-pmvs/index-eng.htm under “Fish Hatcheries in BC”, and through integrated data resources such as *Mapster* (Section 3.3.1.4).
- Some hatchery fish are marked to collect information about the survival and contribution of enhanced fish. This includes external marks, such as tags or fin clips, and thermally-induced otolith marking. Indicator stocks are marked to establish release-to-adult survival rates

(i.e. biostandards). Marking and interception data is publicly available through the *Regional Mark Information System* (Section 3.3.1.4). Hatchery mark rates are adapted to the statistical requirements of the mark-recovery program:

- Hatchery chum with targeted fisheries are marked to provide indicators of survival rate and contribution to catch (Nitinat chum: all thermally marked, Snootli and Big Qualicum chum: percentage marked with fin clips).
- Large-scale marking programs for pink salmon were discontinued in the 1990s because the large number of pink salmon returning to the Fraser in odd-numbered years makes recovery rates of marked fish too low to be practical. The majority of hatchery pink are produced on the East Coast of Vancouver Island (Areas 13 and 14). For these stocks, historical data is used to estimate returns based on release numbers and past survival rates. Small scale marking may occur to address local assessment needs.

- Fisheries targeting predominantly enhanced fish are either managed to overall abundance and constrained to a low exploitation rate (e.g. Johnston Strait mixed-stock fishery) or harvest enhanced fish terminally near the natal stream to minimize impacts on wild salmon.
- Egg targets are determined pre-season for each stock and consider potential adult production based on the objective of the program, average fecundities, average incubation to release survival rates, average marine survival rates, and average exploitation rates.
- Expected adults are calculated based on long-term average survivals for the species, area, and stage at release and may not reflect current marine survivals because of year-to-year fluctuations in survival rates.
- DFO enhancement and management activities consider potential interactions with wild stocks, including high target exploitation rates on wild stocks due to abundant hatchery stocks, competition for available food sources, and loss of genetic identity. Mechanisms are in place to address all three of these potential interactions:
  - Exploitation rates are constrained to be sustainable for less productive stocks in mixed stock fisheries, and abundant stocks are fished terminally, as illustrated by the fishery overview in Section 2.2.3.
  - Juvenile interactions in freshwater are managed through release strategies that either minimize freshwater residency periods or take into account juvenile carrying capacity. Marine carrying capacity is unknown, but SEP is working with DFO Science on Ecosystem Research Initiatives to support our understanding of marine carrying capacity (Section 3.3.2).
  - The *Federal-Provincial Introductions and Transfers Committee* (Section 1.1.3.1) reviews all movements of enhanced salmon and considers genetic, disease and ecological issues.

Enhancement activities are thoroughly documented, information is publicly released, and public feedback on enhancement practices is compiled through established processes, including the *Salmon Enhancement and Habitat Advisory Board* (Section 4.3.3.2):

- Salmon enhancement plans are publicly reviewed each year through the *Integrated Fisheries Management Plans* (Section 4.2.1.2). For example, the 2007 IFMP for South Coast Salmon includes the following information about enhancement activities:
  - Enhancement plan for 2007, including targets for egg takes and brood production, and operational details for each hatchery and community economic development project (Section 3.7 of the IFMP).
  - Post-season review of 2006, comparing actual enhancement activities to 2006 pre-season plan (Section 8.6 of the IFMP)

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- The SEP main page at http://www.pac.dfo-mpo.gc.ca/sep-pmvs/index-eng.htm links to detailed information about each enhancement facility, including automated queries to the *Release Database*, as well as an inventory of community projects.
- Hatchery releases and restoration projects are included in on-line databases, such as Mapster, the Fisheries Project Registry (FPR), and the Fisheries Information Summary System (FISS). Section 3.3.1.4 includes links and background information for these data services.
- A well documented example of enhancement as part of a recovery plan is summarized in the 2005 report *An integrated approach to rebuilding Stave River chum using harvest reduction, hatchery augmentation, flow control, and habitat improvement* by Bailey, Fedorenko, and Cook (Can. Tech. Rep. of Fish. Aqu. Sc. 2593, available at http://www.dfo-mpo.gc.ca/Library/320926.pdf). Other examples are listed in Section 3.2.5.3.

Scoring Rationale:
Current hatchery protocols and marking programs are sufficient for the WCVI and Inside chum fisheries to pass all SGs at the 60 and 80 levels and the first SG at the 100 level. The second scoring issue at the SG100 level was not passed because hatcheries don't mark all of their production.

3.2 – MSC P3 Criterion 2	**The management system provides for a framework for research, the results of which are pertinent to achieving the objectives of management.**
Intent	Under this criterion we are interested in evaluating whether there is a research component to the management system that is sufficiently broad in scope to include all target species and other components of the ecosystem that may be impacted by fishing, and which provides for the acquisition of information and data to support scientifically- sound management actions, and whether the research is timely, open to review by peers and stakeholders in general, and is adequately funded.

3.2.1	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	• Research provides for the collection of catch statistical and biological data for the target species. • There has been useful research	• The management system incorporates a research component that provides for the collection and analysis of information necessary for formulating management strategies	• The management system incorporates a research component that considers relevant data and information needs for formulating management strategies for all

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	species, and considers the impact of fishing on the ecosystem and socioeconomic factors affected by the management program.	on the impact of fishing on target and non-target species taken in the fishery, and on the ecosystem in general.	and decisions for both target and non-target species. • The research plan addresses concerns related to the impact of the fishery on the ecosystem. • The research plan addresses socioeconomic issues that result from the implementation of management. • The research plan is responsive to changes in the fishery. • Funding is adequate to support short-term research needs. • There is progress in understanding the impact of the fishery on target and non-target species. • Research results are utilized in forming management strategies. • Research is reviewed by PSARC or PSC, or other appropriate and technically qualified entities.	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. • The framework for research includes investigations dealing with socioeconomic impacts of the fishery. • The research plan responds in a timely fashion to unexpected changes in the fishery. • Funding is secure and sufficient to meet long-term research needs. • There is significant continuing progress in understanding the impact of the fishery on target and non-target species, and the ecosystem in general. • Research results form the basis for formulating management strategies and decisions. • Research is regularly published in peer review journals and/or is reviewed by PSARC or the PSC.
Weight		**Score**	**NCCC Chum: 73** **WCVI Chum: 73** **Inner SC Chum: 73** **Fraser Chum: 73**	

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

DFO has established an extensive monitoring and assessment structure for Pacific salmon and the fisheries targeting them. The management system publicly shares data and research as they become available, typically working closely with external reviewers and stakeholders.

- MS 2.4.1 outlines the stock assessment program for Pacific salmon with links to different publications (e.g. Science Advisory Reports, Stock Status Reports, information bulletins).
- MS 2.4.1.2 describes the different types of data collection activities (stock assessment, research, fishery monitoring).
- MS 2.4.2 summarizes monitoring and assessment activities for BC pink and chum salmon (e.g. escapement surveys, test fisheries, catch monitoring), with links to on-line data sources which are frequently updated during each fishing season.
- MS 2.4.3 describes how escapement and catch data are collected, managed, and publicly released.
- MS 3.2.3 summarizes salmon research priorities, describes the 5-year research agenda, and includes links to relevant research papers organized by topic area (e.g. enumeration methods, stock identification).
- MS 3.3.1.4 links to on-line information resources.
- On-going research is shared with participants in collaborative and consultative processes that contribute to the annual planning cycle (MS 4.2.1.1) and documented in the Integrated Fisheries Management Plan (MS 4.2.1.2).
- Also refer to relevant sections for MSC Indicator 2.1.1 and 2.1.2 for details about the monitoring and assessment framework.
- CUP 4 describes the assessment framework in each area (catch, escapement, exploitation rates).
- CUP 5 reviews the current status of stock units, including trends in escapement, catch, and exploitation rate.

Research on BC salmon and their ecosystem is conducted by Science Branch. Research focuses on achieving a better understanding of salmon habitat, the impact of natural and man-made events, and returning stock abundance for the upcoming year.

As the department progresses with the move from single-species management to integrated ecosystem management, DFO Stock Assessment is retooling the data collection process and DFO Science is restructuring research efforts.

DFO launched the national *Science Renewal* initiative in 2005 to coordinate these efforts, which includes a comprehensive review of its operations and priorities to address the increasing requirement for integrated information to incorporate broader ecosystem considerations into the conservation and management of fisheries resources. In early 2008 DFO released *Science at Fisheries and Oceans Canada: A Framework*

for the Future, which lays out the delivery models for collaborative research in support of integrated ecosystem management. Key elements of the framework are:

- *Ecosystem Science Framework in Support of Integrated Management* (http://www.dfo-mpo.gc.ca/science/Publications/Ecosystem/ecosystem_index_e.htm)
- *Five Year Research Agenda* (Section 3.2.3.2)
- *DFO Science Collaboration Framework*
- *Centres of Expertise* (e.g. Aquatic Risk Assessment, Marine Mammals). A list of COEs with links to detailed program descriptions is available at http://www.dfo-mpo.gc.ca/science/coe/index_e.htm.

The full framework is available at www.dfo-mpo.gc.ca/science/Publications/Framework/index_e.htm.

The research activities of the Department's science branch are summarized in scientific papers that are peer reviewed through the *Pacific Scientific Advice Review Committee* (Section 4.3.5.1). The advice is then publicly released and brought into the appropriate advisory and consultative processes. Published science advice is available at http://www.meds-sdmm.dfo-mpo.gc.ca/csas/applications/Publications/publicationIndex_e.asp.

Five Year Research Agenda (2007-2012)

DFO Science Branch is undertaking a comprehensive review of its operations and priorities to address the increasing requirement for integrated information to incorporate broader ecosystem considerations into the conservation, and management of fisheries resources. Under the *Science Renewal* initiative DFO developed a 5-year research agenda highlighting 10 departmental research priorities:

- Fish population and community productivity
- Habitat and population linkages
- Climate Change / Variability
- Ecosystem Assessment and Management Strategies
- Aquatic Invasive Species
- Aquatic Animal Health
- Sustainability of Aquaculture
- Ecosystem Effects of Energy Production
- Operational Oceanography
- Emerging and Enabling Technologies for Regulatory and Policy Responsibilities

The complete research agenda, including specific areas for research under each of these priorities, is available at http://www.dfo-

mpo.gc.ca/science/research/research_agenda_e.htm.

Pacific Region Research Priorities

Regional research plans are developed collaboratively by Science staff, stock assessment staff, and fishery management staff. Section 4.3.5.1 describes the internal review process. General subject areas of Pacific salmon research in recent years include:

- Methods for identifying distinct conservation units of salmon and evaluating their status (Section 3.2.2)
- Methods for selective harvest in BC salmon fisheries (Section 3.2.4)
- Salmon stock identification methods and and genetic baseline sampling (Section 3.2.3.4)
- Evaluating stock status (Section 3.2.3.5)
- Enumeration Methods (Section 3.2.3.6)
- Methods for incorporating environmental information into salmon management and adapting to climate change (Section 3.2.3.7)

Salmon Stock Identification Methods and Genetic Baseline Sampling

On-going research into the population structure of Pacific salmon species has become increasingly important, because conservation effort such as the *Wild Salmon Policy* explicitly recognize the crucial role of diversity in ensuring long-term sustainability. The associated shift towards finer levels of selectivity in fisheries (Section 3.2.4.1) requires new tools for in-season stock-identification. Completed projects are listed in MS Section 3.2.3.4.

Scoring Rationale: Current research is adequate to meet the SG at the 60 level and 5 of the 8 SGs at the 80 level. The 2nd, 3rd and 4th SGs at the 80 level were not passed because the research plan does not address impacts of the fishery on the ecosystem, socioeconomic issues that result from management decisions and has not been responsive to changes in the fishery.

Condition 3.6 - For all chum salmon UoCs. - Certification of all chum fisheries will be conditional until DFO develops a research plan for chum fisheries which incorporates the existing elements under 80SG and addresses impacts of the fishery on the ecosystem, socioeconomic issues that result from management decisions and is responsive to changes in the fishery. The research plan must also include an evaluation of alternative management approaches to reduce bycatch or determine the survival rate of discarded non-target species for non-retention fisheries. This research plan must be provided to certification body by the second surveillance audit.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

3.2.2	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	• 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. • 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. • The majority of research results are available to interested parties.	• The management system provides for periodic reviews by stakeholders in the fishery, of the content and scope of research, including funding requirements. • There are periodic peer reviews of ongoing research. • Inputs from these reviews are used by the management system to modify research plans. • Research results are available to interested parties on a regular basis.	• 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. • There is a formal and codified arrangement for peer review of ongoing research • The management system regularly incorporates into the research plan recommendations emanating from these reviews. • Research results are made available to all interested stakeholders on a regular basis and in a timely manner.
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

The PSARC, PSC and IFMP processes provide the mechanism for periodic review of the content, scope and results of the research related to chum fisheries and stocks.

DFO has established an extensive monitoring and assessment structure for Pacific salmon and the fisheries targeting them. The management

system publicly shares data and research as they become available, typically working closely with external reviewers and stakeholders.

- MS 2.4.1 outlines the stock assessment program for Pacific salmon with links to different publications (e.g. Science Advisory Reports, Stock Status Reports, information bulletins).
- MS 2.4.1.2 describes the different types of data collection activities (stock assessment, research, fishery monitoring).
- MS 2.4.2 summarizes monitoring and assessment activities for BC pink and chum salmon (e.g. escapement surveys, test fisheries, catch monitoring), with links to on-line data sources which are frequently updated during each fishing season.
- MS 2.4.3 describes how escapement and catch data are collected, managed, and publicly released.
- MS 3.2.3 summarizes salmon research priorities, describes the 5-year research agenda, and includes links to relevant research papers organized by topic area (e.g. enumeration methods, stock identification).
- MS 3.3.1.4 links to on-line information resources.
- On-going research is shared with participants in collaborative and consultative processes that contribute to the annual planning cycle (MS 4.2.1.1) and documented in the Integrated Fisheries Management Plan (MS 4.2.1.2).

Also refer to relevant sections for MSC Indicator 2.1.1 and 2.1.2 for details about the monitoring and assessment framework.

- CUP 4 describes the assessment framework in each area (catch, escapement, exploitation rates).
- CUP 5 reviews the current status of stock units, including trends in escapement, catch, and exploitation rate.

Scoring Rationale:

The information provided by DFO for the management of chum fisheries was sufficient to meet all the SGs at the 60 and 80 levels. The first and third SGs at the 100 level were not met because there is no formal and codified annual stakeholder review of the research plans.

3.3 - MSC P3 Criterion 3	**The management system allows for transparency with respect to its operational details, including a consultative process that provides for the incorporation of information and data from stakeholders in the fishery related to matters of a social, cultural, economic and scientific nature.**
Intent	The objective here is to evaluate whether the management system is open and transparent with respect to all interested parties and whether the views of stakeholders are considered in formulating management strategies.

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3.3.1	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.	• The majority of interested and affected stakeholders are provided with a forum for input into the formulation of management plans and measures.	• The management system provides for the regular participation of most interested and affected stakeholders on matters of a social, cultural, economic and scientific nature. • The management system generally provides notice of meetings at which there can be stakeholder participation. • The management system does not usually exclude involvement of any interested and affected stakeholder. The views of most interested and affected stakeholders are regularly considered in the formulation of management strategies.	• 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. • The management system provides timely, advanced notice of meetings at which there can be stakeholder participation. • The management system does not exclude any interested and affected stakeholder from the consultative process. • The management system addresses the interests of all interested and affected stakeholders.
Weight		**Score**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**
Client Submission: The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.			

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

DFO has an extensive fisheries management consultation process.

A comprehensive network of processes for collaboration, consultation, and public participation has been established for BC salmon fisheries.

- MS 4.2 outlines the departmental support structures for enabling participation.
- MS 4.3 describes the different types of participatory processes, with an inventory of examples for each, explains the departmental approach to major policy initiatives, and summarizes procedures for internal and external review.

4.3.1 Network of Participatory Processes

A comprehensive network of planning and advisory processes has evolved to deal with BC salmon, their ecosystem, and the fisheries targeting them. Processes with public participation operate at different scales of geographic reach and participation:

- *Major policy consultations* are usually region-wide efforts involving fisheries managers, scientists, and stakeholders over several years (Section 4.3.2.1).
- *Community Dialogues* are coordinated through the Consultation Secretariat and bring information about regional DFO initiatives to local communities. Discussions range from broad policy feedback to the specifics of local implementation (Section 4.3.2.2).
- *Local Integrated Advisory and Planning Processes*, such as community roundtables, emphasize structured and on-going collaboration on local operational details (e.g. selective fishing mesasures, water use). DFO actively participates in most local processes dealing with fisheries issues and provides funding support for many of them (Section 4.3.3.1).
- *Regional Integrated Advisory and Planning Processes* are generally set up to tackle specific issues on a larger geographic scale, such as enhancement strategies (Section 4.3.3.2).
- *Consultation and Collaboration with First Nations* takes place locally, in technical forums, and through formal bilateral consultation (Section 4.3.4.1).
- *Harvester Advisory Processes* include commercial representative groups for each gear type and licence area, as well as the Sport Fishing Advisory Board, its sub-committees, and its community-based advisory committees (Section 4.3.4.2).
- *Collaborative Agreements* are used to implement formal co-management arrangements with a clearly specified group of representatives. A recent court decision regarding DFO's Use-of-Fish policies has triggered a transition in funding approaches for work under collaborative agreements. (Section 4.3.4.4).
- Joint federal-provincial and international decision processes (e.g. Fraser River panel of the Pacific Salmon Commission) typically include representatives from regional stakeholder organizations (Sections 1.1.3.1 and 1.1.4.4).

The *Consultation Secretariat* (Section 4.2.2.2) maintains an up-to-date inventory of consultation mechanisms, which is available upon request.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Scoring Rationale:

Section 4.3 of the Management summary clearly describes the partipatory consultative processes which are employed in the BC salmon fisheries. The 100 level scoring elements for all fisheries were met. There is a well defined, formal arrangement for the participation of interested and affected stakeholders. The Consultation Secretariat provides updated information on all upcoming consultations. The team was convinced, through testimony and documentation that all interested and affected stakeholders had access to participate in the consultative process. The salmon management systems does address all categories of interest raised in the consultative process.

3.4 - MSC P3 Criterion 4	**The management system implements measures to control levels of exploitation in the fishery.**

3.4.1 TAVEL Sub-Criterion	**The management system has provisions for controlling levels of exploitation to achieve the escapement and/or harvest rate goals for target stocks, and for the setting of harvest limits for non-target species, when there is information indicating such limits are necessary.**
Intent	Under this sub-criterion the issue of whether the management system provides for mechanisms such as closed areas, no take zones, and closed dates and times for placing controls on fisheries to ensure that objectives related to exploitation levels and escapement are achieved is evaluated.

3.4.1.1	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.	• 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. • 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	• Harvest rates and/or escapement levels designed to achieve target goals are regularly implemented. • The management system provides for the establishment of closed areas, no-take zones and closed dates and times. • Controls are set to maintain or restore target species to high productivity levels, and in a manner	• 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. • The management system provides a formal and codified mechanism for establishing closed areas, no-take zones, and closed

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

		generally.	that does not contribute significantly to ecosystem degradation. • Measures that limit harvest rates and set escapement goals are implemented when necessary.	dates and times for any areas of the fishery. • Management sets exploitation and escapement levels designed to maintain the target stock units at levels of abundance that can sustain high productivity. • 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. • Measures are currently implemented to achieve these objectives.
Weight			**Score**	**NCCC Chum: 78** **WCVI Chum: 96** **Inner SC Chum: 96** **Fraser Chum: 96**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum fisheries are managed to address time- and area-specific concerns over incidental harvests and by-catch through restrictions on location, timing, gear, and retention for net and troll fisheries.

- MS 1.2.9 describes on-going initiatives related to the changing structure of Pacific salmon fisheries, including licence retirement and enhanced monitoring.
- MS 2.3.3 describes the management reference points used to manage the fisheries and target stocks.
- MS 2.4 describes the current monitoring and assessment approach, and more specifically,

- MS 2.4.2.5 discusses catch monitoring programs in the different fisheries, including provisions for reporting any harvest of non-target species.
- MS 2.5.3 summarizes the access controls in place for each harvest sector, including the strict licencing requirements for commercial salmon fisheries.
- MS 2.5.2 describes the decision guidelines used to open, close and restrict fisheries either pre-season or in-season.

2.3.3 Reference Points

BC pink and chum fisheries are currently planned and implemented using 4 types of management reference points:

- *Escapement goals* are in place for target stocks. Pink and chum escapement goals have been generally based on experience and judgment (e.g. past escapements, habitat capacity). The *Certification Unit Profiles* list escapement goals for each of the actively managed pink and chum stocks. For example, management escapement goals have been set for all streams identified in the *North and Central Coast Core Stock Assessment Program for Salmon* by English, Spilsted, and Peacock (2006). Annual fishing plans, covering all harvests, are designed to achieve escapement targets with an acceptable risk tolerance.
- *Exploitation rate ceilings* are in place for many stocks of concern to support recovery efforts. This includes any incidental harvest or by-catch in fisheries targeting other stocks and species, and fisheries are shaped to balance economic constraints on fisheries targeting other stocks against cumulative fishing impacts on the stock of concern. For example, the Canadian fishery exploitation rate for Interior Fraser coho is limited to 3% (Section 3.4.2.1).
- *Fixed harvest rates* are in place for several mixed-stock fisheries to minimize long-term impacts on component stocks. For example, Johnstone Strait mixed-stock chum fisheries are constrained to 20%, while terminal fisheries harvest local abundances where they exceed the escapement goals.
- *Allocation targets* describe either a target amount (FSC fisheries), a target opportunity (recreational fishery), or a target share (commercial gear types). Allocation targets are generally defined by species, not by stock, but in practical implementation allocations tend to be area-specific. Section 1.3.2 describes the allocation principles.

DFO incorporates escapement goals into annual planning and implementation as follows:

- Fisheries are designed to achieve escapement goals, and any excess abundance becomes available for terminal harvests for ESSR fisheries if there are no other constraints, such as by-catch concerns.
- Escapement goals are intended to ensure future production, not identify the minimum abundance that is likely to persist over time. Accordingly, occasional shortfalls should not pose serious risks of extirpation, especially if the escapement goals are set for components of a larger conservation unit.
- Any consistent shortfall from the escapement goals triggers corrective actions to build stocks back up to the target abundance (Section

3.4.2)

Under the *Fisheries Act* (Section 1.1.2.2) all commercial fisheries are closed unless specifically opened through one of the legal instruments described below. DFO opens commercial fisheries for clearly delineated times and areas, subject to many regulations that operationalize coastwide and local conservation objectives. Specific conservation measures are described in Section 2.5.4. The legal instrument for opening commercial fisheries is a *Variation Order* (Section 1.1.2.8), with sign-off authority by the local resource manager. Section 4.3.5 summarizes the internal review process. Anticipated openings are carefully planned for each year based on the best available information and publicly reviewed as part of the *Integrated Fisheries Management Plans* (Section 4.2.1.2).

All fishery openings are publicly announced through *Fishery Notices* listing exact time and location of the fishery, and any specific regulations in addition to the general *Conditions of Licence*, such as gear restrictions implemented to reduce by-catch. Fisheries Notices often summarize the information available at the time, such as abundance estimates, the rationale for the opening, and any specific regulations.

2.5.3 Access Controls

2.5.3.1 Mandatory Licencing and Limited Openings

DFO manages the general structure and characteristics of all BC pink and chum fisheries through a strict licencing program. The *Fisheries Act* (Section 1.1.2.2) prohibits any harvest unless authorized with a licence. An overview of licence types for First Nations, recreational, and commercial fisheries is available at http://www.pac.dfo-mpo.gc.ca/species/salmon/salmon_fisheries/licensing_e.htm. Each licence comes with detailed provisions that shape the fisheries of each harvester group and specify conservation measures to be observed by each harvester. Licence conditions specify which species may be taken, fishing areas, permissible fishing gear, and fishing times. Licence conditions also stipulate requirements for selective fishing measures, catch reporting, and catch handling. Sample licence conditions for commercial fisheries are available at http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/conditions.htm.

DFO manages annual fisheries primarily by controlling fishing effort and secondarily by limiting the amount and type of gear permitted in a fishery. Effort controls differ by harvester group and gear characteristics.

2.5.3.4 Commercial Fisheries

A limited number of commercial fishing licences are currently held in the Pacific Region. The current commercial licencing structure was established in 1996. The main features were permanent gear choice, area selection, and licence stacking:

- Permanent gear choice meant that each salmon licence eligibility would be restricted to either seine, gillnet or troll fishing for the future.
- Area selection meant that vessel owners/licence eligibility holders selected one area to fish for a period of four years.
- Area licensing divided the coast into two areas for seine gear, three areas for gillnet and three areas for troll:
    - Area A: North coast and central coast seine
    - Area B: South coast seine
    - Area C: North coast and central coast gill net
    - Area D: Johnstone Strait, northern Strait of Georgia and West Coast Vancouver Island gill net
    - Area E: Southern Vancouver Island and Fraser River gill net
    - Area F: Northern troll
    - Area G: Southern outside troll
    - Area H: Southern inside troll

Commercial licences specify which species may be taken, fishing areas, permissible fishing gear and fishing times. Licence conditions also stipulate catch sorting and species segregation requirements, information that the vessel master is required to report to DFO, harvest operations records, in-season and post-season catch reporting requirements, and requirements regarding observers and fish slips. Sample licence conditions are available at http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/conditions.htm. Licence conditions specify all aspects of a commercial fishery:

- Target species, allowable quantity of catch (not all licences), and allowable by-catch retention.
- Conservation measures (e.g. closed areas, closed times)
- Permitted gear, and selective fishing equipment (e.g. revival box)
- Harvest log
- Reporting requirements for starting and ending fishing, as well as daily catch reports
- Observer requirements
- Handling and transport requirements

2.5.2 Decision Guidelines

Documenting decision rationales was an important priority in the initial development of the *Integrated Fisheries Management Plans* (Section 4.2.1.2), and *Decision Guidelines* were introduced as a regular feature of BC salmon management in 2002. Decision Guidelines describe anticipated management actions under different plausible scenarios. These contingency plans are publicly reviewed prior to each season, and substantially enhance transparency for the hectic in-season period when thorough public review is not feasible. Development is guided by

relevant departmental objectives (Section 2.3), scientific advice, consultation with harvesters and other interests, and the experience of fishery managers. Decision guidelines are updated annually, and are publicly reviewed prior to the fishing season during the annual planning cycle (Section 4.2.1.1) as part of the *Integrated Fisheries Management Plans* (IFMP) for salmon (Section 4.2.1.2). Through these on-going revisions, the decision guidelines are becoming both more comprehensive and more detailed.

Decision Guidelines cover pre-season planning and in-season implementation, as described in this excerpt from the 2007 salmon IFMPs:

- Pre-season decisions include the development of escapement targets, exploitation ceilings, sector allocations, and enforcement objectives.
- In-season decision points vary from fishery to fishery depending on type, availability, and quality of in-season information, as well as the format of established advisory, consultation, and decision-making processes. Decisions include opening and closure of fisheries, level of effort deemed acceptable, gear type restrictions, deployment of special projects, and other details.
- In-season decisions are consistent with pre-season plans; however, the implementation and applicability of decision guidelines and pre-season plans can be influenced in-season by a number of factors. These include unanticipated differences between pre-season forecasts and in-season run size estimates, unexpected differences in the strength and timing of co-migrating stocks, unusual migratory conditions, and the availability and timeliness of in-season information (e.g. poor weather conditions). In-season management reacts to weekly catch and escapement abundance indicators. Fishery managers and biologists are aware of the dynamic nature of between-year and within-year variations in run timings and abundance and manage these stocks on a day-by-day or weekly time frame. Changes from the pre-season decision guidelines are the exception and occur very infrequently.

Decision guidelines for BC pink and chum fisheries have some basic elements in common:

- Low-impact fisheries are generally implemented 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.
- Mixed-stock fisheries are managed to a low target exploitation rate which is either fixed (e.g. Johnstone Strait chum fishery fixed at 20%) or changes with abundance (e.g. Fraser River chum fishery).
- Terminal fisheries are managed in-season based on estimated surplus to the escapement goal, with a precautionary buffer applied in both the abundance estimate and the timing of the fishery (e.g. seine fisheries on Nitinat chum after first week of October only if escapement milestones into Nitinat Lake have been met).
- Pre-season fishing plans use available data from previous years to anticipate stock levels returning in any given year. These pre-season plans are established for most fisheries through consultation with Departmental managers, biologists and scientists as well as industry and First Nations representatives. Most fisheries commence each year using the established pre-season plan. As inseason catch and escapement data become available through the season, fishing plans are adjusted on a daily or weekly basis to reflect this 'real-time' data. In terminal areas with less accurate preseason information, fisheries are managed mainly based on in-season information (e.g. observed escapement into river, plus estimates of fish holding in the inlet)

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- Stock recovery strategies are reflected in the decision guidelines. These take the form of reduced harvests at low abundance of target stocks and selective fishing measures to reduce impacts on non-target stocks or species (Section 2.5.4).
- In-season information may not provide a clear-cut indication of run status. In this case, management actions use a precautionary approach on stocks of concern.
- If stocks of concern cannot be monitored or selectively protected, broader area and time closures are specified prior to the season.

The fishery-specific sections of each *Certification Unit Profile* are expanded from the decision guidelines in the *Integrated Fisheries Management Plans* (Section 4.2.1.2).

Scoring Rationale: At the 80 level, All fisheries demonstrated that the first scoring element was met, management escapement goals (MEGs) are regularly implemented to achieve target goals. There is a clear legal process defined which ensures that all fisheries and areas remain closed until there is a specific variation order which opens an area fishery (gear specific) for a specific time or until a specific decision guideline is met. The NCCC chum fishery did not pass the third scoring element at the 80 level because controls for the Area 3 and 4 fisheries have not been sufficient to maintain or restore the target species to high production levels. The NCCC chum fishery scored 78 as there is evidence that fisheries have played a role in the lack of recovery for Lower Nass and lower Skeena chum stocks. All other chum fisheries were considered to have met this scoring element. Access controls, primarily through the licence conditions and in-season Variation Orders limit harvest rates as necessary in order to achieve escapement goals.

The lack of a formal and codified system to achieve management goals resulted in all fisheries not passing the first SG at the 100 level. WCVI, Inner SC and Fraser chum fisheries scored 96 on this performance indicator.

Condition 3.7 – For the NCCC chum salmon UoC. - Certification of the NCCC chum fishery will be conditional until DFO implements a recovery plans to restore Area 3 and 4 chum stocks to productive levels and provides evidence that Canadian fisheries are not impeding the recovery of these stocks. Evidence that recovery plans have been implemented to be provided to the certifier by the second surveillance audit.

3.4.1.2	Provides for restoring depleted target species to specified levels within specified time frames.	• The management system includes measures for restoring the majority of depleted populations of target stock to the TRP or	• 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	• 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,

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		equivalent high level of abundance.	relevant environmental factors. • A time schedule for restoration, which considers environmental variability, is determined by the management system.	as qualified by relevant environmental factors. • The mechanism includes strict guidelines for restoring these depleted populations within a certain time frame are formalized by the management system.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 80** **Inner SC Chum: 80** **Fraser Chum: 80**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

The IFMP, WSP and annual Salmon Outlook documents describe procedures for restoring depleted populations of the target stock to the Management Escapement Goals (the operational equivalent of the TRP) for those stocks. The client submission for PI 3.4.1.1 provides information on the decision guidelines, reference points and the access control used to control and recover depleted populations.

Scoring Rationale:

All chum fisheries passed the SGs at the 60 level because the management procedures are adequate for the majority of target chum stocks. The WCVI, Inside and Fraser chum fisheries passed the SGs at the 80 level because these management procedure appear to have been effective for preventing the sustained depletion of the target chum stocks. However, NCCC chum fisheries only partially met the SGs at the 80 level due to the continued depleted status of Area 3 and 4 chum stocks. Therefore, the condition identified for the previous indicator applies here as well.

Condition 3.8 - For the NCCC chum salmon UoC. - Certification of the NCCC chum fishery will be conditional until I DFO implements a

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recovery plans to restore Area 3 and 4 chum stocks to productive levels and provides evidence that Canadian fisheries are not impeding the recovery of these stocks, by the second surveillance audit.

3.4.2 TAVEL Sub-Criterion	**The management system incorporates measures to ensure that its objectives regarding the conservation of the stocks under its purview and the impact of the fishery on the ecosystem are carried out.**
Intent	Two major issues are dealt with under this topic. One examines whether the management system includes provisions to determine whether there is adequate enforcement of the measures established for achieving the objectives of management. In these evaluations, compliance is considered to be the result of adequate enforcement mechanisms by the management system and education with respect to providing clear and timely information to the fishing industry regarding such measures. The other examines whether the management system includes adequate monitoring of the fishery so as to evaluate the performance of the fishery with regard to the policies and objectives of management.

3.4.2.1	The management system includes compliance provisions.	• The management system includes compliance provisions that are effective for the majority of the fisheries.	• The management system includes compliance provisions that are effective for the fisheries. • Infractions, which result in adverse impacts on the status of the stocks or on the ecosystem, are rare.	• 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. • Education and enforcement procedures are implemented and applicable rules are consistently applied. • Enforcement actions are effective in achieving the objectives of management. • There are no infractions being consistently committed in the fishery.

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Weight		Score	NCCC Chum: 90 WCVI Chum: 90 Inner SC Chum: 90 Fraser Chum: 90

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for harvest targets, selective fishing, and by-catch reporting.
- Also refer to the relevant sections for **MSC Indicator 3.1.8**.

DFO uses a full spectrum of complementary compliance mechanisms to achieve conservation and sustainability objectives. These mechanisms can be broadly categorized into incentives, and the application of principles, tools and approaches forming a comprehensive national Compliance Framework.

Incentives are used to increase compliance and collaboration in the long-term. For example, commercial openings in low abundance years are tied to proven selective fishing methods and a demonstrated ability to control effort within a fleet. Several on-going policy initiatives include provisions for improved monitoring and effort control, but these are balanced against increased efficiency, predictability, and stability of harvests.

National Compliance Framework

The National Compliance Framework has nine underlying principles:

- Proactive (promote voluntary compliance)
- Collaborative (build support through partnerships)
- Problem-solving (special attention to specific problems)
- Risk-based (effort and response proportional to risk)
- Innovative (optimize the use of technology and other tools)
- Intelligence-led (increased role of intelligence and analysis in supporting enforcement operations)
- Cost efficient and cost effective (better use of resources), and

- Balanced (appropriate mix of activities undertaken to achieve compliance).

These approaches and principles guide the application of compliance tools by DFO staff. The primary program associated with the management of compliance for DFO is the Conservation and Protection (C&P) Directorate. C&P promotes and maintains compliance with legislation, regulations and management measures implemented to achieve the conservation and sustainable use of Canada's aquatic resources, and the protection of species at risk, fish habitat, and oceans. The program is delivered through a balanced regulatory management and enforcement approach including:

- Promotion of compliance through education and shared stewardship;
- Monitoring, control and surveillance activities; and
- Management of major cases and special investigations in relation to complex compliance issues.

All Compliance Management Plans should be consistent with the National Compliance Framework and the DFO Compliance Model.

General information about C&P is available at http://www.pac.dfo-mpo.gc.ca/ops/CP/default_e.htm

An overview of C&P activities is available at www.pac.dfo-mpo.gc.ca/ops/cp/programs_e.htm

Compliance Monitoring Mechanisms

The Conservation & Protection (C&P) Directorate conducts an Evaluation of Enforcement and Compliance annually as part of the department's post-season review and evaluation of the fishery.[27]

At the end of each season, statistics are compiled on the numbers of checks conducted from various platforms (at-sea, vehicle, and foot) and the number of charges resulting from these checks. Using this information, staff can evaluate whether enforcement priorities were met and whether various enforcement activities were effective. Overall compliance rates for each area and fishery are calculated to identify priority areas for enforcement in subsequent seasons.

Post-season review meetings with C&P and resource management staff are held annually. From these sessions, staff identify key enforcement issues and recommend strategies for addressing these issues.

DFO's *Conservation & Protection Directorate* (C&P) monitors fishing activities and enforces regulations under the mandate of the *Fisheries Act*. C&P currently deploys 170 Fisheries Officers plus Marine Enforcement Officers and Aboriginal Fishery Guardians. General information about C&P is available on their website, as is an overview of C&P activities, and a guide to typical enforcement responses.[28]

[27] http://www.pac.dfo-mpo.gc.ca/ops/Cp/evaluation_e.htm

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Observers conduct on-board or dockside monitoring and are typically funded by DFO. They focus on monitoring by-catch and compliance with fishing regulations, but also collect information for stock assessment (e.g. species mix , size, age, condition, scales, tags). Observers record and report any violations, but do not have a mandate for legal enforcement. There are no formal guidelines in place to indicate the number of observers; rather the level of observer coverage depends on the severity of the conservation issue and varies from one year to the next. Observer deployment focuses on areas with high-priority by-catch reduction regulations, but most fisheries have some coverage in most years. Licence conditions include a provision that commercial fishing vessels must take an observer on board when requested to do so by DFO.

- If there is no conservation issue, the level of observers is low (0 to 2 in each of the fisheries).
- If there is potential to have an impact on stocks or species of concern, the number of observers can increase to 6 to 10 per fishery (with 30-100 vessels operating in the fishery).
- During experiential pilot projects observer coverage is usually high (up to 100% of the vessels would carry an observer).

Charter Patrols employed under a vessel charter contract are designated as "fishery inspectors". Their primary duty is to monitor compliance with conditions and regulations (e.g. area, time). Charter Patrols, just as observers, record and report any violations, but do not have the legal mandate to enforce. Charter patrols also collect biological information (e.g. stream surveys, anecdotal abundance information) and facilitate communication between the department and the fleet (collect catch reports disseminate closures notices). Most BC salmon fisheries have charter patrols.

Recent charges and convictions are publicly announced, and an archive of charges and convictions back to 1994 is available.[29]

Measuring the Success of Compliance Management Activities

The *Conservation & Protection Directorate* conducts an annual assessment as part of the department's post-season review and evaluation of the fishery, as described at http://www.pac.dfo-mpo.gc.ca/ops/Cp/evaluation_e.htm.

At the end of each season, statistics are compiled on the numbers of checks conducted from various platforms (at-sea, vehicle, and foot) and the number of charges resulting from these checks. Using this information, staff can evaluate whether enforcement priorities were met and whether various enforcement activities were effective. Overall compliance rates for each area and fishery are calculated to help identify priority areas for enforcement in subsequent seasons. In addition, valuable narrative data is collected to ensure problem areas are identified and addressed.

[28] http://www.pac.dfo-mpo.gc.ca/ops/CP/default_e.htm
[29] http://www.dfo-mpo.gc.ca/media/charges_e.htm

Post-season review meetings with C&P and resource management staff are held annually. From these sessions, staff identify key compliance issues and recommend the most effective compliance tool to address each of those issues. This is supported by the development of specific strategies to target and mitigate identified risks to the sustainability of aquatic resources.

Compliance rates are generally high:

- Recent charges and convictions are publicly announced at http://www.dfo-mpo.gc.ca/media/charges_e.htm, which includes an archive of charges and convictions back to 1994
- DFO has documented compliance with catch monitoring provisions. These documents show that compliance with log book requirements range from 67% to 89% of the fleet.
- Section 8.5 of the 2008 SC salmon IFMP summarizes enforcement activities in six categories (Commercial Troll, Commercial Net, Aboriginal, Aboriginal Economic, Recreational Tidal, and Recreational Non-tidal) and lists the number of patrol hours, checks, observed violations, and compliance rate.
- 1996 - *The Fisheries Act and Local Governments: Court Judgments (1984 - 1994) in the Pacific Region* outlines the enforcement policy in the context of other federal and provincial acts, and summarizes court judgments in cases where local jurisdictions were charged. The report is available at http://www.dfo-mpo.gc.ca/Library/222013.pdf
- 1999 - *Habitat protection provisions of the Fisheries Act : a review : inventory of prosecutions and court decisions and innovative funding approaches to furthering fisheries habitat management objectives* (WAVES CATNO 237501)
- DFO prepares an *Annual Report to Parliament on the Administration and Enforcement of the Fish Habitat Protection and Pollution Prevention Provisions of the Fisheries Act*, which are available at http://www.dfo-mpo.gc.ca/publication_e.htm. These annual reports include a review of development proposals evaluated, summaries of habitat enforcement activities and resulting warnings, charges, and convictions, and a list of all convictions with sentencing details.

A comprehensive network of planning and advisory processes has developed for BC fisheries, as described in Section 4.3.1. The main purpose of all these processes is to build collaboration and pre-empt any confrontations. However, some disagreements cannot be resolved through the established channels, resulting in unilateral decisions by the department. Section 4.2.2.4 reviews the various dispute resolution mechanisms in place for BC pink and chum fisheries.

Scoring Rationale:
All chum fisheries passed the 60, 80 and first scoring SG at the 100 level.

There is evidence of compliance concerns with regarding to the reporting of steelhead catch in Area 3 and 4 fisheries, ramping for seine

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

vessels and the use of revival boxes. There is also evidence that harvest management rules have not been consistently applied and enforcement actions have not been effective in some years (e.g. 2006). Consequently, all fisheries only partially met the second and third scoring issue at the SG 100 and did not pass the fourth SG100 scoring issue.

3.4.2.2	The management system includes monitoring provisions.	• The management system includes provisions for a monitoring program to evaluate the performance of the majority of the fisheries against its policies and objectives.	• The management system incorporates an effective monitoring program, which evaluates the performance of the fishery relative to management goals and policies. • Monitoring is broad in scope, and results are available to the majority of the stakeholders.	• 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. • Monitoring is comprehensive, and includes all relevant components of the fishery • Results are reported widely on a regular and timely basis.
Weight			**Score**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 2.4.1 outlines the stock assessment program for Pacific salmon and provides an overview of different publications (e.g. Science Advisory Reports, Stock Status Reports, information bulletins)
- MS 2.4.2 summarizes monitoring and assessment activities for BC pink and chum salmon (e.g. escapement surveys, test fisheries, catch

monitoring).
- MS 2.7 summarizes DFO's toolkit for monitoring and assessment.
- MS 3.2.3.5 lists available stock status reports for BC pink and chum salmon
- An extensive network of processes is in place to assess the status of BC pink and chum stocks, including the annual post-season review (MS 4.2.1.1) and formal external reviews (MS 4.3.5)
- CUP 4 details the assessment programs for each area.
- CUP 5 describes the status of target stocks in each area.

2.4 Monitoring and Assessment

2.4.1 Stock Assessment Program

2.4.1.1 Organization

Fisheries and Oceans Canada Science Directorate includes the *Stock Assessment Division* and the *Pacific Scientific Advice Review Committee* (PSARC). PSARC serves as an efficient peer-review process for stock assessment work (e.g. survey methodology, stock status reports). Section 4.3.5 describes PSARC and other review processes.

A summary of stock assessment activities, with links to data bulletins is available at http://wwwops2.pac.dfo-mpo.gc.ca/xnet/content/salmon/stock.htm.

Note that assessment activities described in the sections below may also be organized and implemented through DFO's Fisheries Management Branch (e.g. test fisheries on the Lower Fraser).

2.4.1.2 Types of Data Collection Activities

DFO has established an extensive monitoring and assessment structure for Pacific salmon and the fisheries targeting them. Data collection activities can be grouped into 3 categories:
- *Stock assessment*: collects abundance data, escapement data, and biological data needed to manage stocks and monitor their status. (Section 2.4.2).
- *Research*: collects data to address fundamental knowledge gaps and improve our understanding of BC fish stocks and their ecosystem (Section 3.2.2.5).

- *Fishery monitoring and reporting:* collects information about harvesters, fishery openings, and catch (Section 2.4.2.5)

This information is collected through a combination of:

- Fishery-independent data collection (i.e. does not require a fishery opening). This includes departmental escapement surveys (e.g. mark-recapture programs, overflights), test fisheries, and tagging programs.
- Collaborative data collection in commercial fisheries. This includes reporting provisions identified in the licence conditions, assessment fisheries, charter patrols, observers, and dock-side monitoring.
- Collaborative data collection through co-management and capacity building arrangements. This includes joint escapement surveys, fishwheels, and aboriginal guardians.
- Information exchange between DFO, other agencies, and stakeholders though an extensive network of collaborative, advisory, and consultative processes (Section 4).

Section 2.7 summarizes DFO's toolkit for assessment, monitoring, and enforcement.

2.4.2 Monitoring and Assessment of BC Pink and Chum Salmon

2.4.2.1 Escapement Surveys

Information about the abundance and distribution of adult spawners (i.e. escapement) is the corner stone of BC salmon management. A comprehensive suite of annual escapement surveys is in place to collect this information using a combination of permanent, temporary, and mobile platforms:

- *North Coast and Central Coast:* A formal assessment framework has been developed an publicly released (English, Peacock and Spilsted. 2006. North and Central Coast Core Stock Assessment Program for Salmon). *Annual Working Plans* are develop to implement this framework, which in turn are translated into detailed *Field Work Plans* for each sampling site. Counting facilities include the Babine River counting fence, Docee River counting fence, Kitwanga River Salmon Enumeration Facility, Meziadin Fishway, and the Nass River Fishwheel. Descriptions of these facilities and links to up-to-date counts are available at http://www.pac.dfo-mpo.gc.ca/northcoast/counts/default.htm.
- *Inner South Coast:* The target level of coverage is to survey all major chum producing streams every year, using a combination of counting fences, sonar, visual counts from fixed-wing or helicopter overflight, and streamwalks. Some major streams, such as the Nanaimo and Englishman Rivers, are monitored for pink escapement, and some smaller streams are monitored by hatcheries and volunteer groups. Survey effort for pink escapements is low, because abundance and catches are also low.
- *West Coast Vancouver Island:* Twenty one systems throughout the WCVI are surveyed annually by DFO-contracted survey crews or

hatchery staff. Crews count spawners in these systems several times throughout the run. Spawners are usually counted during swim surveys, but other methods may be used, such as aerial surveys or bank walks. The counts are compiled and analyzed (via area under the curve methods where survey number is adequate) to estimate total escapement. Chinook are the priority species for escapement surveys on the WCVI. Chum escape and spawn later, so the surveys may not capture the entire return and therefore the chum estimates are generally less reliable. A suite of other systems are surveyed less frequently and less rigorously by charter patrols and other groups (e.g. First Nations, BC Streamkeepers). Statistical estimates of abundance are not generated for these systems; however, they provide a gauge of spawner distribution among other chum rivers. For chum in particular, partial in-season estimates of spawner abundance may be used to trigger fishery openings on identified hatchery surpluses. Therefore, these surveys can be an integral part of fisheries management.

- *Fraser River:* DFO implements chum escapement surveys in a number of Fraser systems, some of them in collaboration with First Nations, ranging from intensive surveys that produce relatively accurate and precise escapement estimates to less precise methods that are used more for assessing population trends. The most precise and accurate escapement estimate is produced on the Harrison / Chehalis / Weaver system using mark-recapture methods by Chehalis First Nation and DFO jointly since 1991. This complex represent the largest populations of chum in the Fraser watershed. Early observations of pink escapement were conducted for much of the last century by enforcement officers (Farwell et al. 1987). Adult tributary escapement estimates, using mark-recapture surveys, were compiled for the odd-year run from 1957 to 1991. A streamlined approach was implemented from 1993 to 2001, using a mark-recapture sampling in the lower river to develop a pink salmon escapement estimate for the entire Fraser system. A fry enumeration program at Mission has been conducted from 1962 to present. These changes in survey coverage are consistent with increasing abundance and changing harvest patterns over the same period. Assessment programs in Squamish and Burrard Inlet are led by local First Nations, Section 2.4.3.1 describes how escapement data is compiled and managed. A detailed description of escapement monitoring in each area is included in the appropriate *Certification Unit Profile*.

2.4.2.2 Test Fisheries

Commercial fishing vessels are contracted for standardized test fisheries under *Collaborative Agreements*. These are primarily intended to provide in-season abundance indices for target stocks, but also observe fish behaviour, species composition including by-catch species, and collect biological samples (e.g. scales, tissue, fins). Test fisheries are considered part of the necessary data collection process, and are implemented with scientific licences under Section 52 of the *Fisheries Act* (Section 1.1.2.2). As a result, these catches are not counted towards the commercial Total Allowable Catch. However, test fishing catches are included in the calculation of total catch and exploitation rates. For example, the mixed-stock chum fishery in Johnstone Strait is managed to a fixed exploitation rate of 20%, of which 5% is specifically set aside for First Nations FSC fisheries, recreational fisheries, and test fisheries.

Test fishing contracts undergo a public bidding process, described at http://www-ops2.pac.dfo-mpo.

gc.ca/xnet/content/salmon/testfish/selection.htm.

An overview of past test fishing coverage is available at http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/salmon/testfish/default.htm. Some of the summaries on the site are from 2006, but up-to-date information for pink and chum test fisheries can be accessed through the links below.

Daily test fishing results can be queried from the *Fisheries Operating System* (FOS) through the *Daily Test Fishing Summary Report* link at the top of each page. A map of test fishing locations in southern BC is available at www.psc.org/image_test_fishing_locations.htm. A detailed map of Fraser River test fishing sites is available at www.psc.org/image_lower_fraser_river.htm.

2.4.2.3 Assessment Fisheries

DFO uses commercial openings with controlled effort to collect abundance and migration data. These openings provide some limited fishing opportunity to commercial harvesters, while improving abundance estimates and reducing in-season uncertainty. Except for the limitations on vessel numbers or short openings, assessment fisheries are regular commercial fisheries and harvests count towards the commercial Total Allowable Catch (TAC).

For example:

- Area 7 (Mussel, Kainet, Neekas, Quartcha and Roscoe): Opportunities for one-day gill net and seine assessment fisheries on the last week of July or first week of August are determined preseason based on recent trends in brood year escapement.
- Area 8 (Kimsquit and Bella Coola): Two-day gill net assessment fisheries early in the run to gauge abundance and determine subsequent openings. A detailed description of assessment fisheries in each area is included in the appropriate *Certification Unit Profile*.

2.4.2.4 Monitoring Enhanced Pink and Chum

BC salmon enhancement programs are implemented for different purposes (Section 3.2.5), and the monitoring approach for enhanced pink and chum differs depending on the purpose of a particular enhancement program:

- Monitoring of long term contribution of enhancement to rebuilding. For example, rebuilding efforts for Stave River chum were augmented with hatchery production. Active enhancement concluded in 2005, but escapement monitoring continues.
- Hatchery contribution to mixed-stock fisheries is estimated based on current and historic hatchery marking programs (e.g. thermally-induced otolith marking). Pink salmon marking concluded in the mid-1990s, but all hatchery releases are counted and adult contribution to run size is calculated from average survival rates. The number of chum populations marked has been reduced in recent years, but marking is maintained on indicator stocks.

- Hatchery contribution to indicator stocks is monitored through fishery and escapement sampling. Methods for assessing hatchery production and contribution to wild systems have been published and reviewed. The methods are still being used, but mark rates have since been reduced (Section 3.2.5):
- 1989 - *Methodology for estimating production chum and pink salmon from SEP facilities* by Bailey and Plotnikoff. PSARC Report S89-24.
- 1990 - *Framework for estimating escapement of naturally spawning mark returns produced by SEP facilities*. PSARC Report S90-11.

2.4.2.5 Fishery Monitoring and Catch Reporting

A complete, accurate and verifiable fishery monitoring and catch reporting program is required to successfully balance conservation with the objectives of optimal harvest levels. Across all fisheries, strategies are being developed to improve catch monitoring programs by identifying standards that must be achieved as well as clarifying roles and responsibilities of the Department and harvesters. The standards focus on data collected to estimate catches, releases, and essential biological data, such as CWT sampling, for stock assessments and fishery evaluations. As well, new technologies are being used to facilitate the timely submission of data directly into centralized DFO databases (Section 1.2.9.4).

Current fishery monitoring programs including non-target species are listed in the annual *Integrated Fisheries Management Plans* (IFMP), described in Section 4.2.1.2. A detailed description of catch monitoring programs in each area is included in the appropriate *Certification Unit Profile*.

Larger FSC fisheries (e.g. at Nitinat) are monitored and sampled by either First Nation fishery or DFO staff. Smaller fisheries are generally not monitored, although as a condition of their communal licences First Nation bands are required to report catch.

Recreational fisheries are monitored through creel surveys. Creel surveyors gather catch-per-unit-effort data and take biological samples from boat landing sites. These data are augmented by logbook and manifest records of catch and effort submitted by lodges operating guided trips. Effort is determined through periodic surveys of fishing areas. These data are compiled and analyzed to produce catch and effort statistics by area and species.

Commercial fishery monitoring programs for target and non-target species are obligatory as a condition of license in all fisheries (Section 2.5.3). Incremental development and implementation of commercial monitoring standards is built into the demonstration fisheries and pilot projects under the *Pacific Integrated Commercial Fisheries Initiative* (Section 1.2.9.2). Specific monitoring and reporting requirements include:

- Conditions of licence require licence holders to report all fish caught whether landed or discarded and specify the catch reporting details applicable to each gear type. Logbooks, frequent phone-ins, and sales slips are mandatory for all commercial salmon fisheries. Harvesters can be charged if they fail to comply with correct use of the logbook. All interceptions must be recorded, whether they are

retained, released, or discarded. This includes details for encounters of non-target species.

For example, salmon gill net harvesters are required to separately record any interception of all species of salmon including steelhead and Atlantics, dog fish, sturgeon, birds, mackerel, lingcod, halibut, rockfish, and marine mammals. Sample logbook pages are included in Appendix 9 of the 2008 salmon IFMPs. Conditions of Licence are outlined in Section 2.5.3.4.

- Observer reporting is currently not mandatory in commercial fisheries specifically targeting pink or chum salmon, but there is a provision in the licence conditions for each commercial vessel to accept observers on board if requested by DFO.
- Phone-in requirement for all license holders participating in commercial salmon fisheries is in place.
- There are provisions for self-reporting and observer reporting. For example, fishery notices include additional reminders for voluntary reporting of sea turtle sightings.
- In addition to log books, sales slips, and phone-in programs, real-time monitoring is in place where necessary.
- In order to properly account for the full impact of fishing on chinook and coho stocks, the PST specifies that all parties develop programs to monitor all sources of fishing related mortality on chinook and coho. Catch monitoring programs are being modified to include estimates of encounters of all legal and sub-legal chinook and coho, as well as other salmon species, in all fisheries.
- DFO charter patrols monitor commercial net fisheries. Daily information is passed along to the local fishery manager including catch estimates by species, fleet size, and distribution as well as any problems identified with respect to compliance of fishery restrictions. For North Coast and Central Coast fisheries, this information is compiled in each manager's *Record of Management Strategies* (RMS) report.
- Independent observers from environmental organizations have recently begun monitoring by-catch in some salmon fisheries as part of collaborative initiatives. A sample report from the Fraser River chum fishery is available at http://www.watershed-watch.org/news/item.html?nid=157.

Scoring Rationale:

The DFO submission and testimony during the fishery visits provide sufficient evidence of monitoring systems to pass the 60 and 80 level SGs for all chum fisheries. In season escapement monitoring, test fisheries and dockside monitoring components provide sufficient information to evaluate the harvest against the management goals and policies. Monitoring is coast-wide, results of the harvest (dockside) and test fisheries are available on a weekly basis through out the salmon season. Escapement information is available during the post season assessment period. Both scoring elements at the SG80 are met.

The lack of a comprehensive stock status report, clearly define management goals, and estimates of harvest rates prior to the MSC submissions was clear evidence that the SGs at the 100 level are only partially met for all chum fisheries.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

3.5 - MSC P3 Criterion 5	**The management system provides for regular and timely review and evaluation of its performance, and for appropriate adjustments based on the findings of these reviews and evaluations that are consistent with the objectives of the program.**		
Intent	The objective under this criterion is to evaluate whether the management system has an effective mechanism for reviewing performance vis-à-vis the objectives and policies of the management programs. An effective mechanism would include both internal and external reviews, and, when appropriate, the recommendations from the reviews would be incorporated into the management of the fishery. Also, the issue of whether the management system provides a mechanism for resolving disputes emanating from such reviews, or any other sources, is evaluated.		
Weight		**Score**	**NCCC Chum: 88** **WCVI Chum: 88** **Inner SC Chum: 88** **Fraser Chum: 88**

3.5.1	There is an effective and timely system for internal review of the management system.	• The management system provides for internal review of its performance, and when available, review results are made available to the majority of interested stakeholders.	• The management system includes provision for an internal review that is conducted periodically as the need arises. • The results of the review are made available to interested stakeholders.	• The management system provides for continuing internal review that is broad in scope, effective, and timely. • The review process and results are made available to all stakeholders.
Weight			**Score**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Section 4.3.5.1 of DFO's Management Summary report describes DFO's comprehensive internal review processes.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

4.3.5 Review Processes

4.3.5.1 Internal Review Processes

DFO has established a comprehensive hierarchy of internal review processes. Review mechanisms are in place within each branch of the department (i.e. policy, management, stock assessment, science) and multi-disiplinary review mechanisms are adapted to the characteristics of different areas and species. The review hierarchy for fisheries planning and implementation is structured as follows:

- *Local managers and biologists* serve as the main conduit of information about local circumstances and operational details. The authority to open commercial fisheries has been delegated to local fisheries managers.
- *Geographic Management Area Teams* (GMAT) are the forum where local managers and biologists from connected areas review broader management actions and co-ordinate implementation. For example, GMATs are in place for Johnstone Strait, Strait of Georgia, and the West Coast of Vancouver Island.
- *Area Management Teams* (AMT) coordinate large-scale integrated management actions and policy implementation. For example, the South Coast Area Management Team reviews selective fishing projects for licence areas B, D, E, G, and H (Section 2.5.3.4).
- *Regional Working Groups* deal with coast-wide initiatives and annual implementation for specific fisheries. For example, the Salmon Working Group reviews the draft *Integrated Fisheries Management Plans* for salmon (Section 4.2.1.2) before they are circulated for public feedback.
- Several higher-level committees provide strategic direction to area staff. These include the *Regional Management Committee* (e.g. guides major policy and operational decisions), and the S*trategic Directions Committee*.
- The highest levels of review and sign-off rest with the Regional Director General, and finally with the Minister.

DFO Science maintains internal processes to coordinate research activities and review scientific work:

- The *Stock Assessment Coordinating Committee*—a departmental committee comprised of Stock Assessment biologists and fishery managers—reviews and provides advice/recommendations to the Director of Stock Assessment and the Chair of the Salmon Working Group regarding stock assessment priorities (e.g. PSARC papers to be developed, stock status assessments and advice regarding prioritizing of stock assessment programs. In making a decision regarding research plans, the Stock Assessment Coordination Committee considers the knowledge base, level of threat of extinction, and known and likely harvest and ecosystem impacts.
- The *Canadian Science Advisory Secretariat* (CSAS) coordinates the peer review of scientific issues for DFO. The different regions conduct their resource assessment reviews independently, tailored to regional characteristics and stakeholder needs. CSAS facilitates these regional processes to ensure national quality standards. CSAS also works with the Regions to develop integrated overviews of

issues in fish stock dynamics, ocean ecology and use of living aquatic resources, and to identify emergent issues quickly. An overview of CSAS processes is available at http://www.dfo-mpo.gc.ca/csas/csas/Process-Processus/Process-Processus_e.htm.

- The *Pacific Science Advice Review Committee* (PSARC) is the regional body responsible for review and evaluation of scientific information on the status of living aquatic resources, their ecosystems, and on biological aspects of stock management. A description of PSARC, steps in the PSARC Review Process, organizational structure, meeting schedules and PSARC documents are available at http://www.pac.dfo-mpo.gc.ca/sci/psarc/whatis_e.htm. Most of the research documents (e.g. stock status reports) listed in Sections 2.4.1.3 and 3.2.3 were reviewed by PSARC. PSARC advises the *Resource Management Executive Committee* (see above) and other bodies on stock and habitat status and potential biological consequences of fisheries management actions and natural events. Fisheries Management provides prioritized requests for research papers to PSARC.

At a departmental level, the *Audit and Evaluation Directorate* carries out the internal audit and evaluation function within DFO and reports its activities to the Departmental Audit and Evaluation Committee (DAEC) 8-10 times per year. This committee is co-chaired by the Deputy Minister and the Associate DM and has all Assistant Deputy Ministers and Regional Directors General as members. The Committee considers and approves an annual workplan; approves the terms of reference for individual audits and/or evaluations; approves the reports and, management action plans that are necessary to address recommendations made in the reports. Up-to-date information about internal audits and resulting implementation plans is available at http://www.dfo-mpogc.ca/communic/CREAD/index_e.htm.

Many of the audits and evaluations focus internal matters, such as language training and fiscal responsibility, but there are frequent reports dealing with fisheries-related matters.

Post season reviews are undertaken on a broad spectrum of fisheries. Preseason forecasts and plans are compared with in-season estimates of run size, management actions and final catches and escapements. Implementation issues are also identified. Internal post season reviews are undertaken and written up by the local manager with input from the local Chief of Resource Management and Regional Resource Manager – Salmon. These documents are released prior to the post season review meetings with First Nations and stakeholders.

Each Party to the PSC (Canada and the United States) is required to provide a post season report for all fisheries before the January Post Season Review meeting of the PSC. This report is included in the PSC Annual report.[30]

Internal post season reviews by the local manager are released prior to the post season review meetings with First Nations and stakeholders. The PSC Post Season Review is included in the PSC Annual report.[31]

[30] http://www.psc.org/publications_annual_pscreport.htm
[31] http://www.psc.org/publications_annual_pscreport.htm

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Scoring Rationale:
DFO's internal review process is sufficient to pass all the SGs for this indicator. There is an annual assessment process which incorporates internal reviews of both science (monitoring and assessment) as well as the management aspects of the fisheries. The process and assessment results are available through the annual assessment cycle process.

3.5.2	There is an effective and timely system for external review of the management system.	• The management system is open to external review at least once every 10 years.	• The management system provides for a review of management performance by one or more independent experts at least once every five years. • The format and standards of the review are established within the management system. • Review results are made available to the public.	• The management system provides for one or more independent experts to review at least bi-annually all of the important components of management performance. • The format and standards of the review are established with input from outside the management system. • Provision is made for making public the review results.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 70** **Inner SC Chum: 70** **Fraser Chum: 70**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

4.3.5.2 External Review Processes

In addition to the on-going review mechanisms integrated into the network of participatory processes (Section 4.3) and the annual planning cycle (Section 4.2.1.1), DFO is subject to several levels of formal external review:

- The *Pacific Fisheries and Resource Conservation Council* (PFRCC), created by DFO in 1998 as an independent body, regularly

publishes reports that address broad challenges in Pacific salmon managent (e.g. impact of climate change on freshwater habititat of salmon). Detailed information about the council is available at http://www.fish.bc.ca, which includes access to all of the council's publications.

- The *Committee on the Status of Endangered Wildlife in Canada* (COSEWIC) was established in 1977 to ensure nationally consistent and scientifically defensible classification of wildlife species at risk. The committee has refined its risk definitions, criteria, and assessment procedures over 30 years of operation, and was designated as the official advisory body under the *Species at Risk Act* in 2003 (Section 1.1.2.4). The federal government takes COSEWIC's risk designations into account when establishing the legal list of species at risk. DFO works closely with COSEWIC to ensure that conservation concerns are identified in a timely manner and implements extensive recovery measures even for stocks or species that are not listed under SARA (Section 3.4.1).
- The *Office of the Auditor General of Canada* (OAG) established a dedicated *Commissioner of the Environment and Sustainable Development* in 1995 to conduct regular performance audits and monitor the 3-year *Sustainable Development Strategies* of about 3 dozen federal departments, including DFO (Section 1.2.2.1). Annual reports of the commissioner and other federal audits of DFO back to 1981 are available at http://www.oagbvg.gc.ca/internet/English/parl_lpf_e_1205.html. For example, the Commissioner conducted a detailed review of Canada's Oceans Management Strategy in 2005.. The full report is available at http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200509_01_e_14948.html. The Government's response to the report is available at http://www.oagbvg.gc.ca/internet/English/att_oag-bvg_e_14097_e_14097.html.
- The *BC Office of the Auditor General* typically conducts performance audits including the management of natural resources and environmental impacts under provincial jurisdiction (e.g. forestry), but in 2004 they also completed a detailed audit of federal-provincial roles in salmon management. *Salmon forever: an assessment of the provincial role in sustaining wild salmon* is available at http://www.llbc.leg.bc.ca/public/PubDocs/bcdocs/372078/Salmon_environment.pdf. The report also includes a formal response by the BC Government.
- The *Treasury Board* has implemented the *Management Accountability Framework* (MAF) which requires that participating departments, including DFO, complete annual *Departmental Performance Reports* (DPR) that summarize progress on key deliverables. Section 1.2.2.4 describes the process and links to the most recent DPRs.
- The *Standing Committee on Fisheries and Oceans* (SCOFO) of the Senate of Canada regularly reviews the planning and implementation of Canadian fisheries. Information about the committee's activities is available at www.parl.gc.ca/fopo. Two reports of particular relevance to BC salmon are the review of *Oceans Act* (Section 1.1.2.3) and the review of the 2004 Fraser River salmon fishery (Section 1.2.8.2). An inventory of SCOFO reports and government responses is available at http://www.dfo-mpo.gc.ca/communic/reports/index_e.htm.
- Formal *Ministerial reviews* of a particular fishery or initiative may be triggered if substantial disagreement and acrimony cannot be

resolved through the other channels described in Section 4.3. For example, the *Willams Review* looked at how the Fraser River sockeye salmon fishery was managed in 2004 (Section 1.2.8.2).

4.3.5.3 Independent Review Processes

DFO fully supports independent reviews of BC pink and chum management practices. For example, DFO publicly distributes data and research results, and contributes staff time to independent review processes. A recent example is the Independent Science Review of Skeena fisheries, as described in the North Coast *Certification Unit Profiles.*

Scoring Rationale:

The client has clearly demonstrated through participation in a number of review processes that DFO is open to, and participates in externally mandated management system reviews, therefore all chum fisheries have met the SGs at the 60 level because the management system is "open to external review". However, none of the chum fisheries passed the first SG at the 80 level as there was no demonstrated review of management performance of chum, or salmon fisheries at least every five years by independent experts. The second scoring element was partially met at the 80 LEVEL because the external review processes described in the DFO submission (PFRCC, COSEWIC, Auditor General of Canada) have not been specifically or consistently engaged in the review of chum salmon fisheries, and certainly not once every 5 years. The third scoring element was awarded as being met because DFO has demonstrated that similar management reviews are publically available.

Condition 3.9 – For all chum salmon UoCs. - Certification of all chum fisheries will be conditional until an external review of chum salmon fisheries management performance is completed and there is commitment to conducting a similar review at least once every five years. The results of the first external review will be provided to the certification body by the second surveillance audit.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
3.5.3	There is a mechanism for incorporating into the management system recommendations resulting from the review process.	• 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.	• The recommendations from internal and external reviews are usually, but not always, used to make changes to the management system.	• The recommendations from internal and external reviews are always acted upon and, where appropriate, incorporated into the management system. • The management system provides for a report to all interested stakeholders describing how it acted on the recommendations of these reviews.
Weight		**Score**	**NCCC Chum: 85** **WCVI Chum: 85** **Inner SC Chum: 85** **Fraser Chum: 85**	

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Recommendations from internal and external reviews are acted upon and incorporated into the management process when appropriate. A recent example is the steps taken to date by DFO responding to the 2002 Review of the Fraser River sockeye fishery. These steps include a report documenting DFO's response to each recommendation in the 2002 Post-Season review.[32]

DFO has a series of annual advisory meetings with stakeholder representative groups (See Indicator 3.3.1) that facilitate incorporation of stakeholder recommendations. In commercial fishery advisory meetings, Licence Area breakout sessions are held in which issues are tabled and recommendations prepared and submitted for incorporation into the annual IFMP[33]. Similar advisory processes are conducted with other stakeholder groups.

Through the development of the annual IFMP, recommendations from internal DFO review processes are incorporated into the management

[32] Bert Ionson, Fisheries and Oceans Canada, pers comm..
[33] Licence Area Breakout Session Issues/Recommendations Document, SCSA Meeting Dec 11-12, 2003

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

system (See Indicator 3.5.1).

The post-season review and the development of the IFMP pre-season, and associated consultations, are the mechanisms by which recommendations resulting from review processes are incorporated into the management system.

Scoring Rationale

By demonstrating that important issues raised in the advisory and sciences processes have been incorporated into the annual integrated fishery management planning process.

All chum fisheries passed the 60 and 80 levels because recommendations from reviews are considered by the management agency and generally incorporated into the decision making process. The second criteria at the 100 guidepost was only partially met because recommendations are not always acted upon (e.g. acting on the recommendations provided in the Skeena Independent Science Review Panel report and the DFO approved Core Stock Assessment Program review) and explanations of what DFO has done or not done regarding these recommendations are not always provided. The two SGs at the 100 level were only partially met because recommendations are not always acted upon. DFO has indicated their agreement with most of the recommendations in North and Central Coast Core Stock Assessment Review (English et al. 2006) and Independent Science Review Panel report for the Skeena Watershed (Walters et al. 2008) but the recommended actions have not been initiated (e.g. improve escapement monitoring for Area 4 chum). Explanations of what DFO has done or not done regarding these recommendations are not always provided.

3.5.4	There is an appropriate mechanism for resolving disputes.	• There is a mechanism for resolving disputes that is provided for by the management system.	• The management system has a dispute-resolution process for resolving significant disputes. • The dispute resolution mechanism is available for use by affected parties, but is not routinely used. • The dispute resolution mechanism does not discriminate against any disputing party.	• The management system has a formal and codified mechanisms for resolution of disputes arising as a result of the fishery. • Affected parties routinely use the dispute resolution mechanism. • The dispute resolution mechanism is unbiased and fair respecting all disputing parties.
Weight			**Score:**	**NCCC Chum: 97** **WCVI Chum: 97** **Inner SC Chum: 97**

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

			Fraser Chum: 97

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Section 4.2.2.4 of DFO's Management Summary report describes DFO's dispute resolution processes.

Scoring Rationale:

DFO's dispute resolution process is sufficient to pass all the SGs for this indicator at the 60 and 80 levels, and two of the three SGs at the 100 level. The third SG at the 100 level was partially met because we some parties contend that a dispute resolution process where the final authority remains with the Minister of Fisheries and Oceans, is not an unbiased process.

3.6 – MSC P3 Criterion 6	**The management system provides for the operation of the fishery to be in compliance with all relevant legal and administrative requirements.**
Intent	In this section we attempt to evaluate the management system with regard to whether it manages the fishery in a manner that is consistent with Canada's commitments under relevant international treaties and agreements, and with domestic laws and regulations that pertain to the fishery. In this context we also evaluate whether the management system is in conformity with the legal and customary rights of First Nations peoples, as established by treaties with those peoples, the Canadian Constitution, and other applicable instruments.

Weight		**Score**	**NCCC Chum: 96** **WCVI Chum: 96** **Inner SC Chum: 96** **Fraser Chum: 96**

3.6.1	The fishery is not operated in a unilateral manner in contravention to	• The management system is in compliance with the majority of	• The management system does not willingly act in contravention to any	• When the stocks of fish under the authority of the management

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
	international agreements.	international treaty recommendations dealing with the fishery.	international treaty obligations pertaining to the fishery. • The management system does not knowingly undertake unilateral exemption from any treaty obligation pertaining to the fishery. • Evidence indicates any inadvertent action with regard to the contravention of any international treaty obligations by the management system is rare.	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. • All measures taken within the management system are in compliance with relevant international treaty obligations. • The management system does not undertake unilateral exemption from any treaty obligation pertaining to the fishery.
Intent	For the purposes of this Indicator, only treaties and conventions which the government of Canada has signed, ratified or otherwise is a High Contracting Party to, shall apply.			
Weight		**Score:**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**	

Client Submission:
The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Section 1.1.4 of DFO's Management Summary report describes the international agreement that are relevant to the management of BC chum fisheries.

Scoring Rationale:

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

No issues have been raised with regard to DFO's compliance with international agreements affecting BC chum fisheries, therefore, BC commercial chum fisheries pass all the SGs for this indicator.

3.6.2	The fishery is carried out in a manner consistent with all relevant domestic laws and regulations relevant to the fishery	• 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.	• 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.	• 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.
Weight			**Score:**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**

Client Submission:
The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Section 1.1.2 and 1.1.3 of DFO's Management Summary report describes the federal and provincial laws that are relevant to the management of BC chum fisheries.

Scoring Rationale:
No issues have been raised with regard to DFO's compliance with domestic laws and regulations affecting BC chum fisheries, therefore, BC commercial chum fisheries pass all the SGs for this indicator.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

3.6.3	The management system exists within an appropriate and effective legal and/or customary framework which ensures that it observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood.	• The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	• The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	• The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
Intent		*At the request of the client, DFO and the MSC, the assessment team agrees to adopt the wording of this performance element from the Fisheries Assessment Methodology (FAM), released in July 2008. The team's intention is to interpret this performance indicator based on the performance elements and definitions identified in the FAM document. .*		
Weight			**Score:**	**NCCC Chum: 90** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 90**

Client Submission:
The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

MS 1.1.5 establishes the legal setting for FN access to fishing opportunities, explains the evolving nature of these rights and their interpretation in specific cases, reviews pertinent case law, explains the different types of FN fisheries (FSC, Pilot Sales, treaty), and summarizes policy development for aboriginal fisheries.

Scoring Rationale:
The management system for BC chum fisheries includes mechanisms to observe First Nation's legal and customary rights related to chum fisheries. Therefore, the SGs at the 60 and 80 levels were met. The single SG at the 100 level was only partially met because there are instances where First Nations have identified deficiencies in the current commitments from BC and Canada regarding First Nations fishing for food or livelihood related to the chum fishery.

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

3.7 – MSC Criterion 7	**Fishing operations make use of gear and fishing practices that limit ecosystem impacts.**		
Intent	The intention regarding this criterion relating to fishery operations is to evaluate the degree to which the management system is capable of implementing responsible fishing practices. The understanding here regarding responsible fishing practices refers to the criteria defined in the MSC, Principle 3.B., Operational Criteria 12-17, and with those sections of the FAO Code of Conduct for Responsible fishing dealing with the conduct of fishing practices by the fishing industry.		
Weight		**Score**	**NCCC Chum: 87** **WCVI Chum: 96** **Inner SC Chum: 96** **Fraser Chum: 87**

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

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

			acceptable. • 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.	gear that minimize the catch of non-target species or undersized individuals of target species. • 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. • 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).
Weight			**Score:**	**NCCC Chum: 90** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 90**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

BC pink and chum fisheries have been substantially modified to reduce by-catch of non-target species:

- MS 1.2.7.4 briefly describes the selective fishing policy.
- MS 3.2.4 recounts the development and implementation of selective fishing measures in BC salmon fisheries, and includes links to mortality studies from different fisheries.

- MS 1.2.9 describes collaborative initiatives related to the changing structure of Pacific salmon fisheries, which include reduction of by-catch mortality.
- MS 2.4 describes the current monitoring and assessment approach, and more specifically,
- MS 2.4.2.5 discusses catch monitoring programs in the different fisheries, including provisions for reporting any harvest of non-target species.
- MS 2.5.4.3 describes measures that have been implemented to control incidental harvest of non-target stocks and by-catch of non-target species.
- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for selective fishing and by-catch reporting.
- MS 3.4 includes an inventory of major conservation and recovery efforts, including measures to reduce by-catch of particular stocks or species of concern.
- Appendix 1 lists management actions designed to achieve conservation objectives (e.g. to reduce coho by-catch).
- Decision guidelines for each fishery in CUP 3.3 outline measures to reduce by-catch of non- target species.
- CUP 6 highlights highlights specific conservation measures in each area.

In January 2001, the Department released *A Policy for Selective Fishing in Canada's Pacific Fisheries*. Under the Department's selective fishing initiative, harvester groups have experimented with a variety of methods to reduce the impact of fisheries on non-target species, with a number of measures reaching implementation in fisheries.

The Selective Fisheries Program included an education, training and communications components. The final report of the program is available at the following web site: http://www-comm.pac.dfo-mpo.gc.ca/publications/SFFinalReport_e.pdf

The annual salmon IFMP includes:

- Conservation objectives for non-target stocks.
- Use of selective fishing gear and methods, and development of the Canadian Code of Conduct for Responsible Fishing Operations.
- Gear restrictions to help avoid stocks of concern and non-target stocks/species or release them with minimal harm (e.g. revival tanks, gillnet construction and selective fishing).

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In addition, management objectives for catch of non-target stocks and species are reflected in the *Conditions of Licence* for each of the licence areas. Revival tanks conforming to the conditions of licence are required for all vessels participating in commercial salmon fisheries. All prohibited species captured incidentally must be revived in the revival tank and released, or released directly to the water in a manner that causes the least harm[34].

See also responses to Indicators 3.4.1.2 and 3.4.2.1.

Scoring Rationale:

The information provided was sufficient for all chum fisheries to pass the SGs at the 60 and 80 level. North-Central Coast and Fraser chum fisheries did not pass the second SG at the 100 level and partially passed the third SG because estimates of bycatch for Skeena steelhead and Fraser steelhead and sturgeon are lacking for these fisheries. The WCVI and Inner SC chum fisheries pass all the 100 level SGs because no bycatch issues have been identified for these fisheries.

3.7.2	Prohibits the use destructive fishing practices, such as poisons and explosives.	• The management system prohibits or discourages the use of destructive fishing practices.	• The management system can demonstrate that destructive fishing practices, such as poisons or explosives, are not currently being used in the fishery.	• 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. • Evidence can be provided by the management system that such destructive practices are not currently being employed in the fishery.

[34] Conditions of 2003/2004 Salmon Area B Licence, part 2, section 1 (no page numbers in Licence Conditions).

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

Weight		Score:	NCCC Chum: 100 WCVI Chum: 100 Inner SC Chum: 100 Fraser Chum: 100

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- The Fisheries Act (MS 1.1.2.2) prohibits any use of explosives (Section 28) or deleterious substances (Section 34) in water frequented by fish.
- MS 3.3.1.3 includes an overview of the permit process for developments that affect fish habitat.

The type, size, and quantity of permitted fishing equipment that is specified in the Conditions of Licence (MS 2.5.3). Neither explosives nor poisons are included in the list of permitted gear and equipment.

- MS 2.5.3.1 links to guidelines for the use of explosives in or near Canadian fisheries waters.
- MS 2.6 explains the mechanisms in place to monitor and enforce compliance with requirements for non-destructive fishing methods.

The *Fisheries Act* prohibits the use of explosives (section 28) or deleterious substances (Section 34).[35] Furthermore**,** the type, size and quantity of fishing gear and equipment that is permitted to be used and the manner in which it may be used are specified in the Conditions of Licence. Neither explosives nor poisons are included in the list of permitted gear and equipment.

Recent charges and convictions are publicly announced, and an archive of charges and convictions back to 1994 is available.[36] There are no recent cases of explosives or poisons used in this fishery, despite regular monitoring by on board observers, charter patrols, and fisheries officers.[37]

Scoring Rationale:

The fishing practices for BC salmon fisheries do not include any destructive fishing practices, therefore, chum fisheries passed all the SGs associated with this indicator.

[35] http://laws.justice.gc.ca/en/f-14/59326.html
[36] http://www.dfo-mpo.gc.ca/media/charges_e.htm
[37] http://www.pac.dfo-mpo.gc.ca/ops/CP/default_e.htm

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3.7.3	Minimizes operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.	• There is a program to reduce operational waste.	• The management system has a program that sets guidelines for reducing operational waste. • The management system encourages the fishing industry and other relevant stakeholders to promote programs for the proper handling of catch.	• The management system has a formal program to reduce operational waste in the fishery, with the long-term goal of eliminating such waste. • The program is effective, as reflected by reduced incidents of operational waste. • 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.
Weight			**Score**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 100**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

- MS 3.2.4.4 outlines impact reduction measures, including the Canadian Code of Conduct for Responsible Fishing Operations.

The Canadian commercial fishing sector has developed its own *Canadian Code of Conduct for Responsible Fishing Operations*.[38] Over 80 percent of Canada's fishing organizations have signed on and ratified the Code that is overseen by a Responsible Fishing Board. Commitments include:

[38] http://www.dfo-mpo.gc.ca/media/back-fiche/2003/hq-ac26b-eng.htm
http://www.fisheriescouncil.ca/pdf/FCCFishingOperations6.pdf

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- Principle 6: “Reduce waste and adverse impacts on the freshwater and marine ecosystems and habitats…”
- Guideline 1.2: “Practice environmentally sound waste management in all aspects of harvesting operations.”
- Guideline 2.6: “Employ fishing practices that minimize the risk of gear loss.”
- Guideline 2.7: “Establish jointly with regulatory agencies protocols for the marking, retrieving and reporting of lost gear.”
- Guideline 2.8: “Make every reasonable effort to retrieve lost fishing gear, reporting all lost gear.”
- Guideline 5.7: “ Cooperate with appropriate regulatory authorities to establish sound waste management policies and procedures:

As well, as part of the licensing scheme, vessels are inspected to ensure, among other things, that operational waste is not released into holding areas. Similarly, inspection programs are in place in fish plants to ensure that operational waste is minimized and disposed of properly.

The BC Institute of Technology (BCIT) in partnership with the Provincial Ministry of Agriculture, Fisheries and Food, runs voluntary fish handling/freezing workshops to promote proper fish handling and food safety. The BC Salmon Marketing council prepares and distributes materials on fish handling and quality to educate its members.

Commercial fishing licence conditions include provisions for minimizing operational waste. Vessels are inspected to ensure, among other things, that operational waste is not released into holding areas. Similar inspection programs are in place in fish plants to ensure that operational waste is minimized and disposed of properly.

Scoring Rationale:

No issues related to operational waste have been identified regarding chum fisheries. Therefore, chum fisheries passed all the SGs associated with this indicator.

3.7.4	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.	• 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	• 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	• 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.

http://www.dfo-mpo.gc.ca/communic/fish_man/code/cccrfo-cccppr_e.htm

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		target species.	for the fishery can be obtained.	• Continued improvement in the quality and quantity of catch and discard data is evident.
Weight			**Score**	**NCCC Chum: 70** **WCVI Chum: 90** **Inner SC Chum: 90** **Fraser Chum: 70**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

DFO has established an extensive monitoring and assessment structure for Pacific salmon and the fisheries targeting them.

- MS 1.2.9 describes on-going initiatives related to the changing structure of Pacific fisheries, which emphasise enhanced monitoring and improved collaboration. The section discusses incentives for collaboration and lists pilot projects.
- MS 2.4.1.2 explains how collaborative programs complement DFO-led, fishery-independent data collection efforts.
- MS 2.4.2.5 outlines fishery monitoring and catch reporting programs in place for pink and chum fisheries.
- MS 2.7 summarizes DFO's toolkit for monitoring and assessment, including collaborative programs such assessment fisheries
- MS 4.3.4.4 describes formal collaborative arrangements, which includes arrangements for catch monitoring (e.g. charter patrols) and stock assessment (e.g. test fisheries).
- MS 3.2.4 summarizes the Selective Fishing Program and includes examples of on-going implementation. MS 2.5.4.3 describes measures in place to reduce incidental harvest and by-catch. Many of these were developed in close cooperation with stakeholders.
- CUP 4.2.4 describes details of the catch monitoring program in each area.

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Catch reporting for target and non-target species are obligatory in all commercial fisheries. Following from the DFO discussion paper Pacific Region Fishery Monitoring and Reporting Framework,[39] mandatory logbooks, frequent phone-in, and sales slip programs are in place for all commercial fisheries.[40] Data on other species of fish, seabirds, and other non-target species, either retained or released, must be recorded. Compliance rates for catch reporting by harvesters are monitoring and reported for each fishery. When compliance rates

New frameworks for catch monitoring and reporting are also being addressed through the PICFI program currently underway and described above (fishery restructuring). Their success depends on cooperation of and assistance from the commercial fishing industry. The industry is brought into the process for developing new standards through extensive consultation processes that are described in Indicator 3.3.1.

Scoring Rationale:

The information provided for WCVI and Inside chum fisheries did not identify any bycatch issues for these fisheries. North-Central Coast and Fraser chum fisheries received a partial rating for the sole SG at the 80 level because estimates of bycatch for Skeena steelhead and Fraser steelhead and sturgeon are lacking for these fisheries. As stated previously for Indicator 3.1.1. No evidence of the quality and quantity of bycatch and discard data has been provided for these fisheries.

Condition 3-10. For NCCC chum salmon UoC. Same as Condition 3-2. Certification of North-Central Coast chum fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for North-Central Coast chum fisheries. To be provided by the first annual surveillance audit.

Condition 3.11. For Fraser chum salmon UoC. - Same as Condition 3-3. Certification of Fraser chum fisheries will be conditional until scientifically defensible annual estimates of non-target species bycatch are obtained for Fraser chum fisheries. To be provided by the first annual surveillance audit.

[39] Pacific Region Fishery Monitoring and Reporting Framework, January 2002. http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/fisheriesmgmt/reportingframework/monitoringpaper_e.pdf

[40] See sample logbook: IFMP 2003, Appendix 3.
For more information on the log-book program, see: 2007 South Coast Salmon IFMP, Section 7.5.

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3.7.5	Implements fishing methods that minimize adverse impacts on habitat, especially in critical zones.	• 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.	• The management system undertakes measures to identify and document the impact of the fishery on habitat and to set guidelines for reducing habitat impacts. • Fish harvesters are encouraged to follow the guidelines for reducing habitat impacts.	• 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. • The crews of fishing vessels comply with such measures and thereby avoid damaging the habitat. • There is no evidence of continued impacts of fishing on habitat.
Weight			**Score: 100**	**NCCC Chum: 100** **WCVI Chum: 100** **Inner SC Chum: 100** **Fraser Chum: 97**

Client Submission:

The following sections of the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) submissions provide evidence specific to this performance indicator.

Commercial salmon fisheries in BC use gill net, seine, or troll gear. Neither of these gear types has been associated with habitat impacts. More generally, a range of measures and initiatives are in place to reduce any impacts of fishing activity:

- MS 2.5.4.4 describes measures to reduce potential marine ecosystem impacts of salmon fisheries.
- MS 3.2.4.4 summarizes impact reduction measures developed under the Selective Fisheries Program, as well as the Canadian Code of Conduct for Responsible Fishing Operations.
- MS 3.3.2.1 lists marine protected areas and other spatially persistent fishing closures.
- Appendix 2 illustrates the fine spatial resolution of critical area protection with a list of salmon fishing closures in Johnstone Strait (Areas 12 and 13).

PERFORMANCE INDICATOR	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100

For commercial salmon fisheries, there is no serious concern regarding impacts of the fishery on habitat given the type of gear that is used and the style and location of fishing. Commercial gillnets fish in the upper 10 meters of the ocean. Seine nets and troll gear types are not effective when in contact with the ocean floor.

Scoring Rationale:

The fishing practices for BC salmon fisheries outside Fraser fishery do not include any evidence of continued impacts of fishing on fish habitat, therefore, three of the BC chum fisheries passed all the SGs associated with this indicator. Concerns have been raised regarding the effect of the intensive beach seine fishery on near shore habitat along the lower Fraser River between Mission and Hope. The Fraser chum fishery received a partial score for the first SG at the 100 level because the Team was not provided any evidence that the management system has a formal program to identify and document the impact of the Fraser chum beach seine fishery on near shore rearing habitat for salmon, sturgeon and other species.

REFERENCE AND CONSULTED DOCUMENTS

Agriculture and Agri-Food Canada, 2004. Fish and Seafood Fact Sheets: Pacific Chum Salmon. Last Assessed: February 2009. Available online: http://www.atn-riae.agr.ca/seafood/chum_salmon-e.htm.

Alaska Department of Fish and Game, 2009. Commercial Fisheries. Last assessed: February 2009. Available online: http://www.cf.adfg.state.ak.us/cf_home.php.

Department of Fisheries and Oceans (DFO), 2011. Inner South Coast BC Chum Assessment Update – March 10, 2011.

Department of Fisheries and Oceans (DFO), 2009. Pacific Salmon. Last assessed: February 2009. Available online: http://www.pac.dfo-mpo.gc.ca/species/salmon/default_e.htm.

Department of Fisheries and Oceans (DFO), 2008a. Pacific Region Integrated Fisheries Management Plan Salmon Southern B.C. June 1, 2008 to May 31, 2009. Available Online: http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm#Salmon.

Department of Fisheries and Oceans (DFO), 2008b. Pacific Region Integrated Fisheries Management Plan Salmon Northern B.C. June 1, 2008 to May 31, 2009. Available Online: http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm#Salmon.

Department of Fisheries and Oceans (DFO), 2008 c. First Nations, Recreational & Commercial Salmon Licensing. DFO, Vancouver, BC. Available online: http://www.pac.dfo-mpo.gc.ca/species/salmon/salmon_fisheries/licensing_e.htm. Last Assessed March, 2009.

Department of Fisheries and Oceans (DFO), 2008d. Pacific Region Salmon: Stock Assessment. Available online: http://www.pac.dfo-mpo.gc.ca/species/salmon/research_and_assessment/assessment_e.htm.

Dobson, D. and G. Pestal, 2008. 2008 Certification Unit Profile West Coast Vancouver Island Chum Salmon. SOLV Consulting Ltd., Vancouver, 53 pps.

English, K.K., T. Mochizuki and D. Robichaud. 2011. Review of North and Central Coast Salmon Indicator Streams and Estimating Escapement, Catch and Run Size for each Salmon Conservation Unit. LGL Limited. Sidney, BC. 73 pps.

Grant, S and G. Pestal, 2008. 2008 Certification Unit Profile, Fraser River Chum Salmon. SOLV Consulting, Vancouver, 52 pps.

GSGislason & Associates Ltd., 2004. British Columbia Seafood Sector and Tidal Water Recreational Fishing: A Strengths, Weaknesses, Opportunities and Threats Assessment. Final Report. Prepared For: BC Ministry of Agriculture, Food & Fisheries. Prepared By: GSGislason & Associates Ltd., Vancouver, British Columbia: 308 pps. Available Online: http://www.env.gov.bc.ca/omfd/reports/SWOT/FULL_Report.pdf.

National Marine Fisheries Service (NMFS), 2009. Chum Salmon (*Oncorhynchus keta*). NOAA Fisheries, Office of Protected Resources. Last assessed: February 2009. Available online: http://www.nmfs.noaa.gov/pr/species/fish/chumsalmon.htm.

Pestal, G., Spilsted, B., and D. Dobson. 2009. 2008 Management Summary for BC Pink & Chum Fisheries. SOLV Consulting Ltd., and Department of Fisheries and Oceans Canada. 204 pps.

Spilsted, B., and G. Pestal, 2008. 2008 Certification Unit Profile: North Coast & Central Coast Chum Salmon. SOLV Consulting Ltd., Vancouver, 73 pps.

Will, P.V., Brahniuk, R., Wo, L.H., and G. Pestal, 2008. 2008 Certification Unit Profile: Inner South Coast Chum Salmon (Excluding Fraser River). SOLV Consulting Ltd., Vancouver, 70 pps.

Appendix A: Chum Salmon Stock Health Trend Summaries for North and Central Coast, West Coast Vancouver Island, Inner South Coast and Fraser River Units of Certification.

North Coast and Central Coast Chum

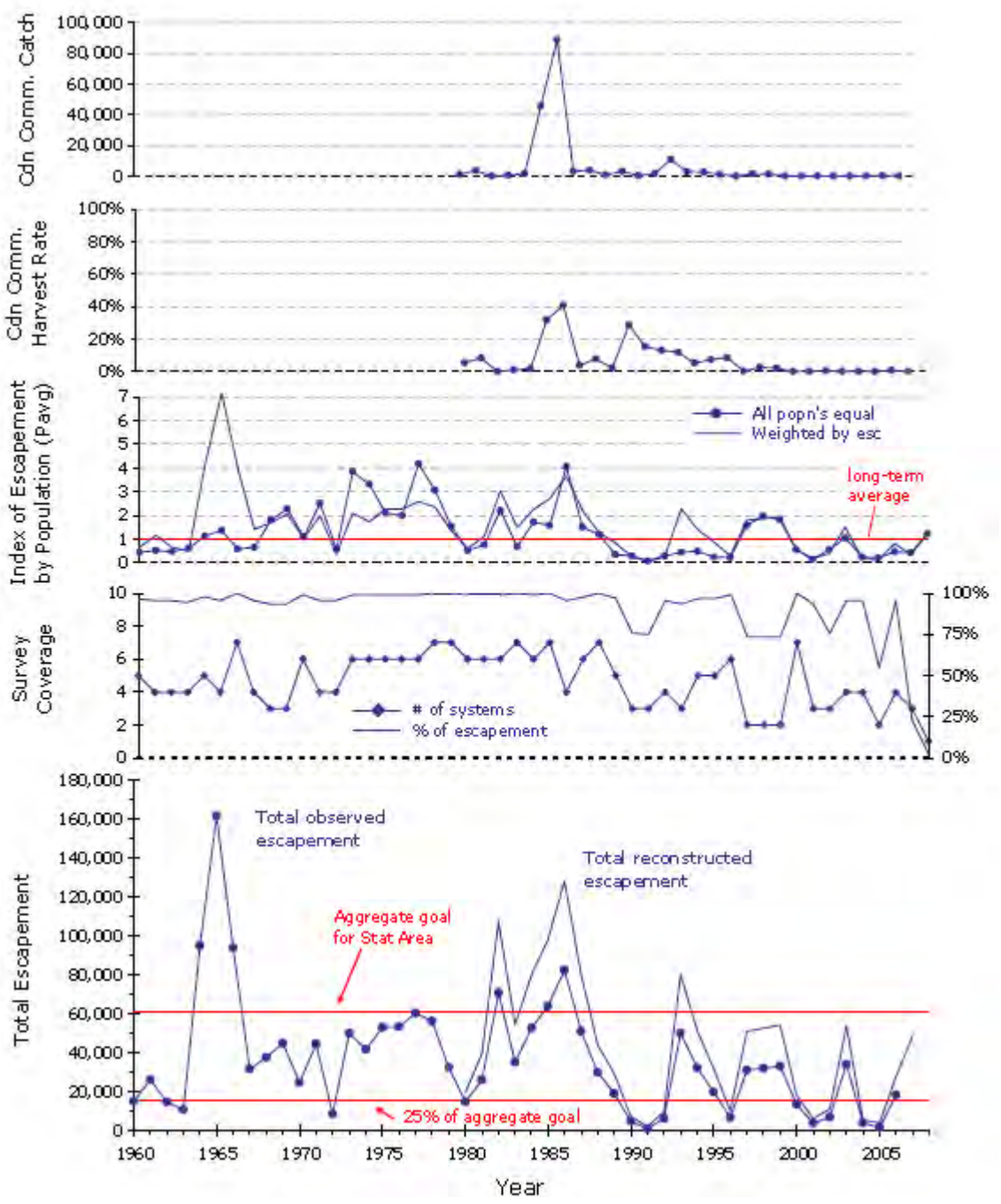

Figure A1. Trend summary for North & Central Coast chum salmon - Area 1

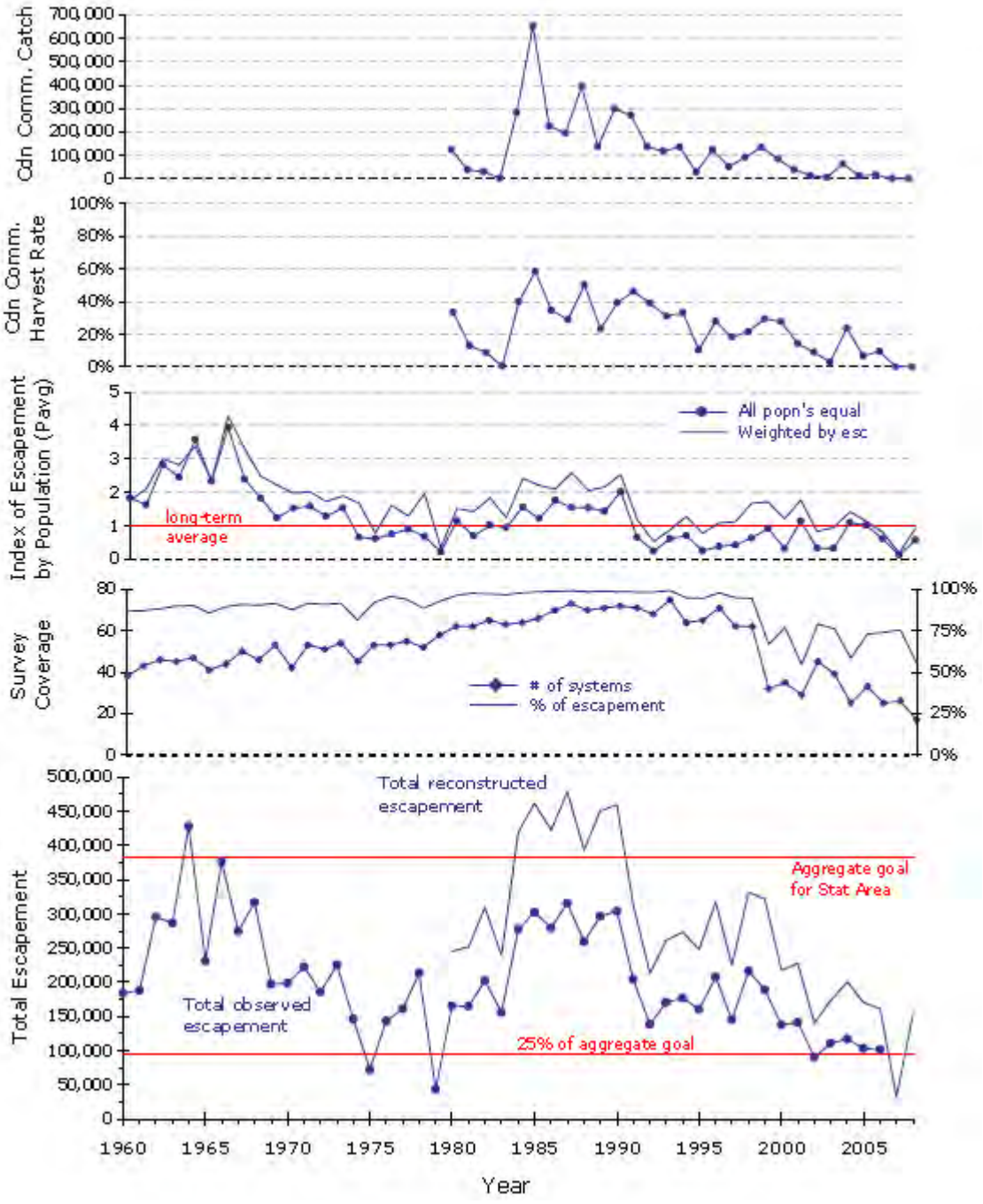

Figure A2. Trend summary for North & Central Coast chum salmon - Area 2E

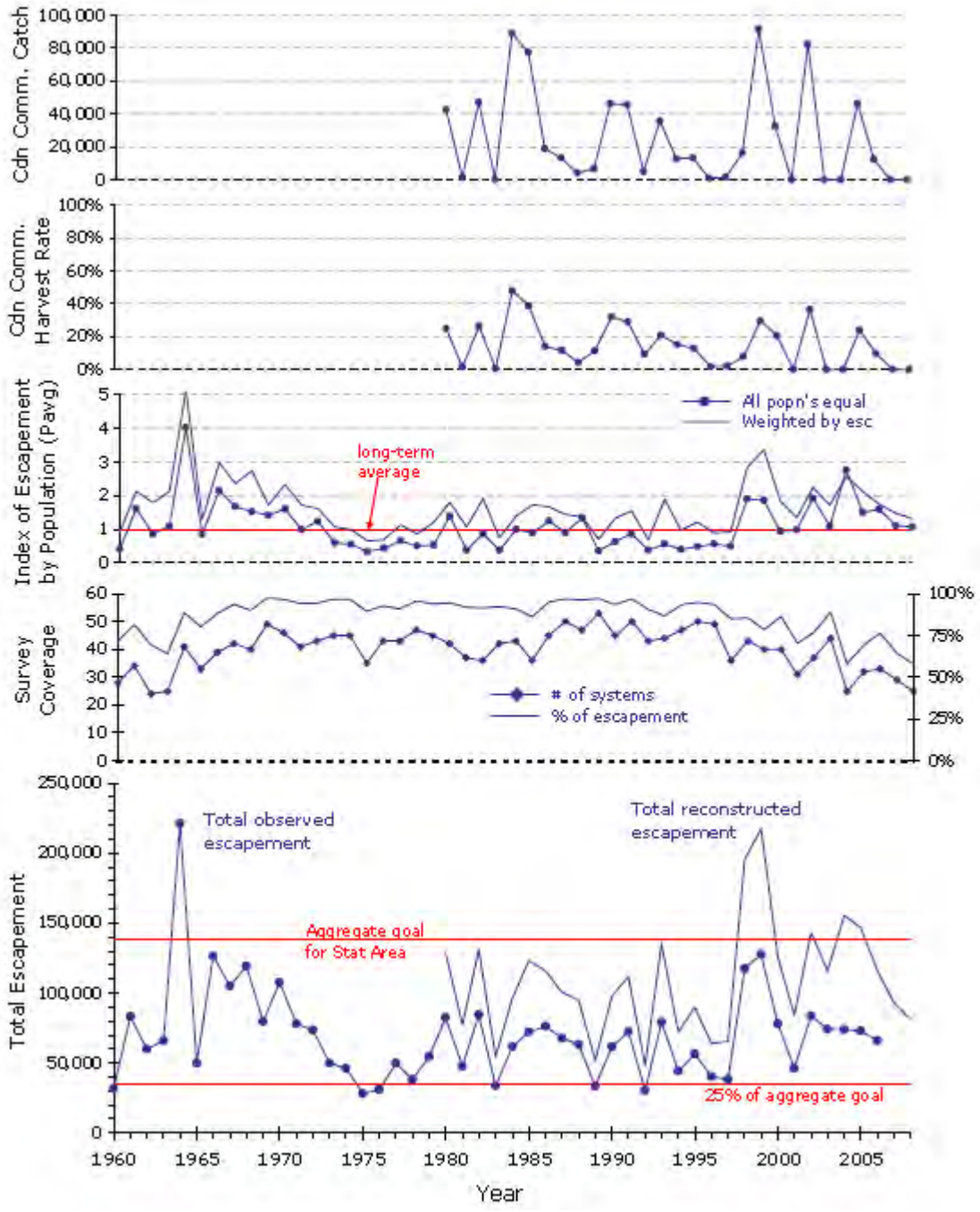

Figure A3. Trend summary for North & Central Coast chum salmon - Area 2W

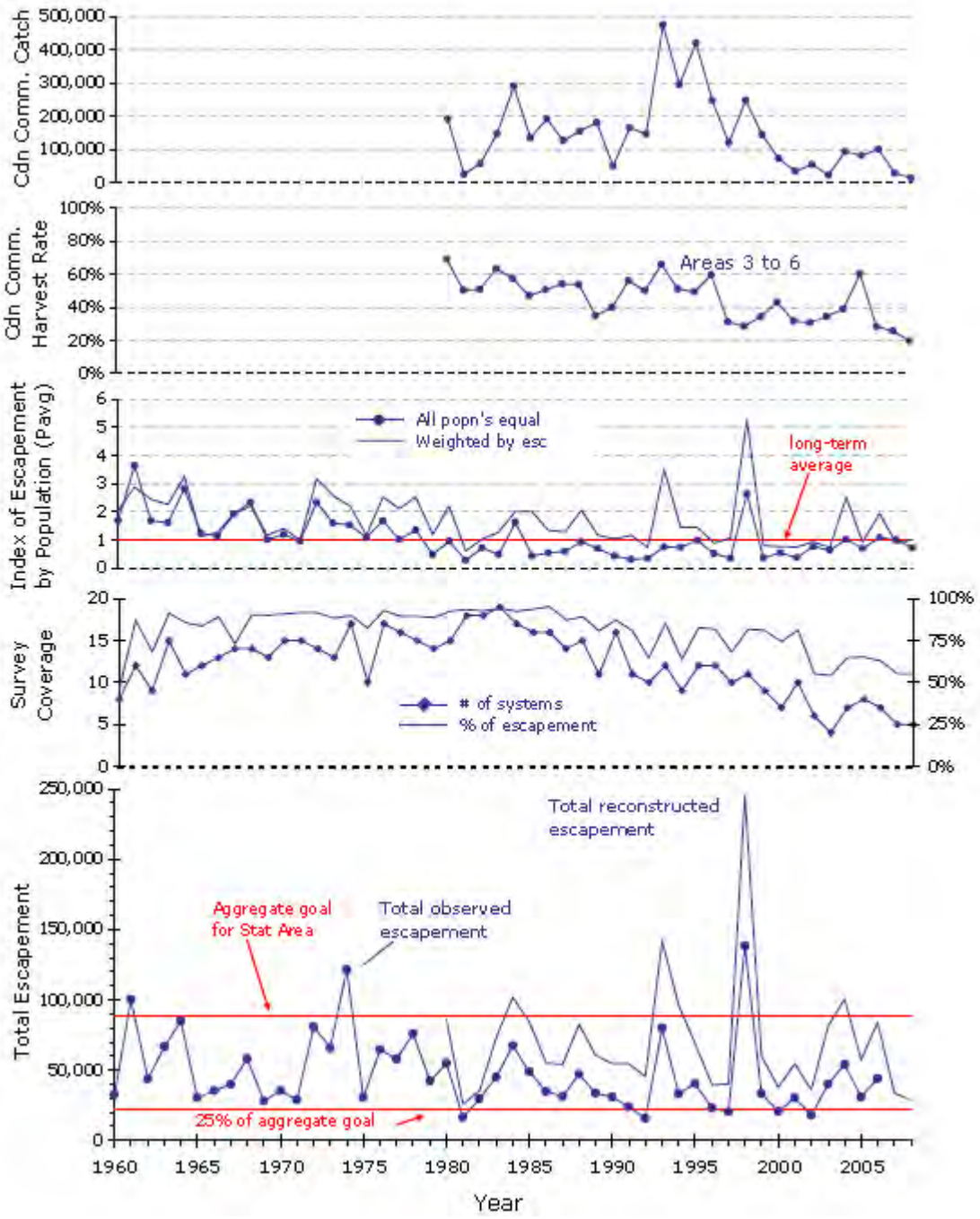

Figure A4. Trend summary for North & Central Coast chum salmon - Area 3

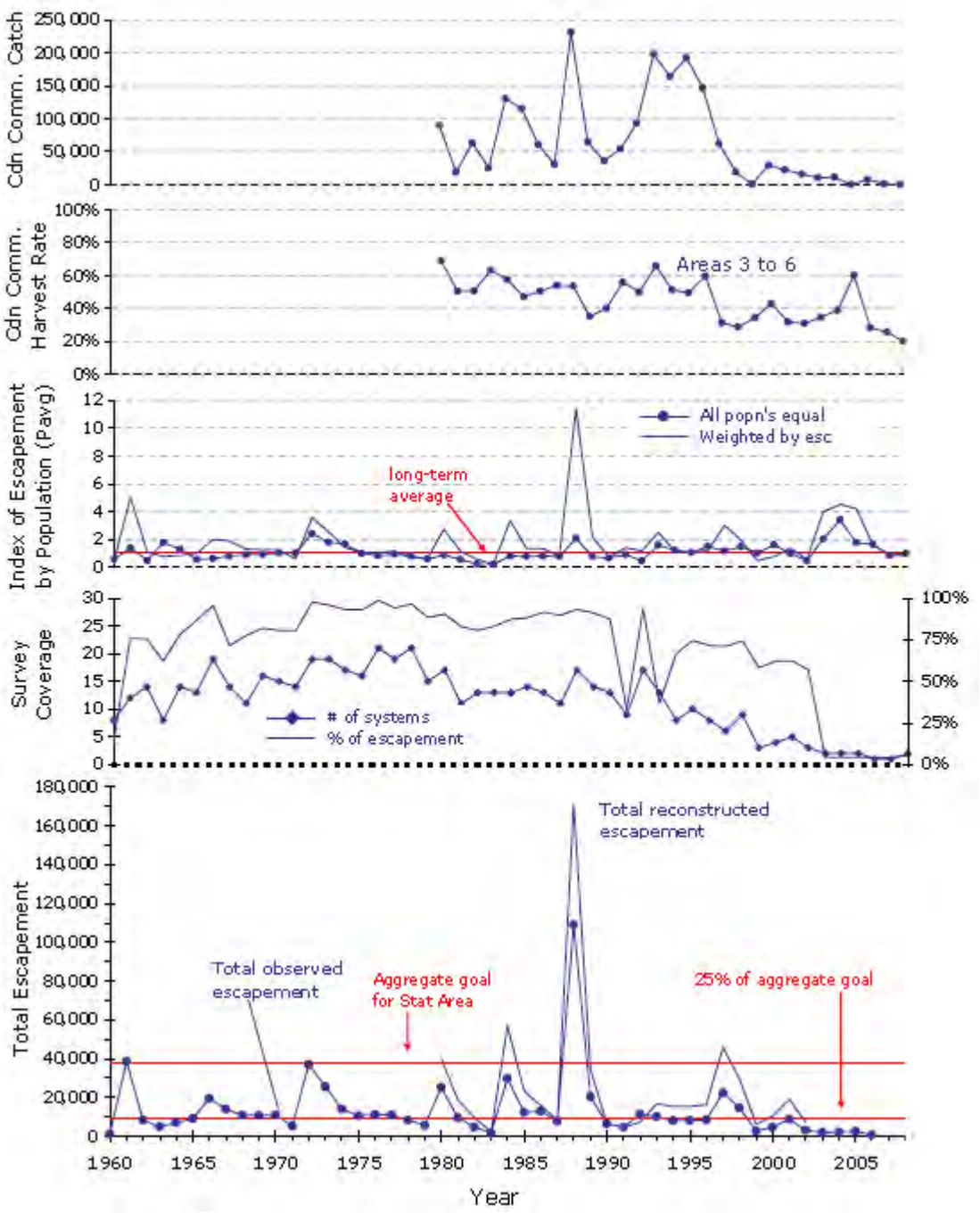

Figure A5. Trend summary for North & Central Coast chum salmon - Area 4

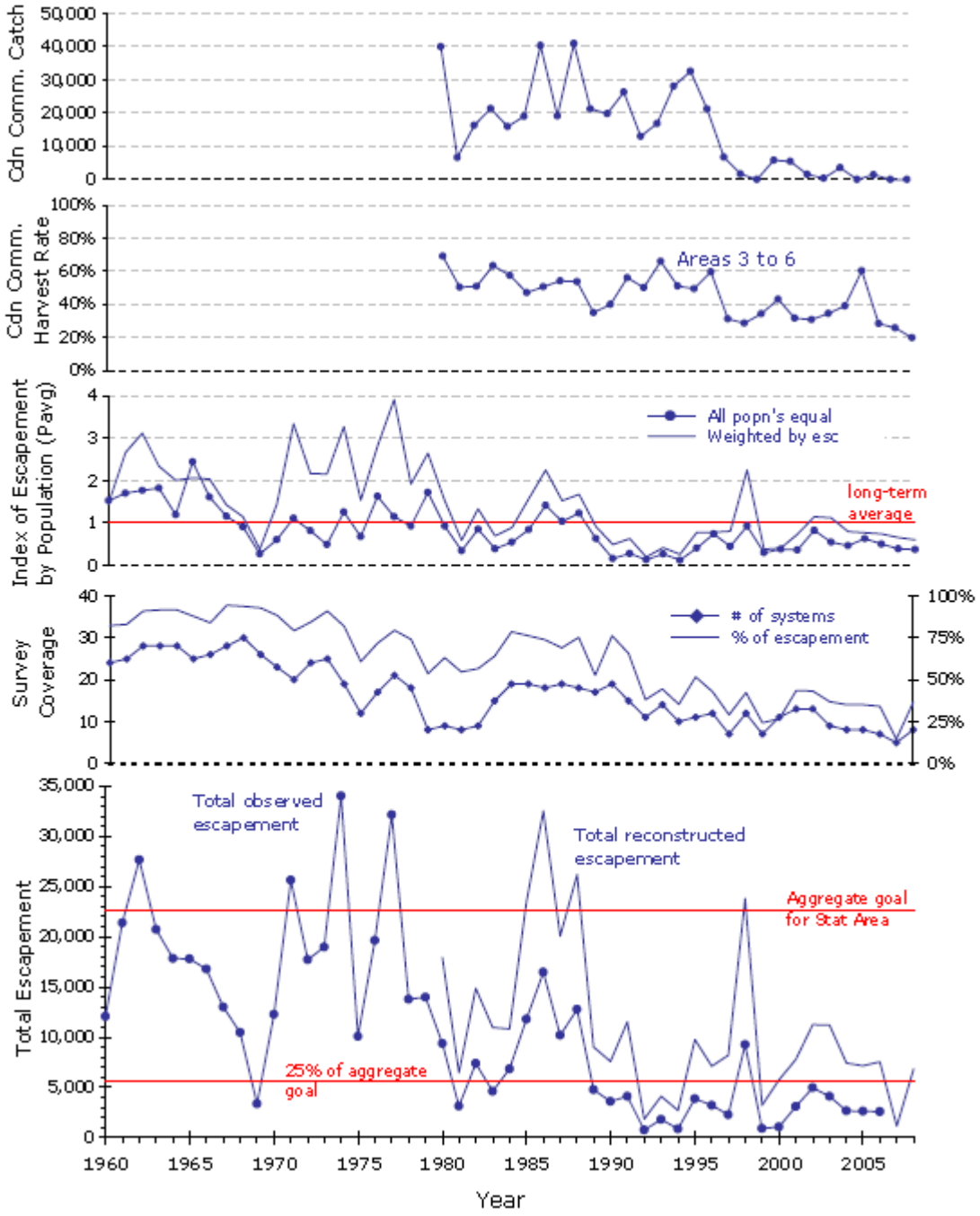

Figure A6. Trend summary for North & Central Coast chum salmon - Area 5

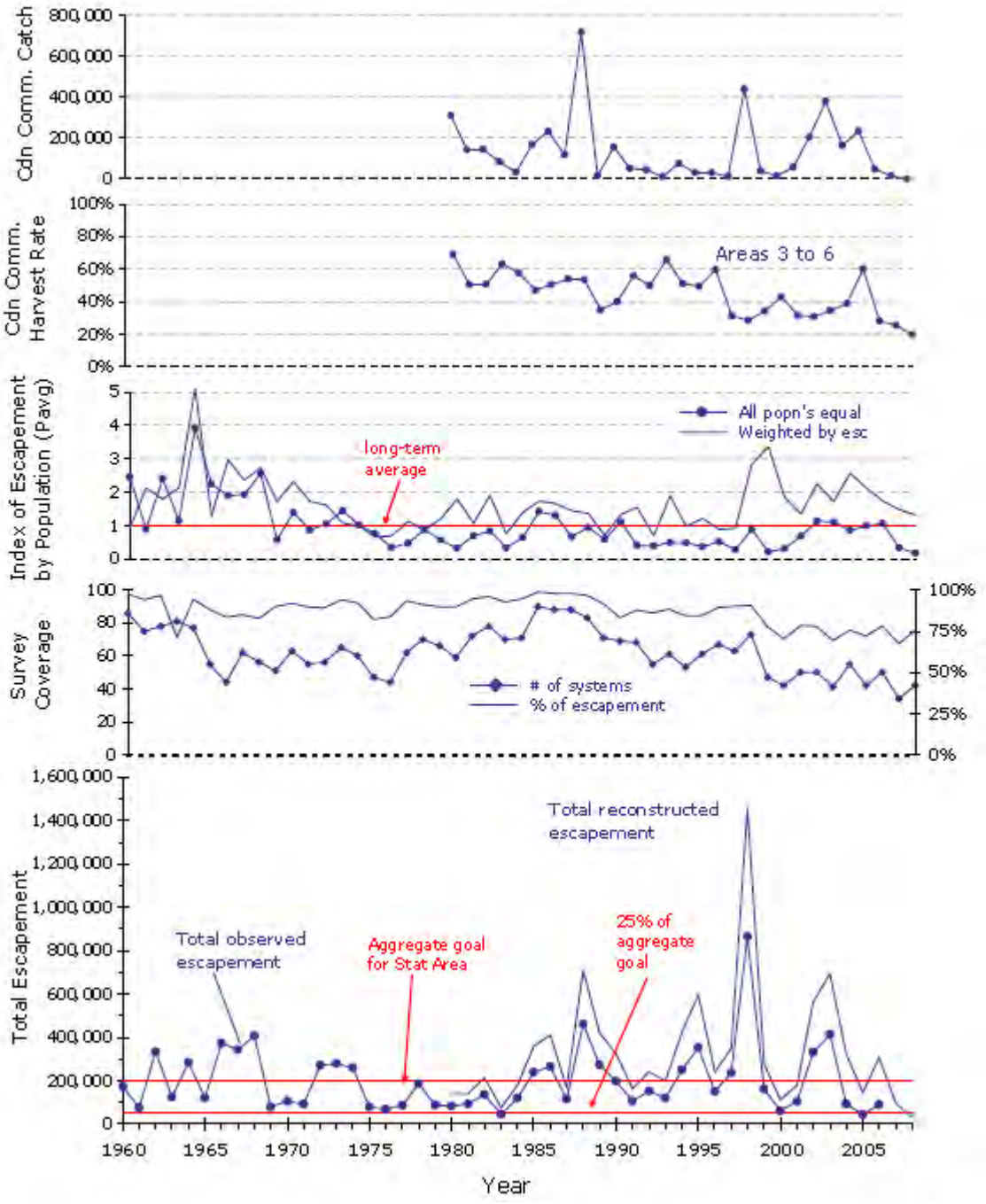

Figure A7. Trend summary for North & Central Coast chum salmon - Area 6

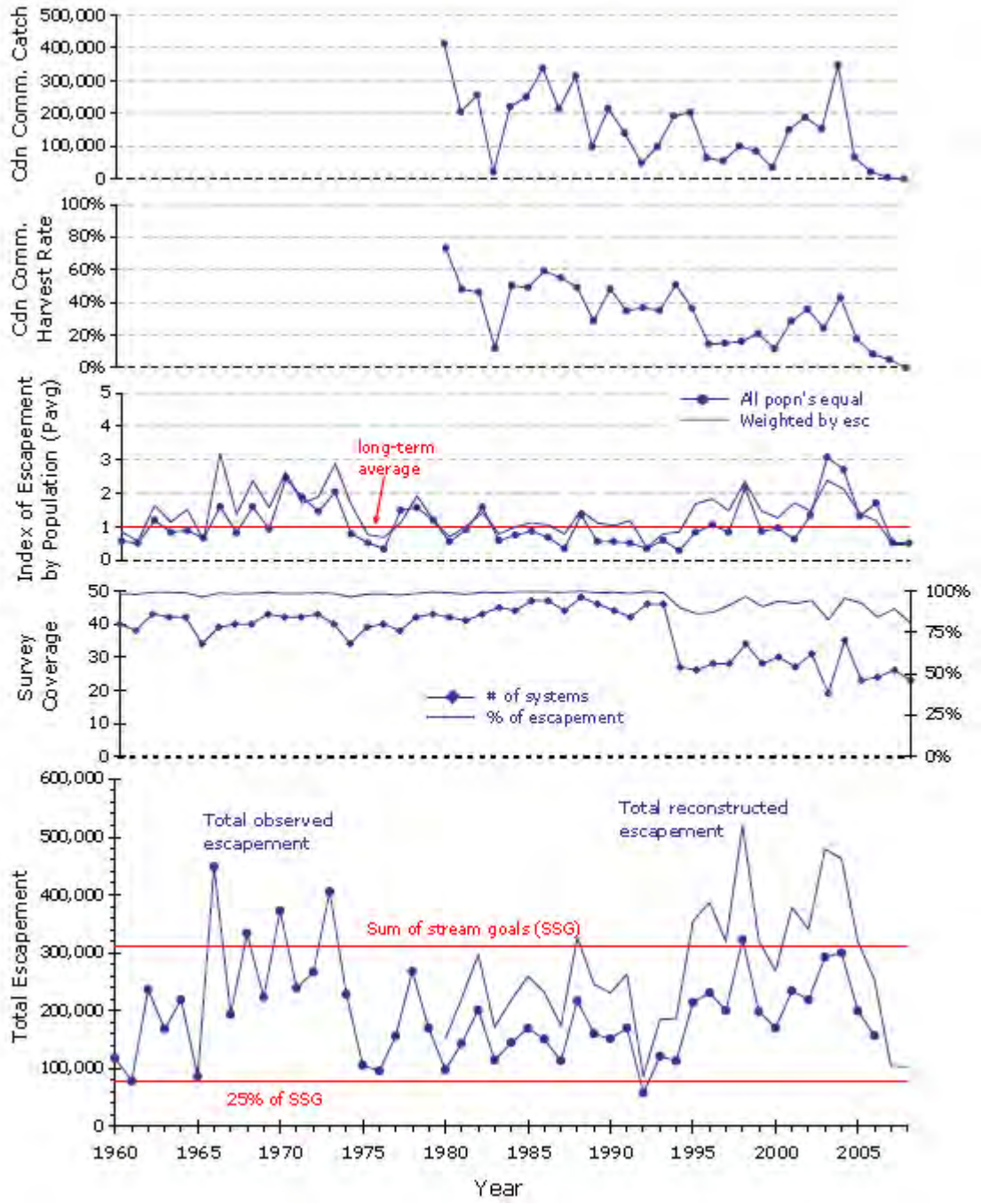

Figure A8. Trend summary for North & Central Coast chum salmon - Area 7

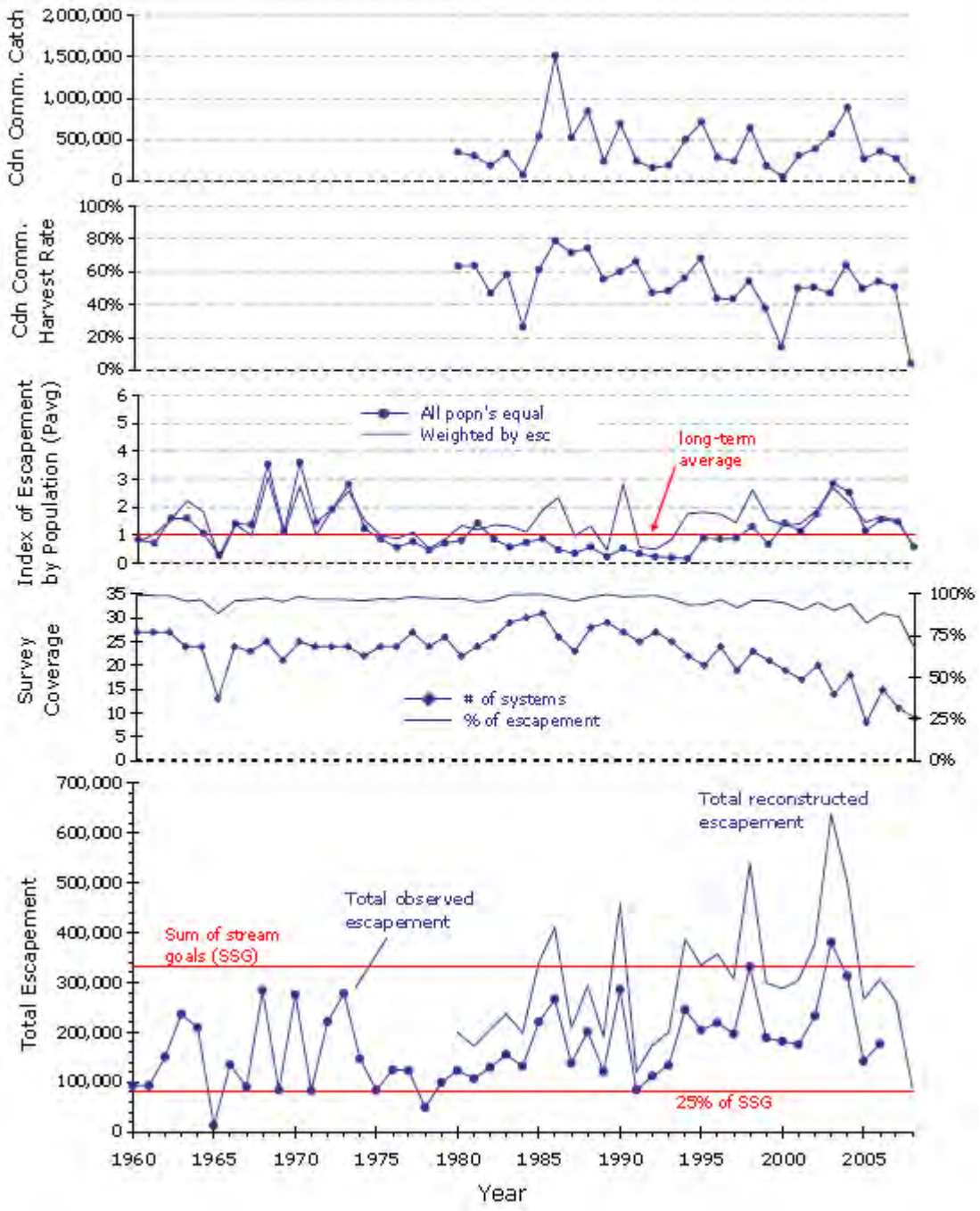

Figure A9. Trend summary for North & Central Coast chum salmon - Area 8

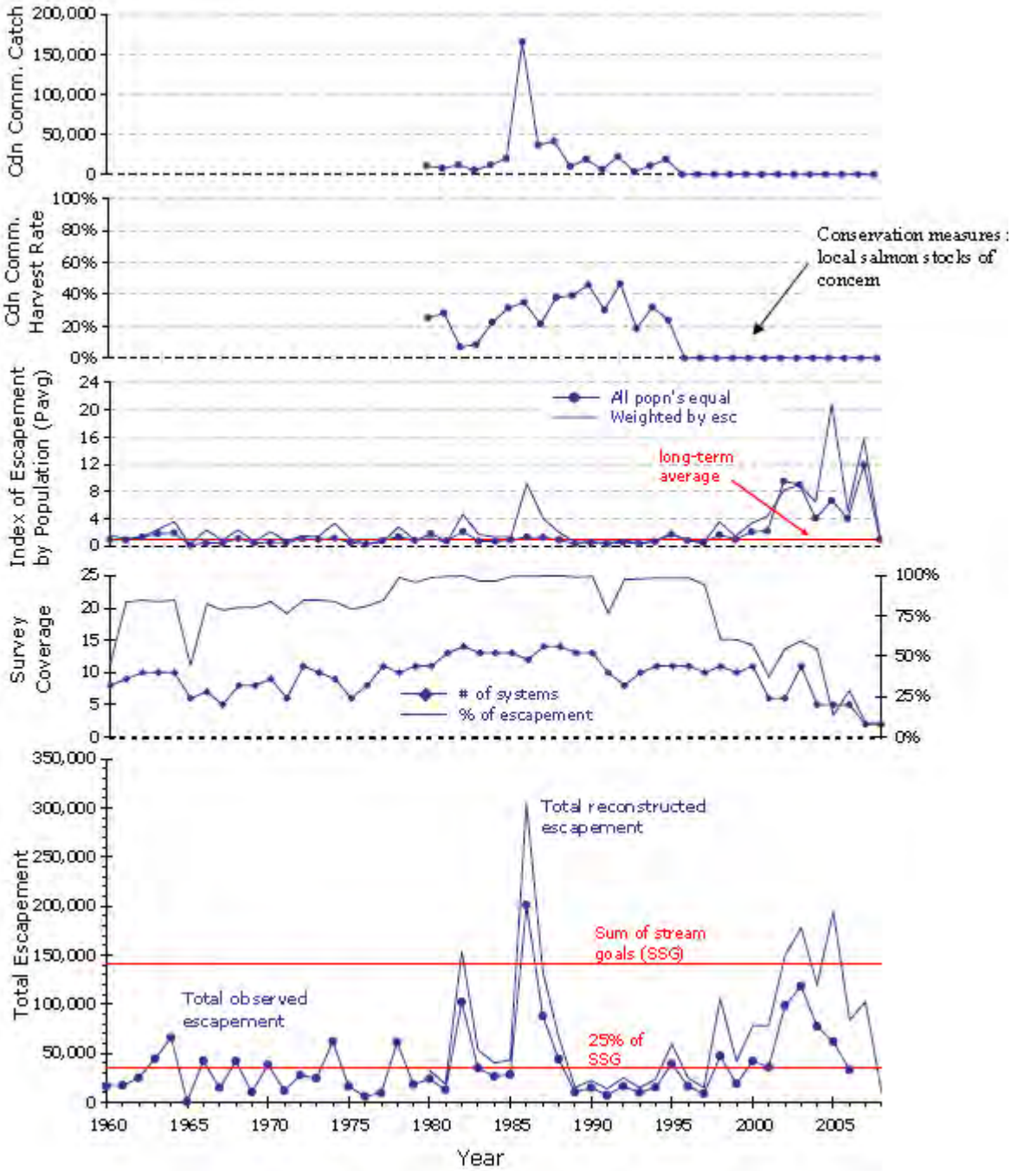

Figure A10. Trend summary for North & Central Coast chum salmon - Area 9

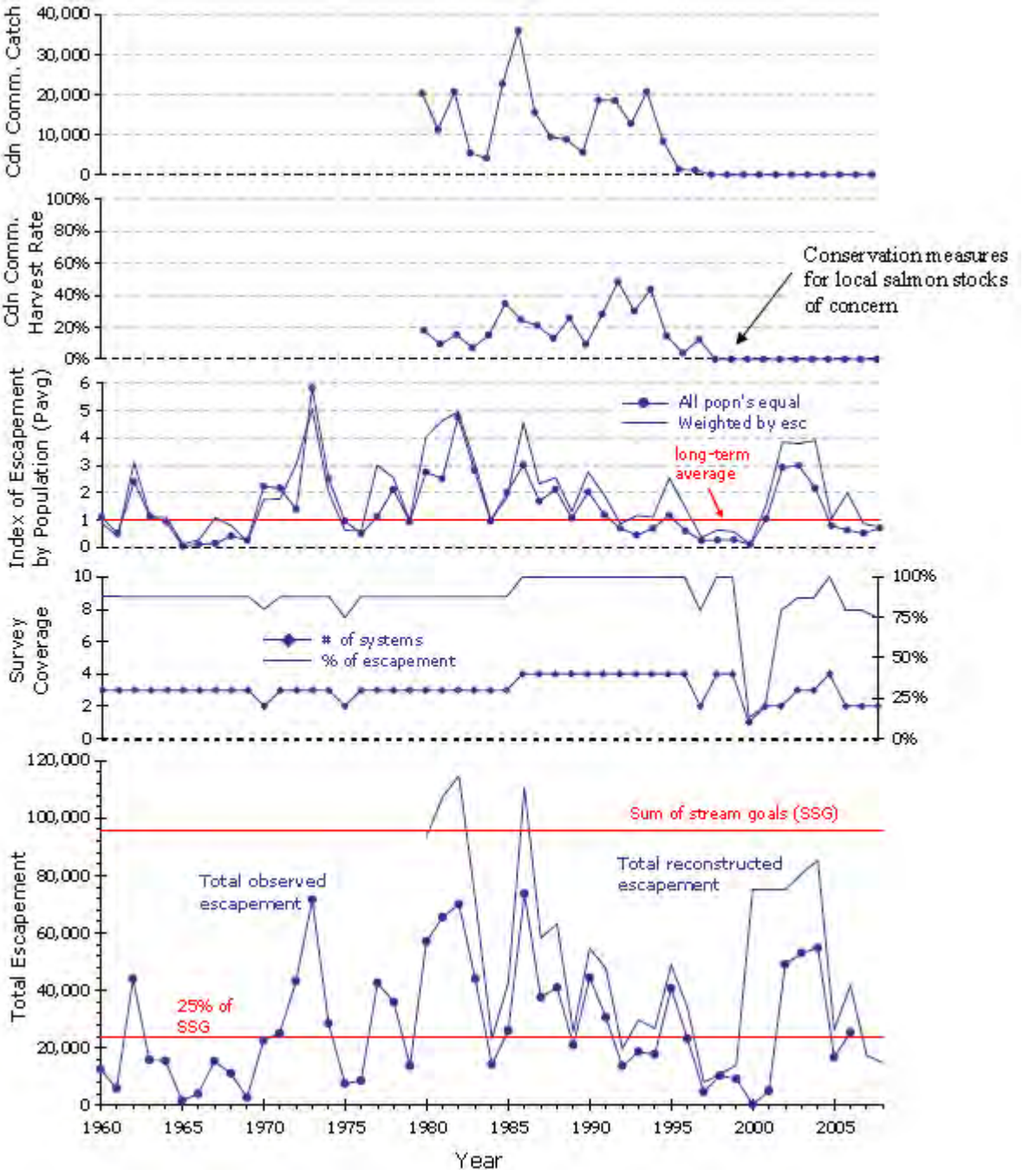

Figure A11. Trend summary for North & Central Coast chum salmon - Area 10

West Coast Vancouver Island Chum Stocks

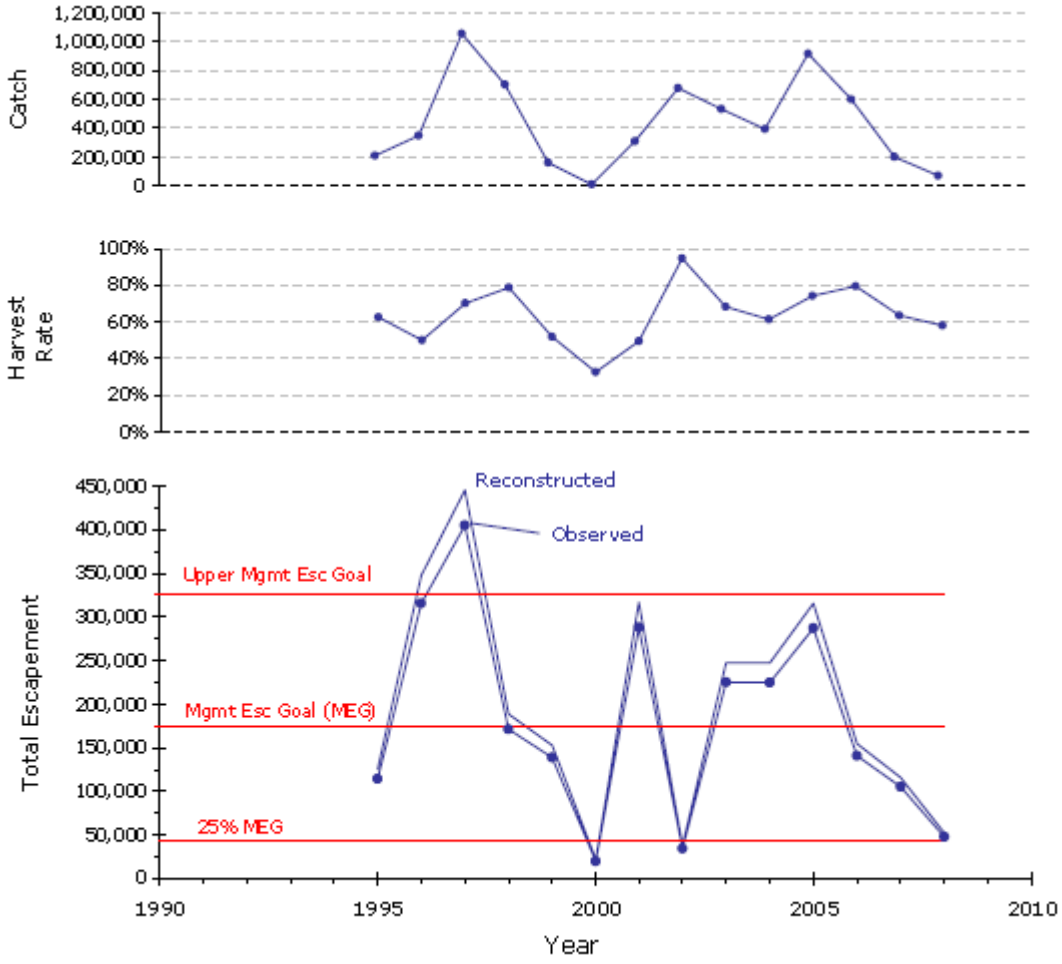

Figure A12. Trend summary for WCVI chum salmon – Nitinat (Area 22)

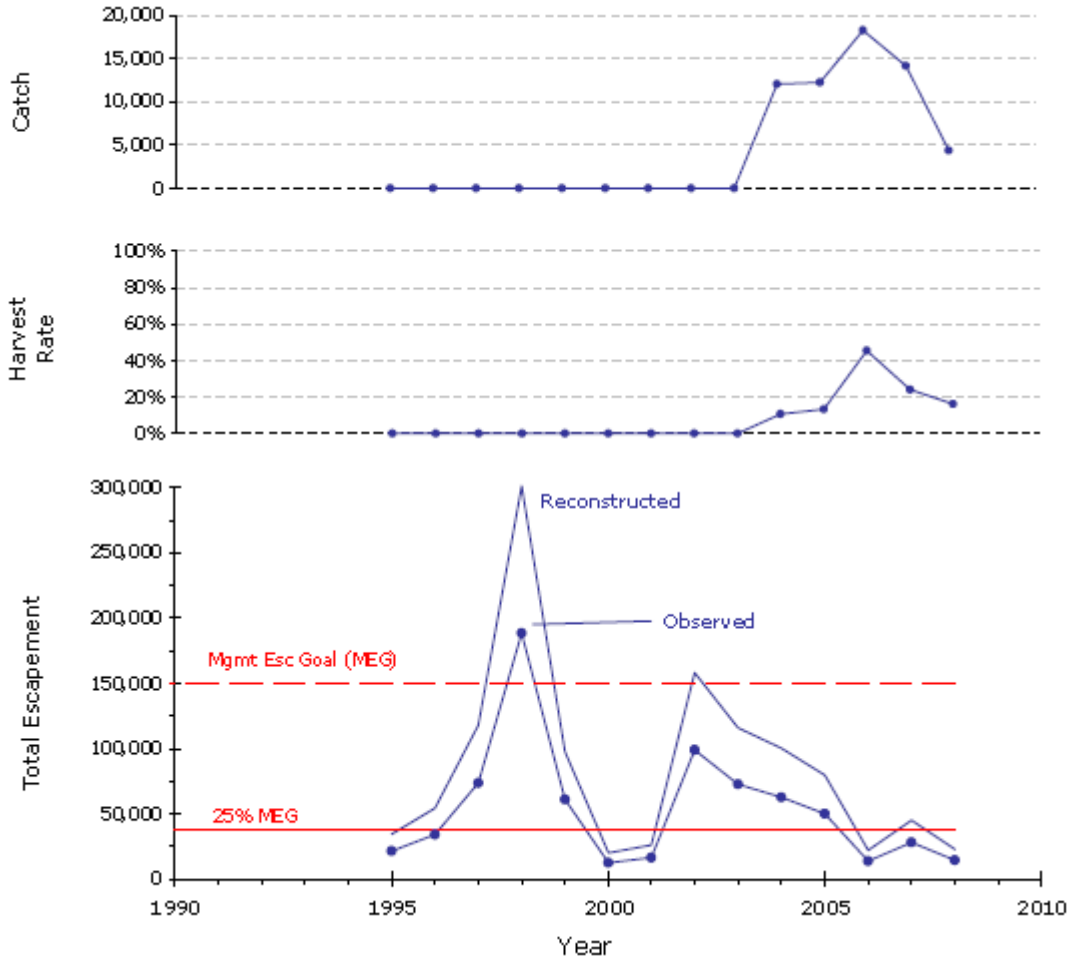

Figure A13. Trend summary for WCVI chum salmon – Barkley (Area 23)

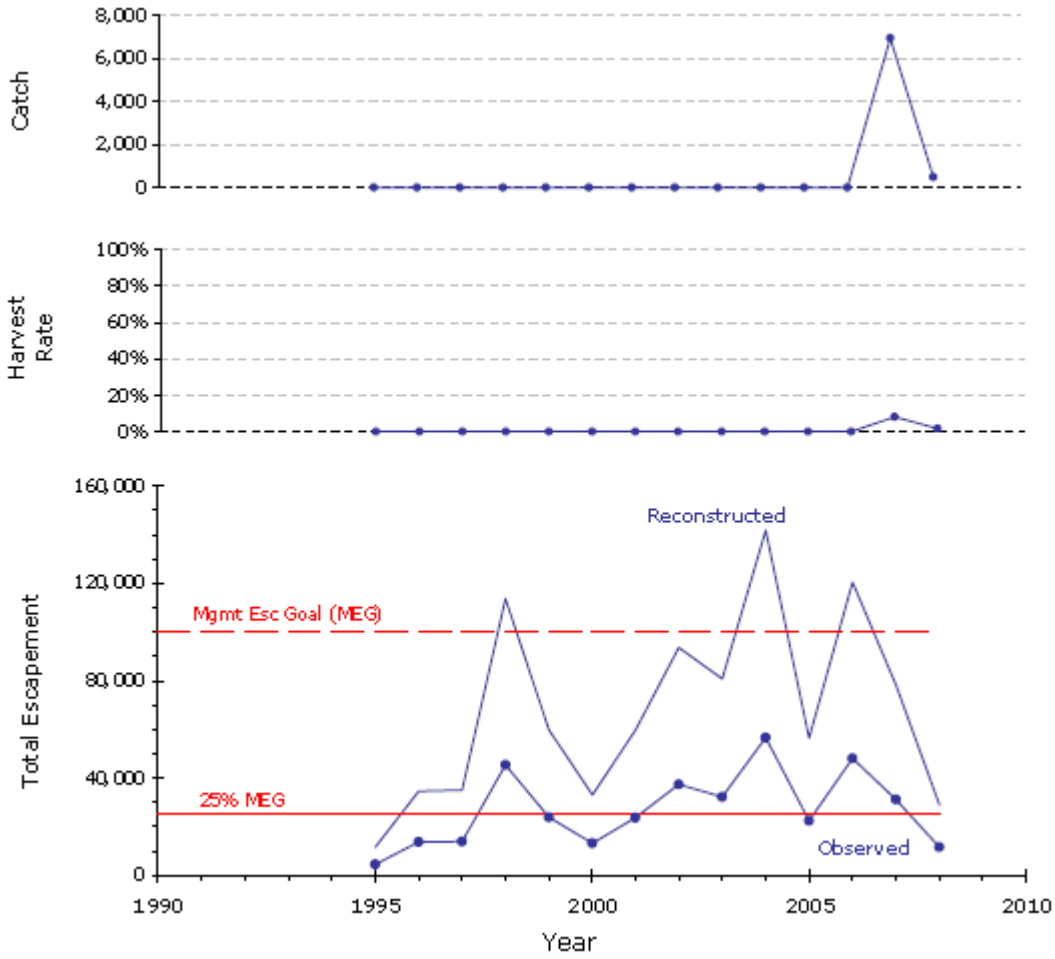

Figure A14. Trend summary for WCVI chum salmon – Clayoquot (Area 24)

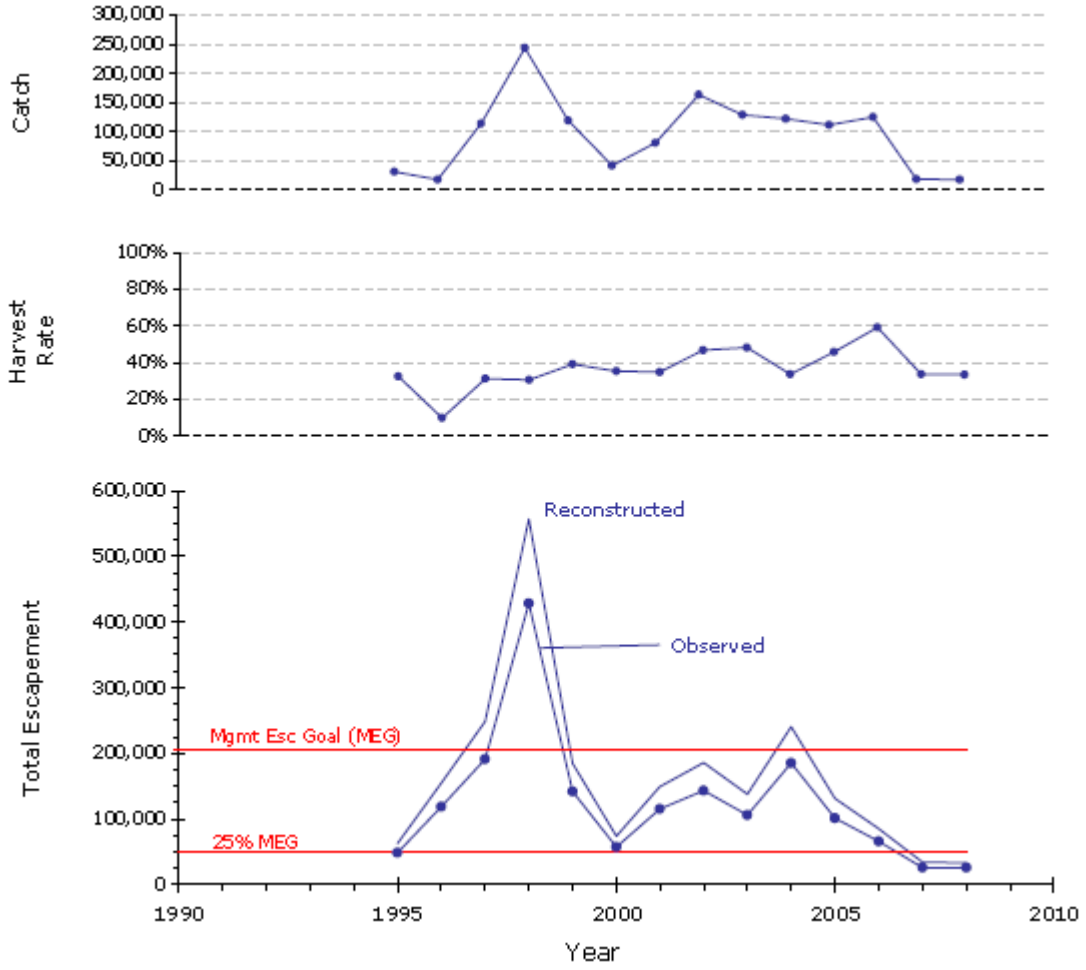

Figure A15. Trend summary for WCVI chum salmon – Nootka (Area 25)

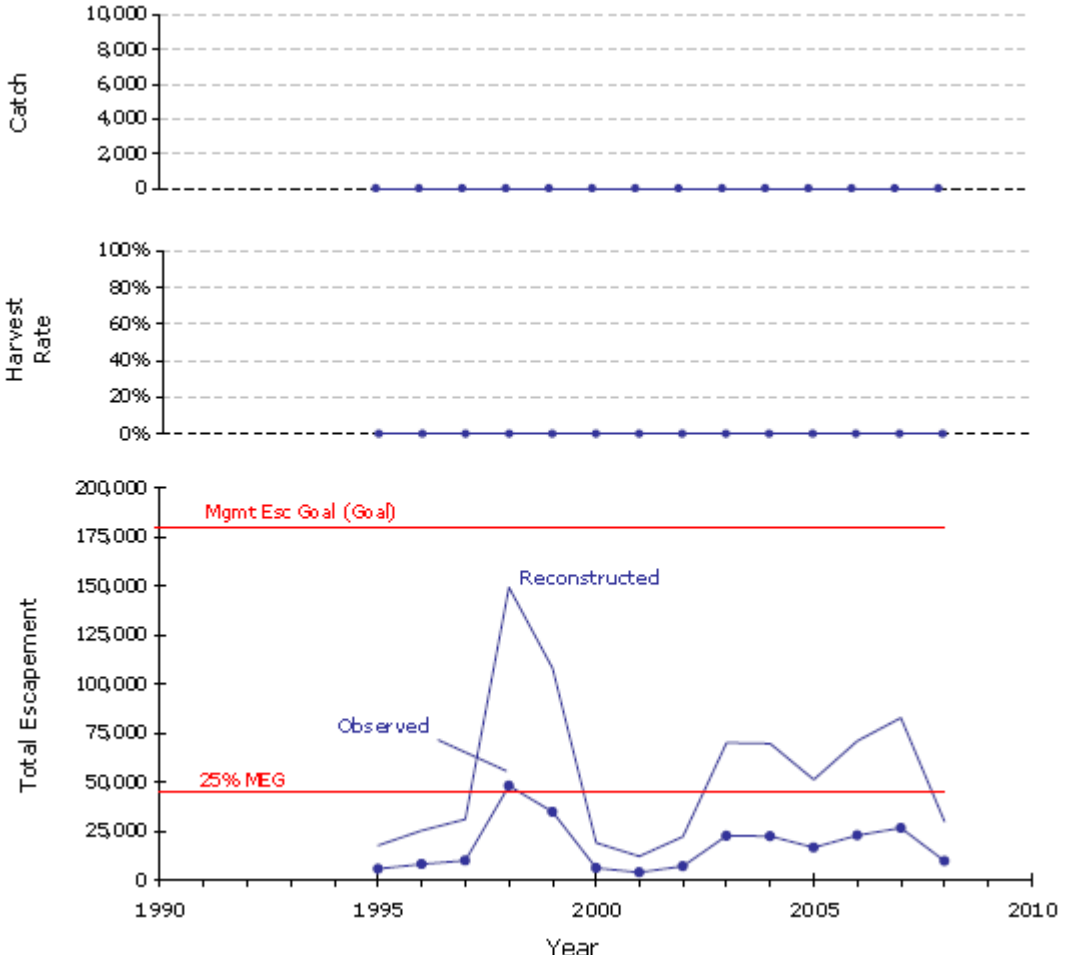

Figure A16. Trend summary for WCVI chum salmon – Kyuquot (Area 26)

Fraser River Chum Stocks

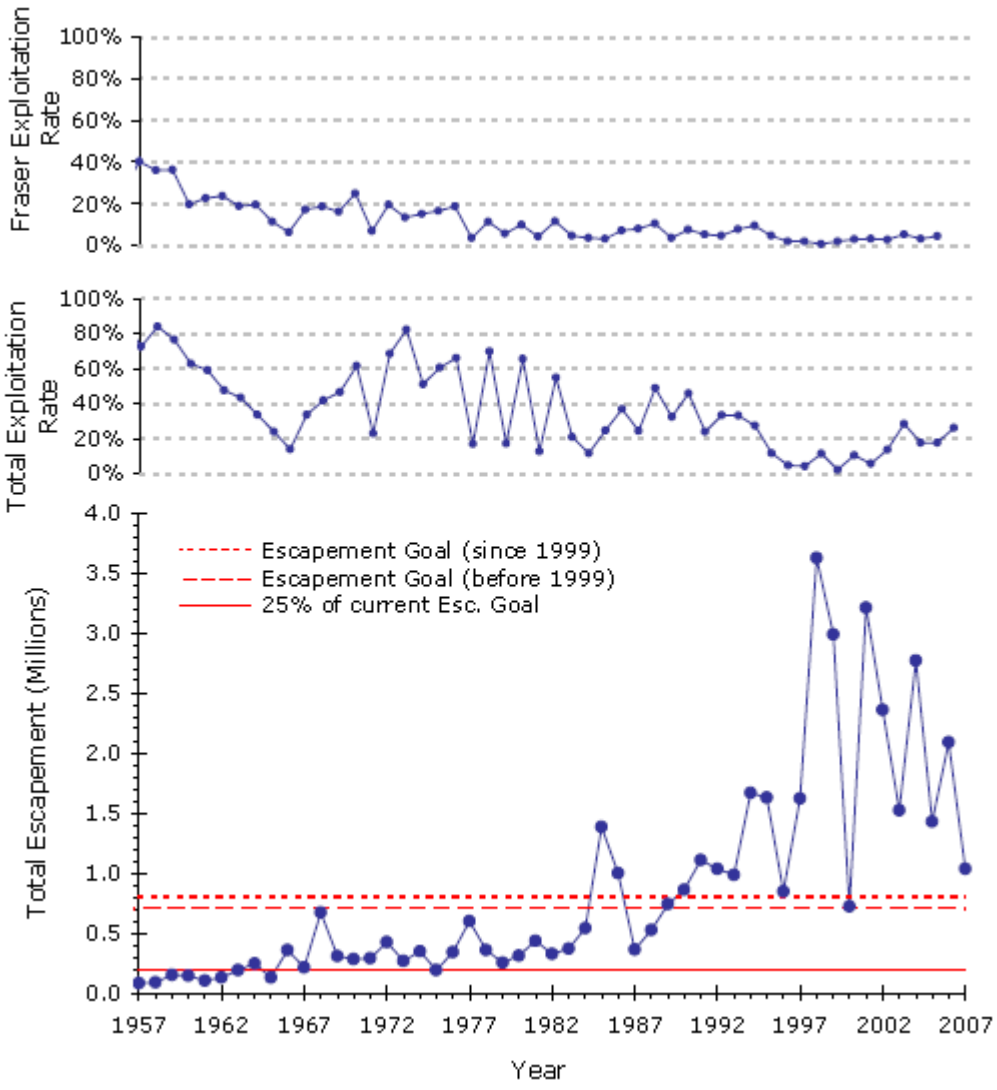

Figure A17. Trend summary for Fraser chum salmon

Appendix B – Inner South Coast BC Chum Assessment Update – March 10, 2011

Inner South Coast BC Chum Assessment Update – March 10, 2011

Completed by DFO for MSC Assessment of BC pink and chum salmon, specifically ISC chum.

SUMMARY

This note provides information supplemental to that submitted in April 2010 (Van Will, et al. 2009) in response to requests from the MSC assessment team for BC pink and chum salmon. The information includes updated exploitation rates and escapement time series for Inner South Coast (ISC) chum management units outside the Fraser River.

This information is updated based on a standard methodology run reconstruction of ISC chum in conjunction with an ECOTRUST funded project (English et al., 2009). The reconstruction methods used are outlined in Appendix A and B for data through 2010.

The results show that the stated management objective of 20% exploitation rate (ER) on the ISC chum aggregate (including the Fraser Stocks) in the Johnstone Strait mixed stock fishery is being met (average 17% ER since 2002). Despite high variability in total return of the ISC chum aggregate escapements have not dropped below the proposed lower sustainable escapement goal benchmark in the period assessed.

The results for individual stock management units (MU) show lower overall exploitation rates for more northerly MUs (generally below 10% ER) but increasing as one moves south (generally around 20% or higher average ER). Despite low exploitation rates for northerly MUs, these same MUs have the lowest escapement levels relative to sustainable escapement goal benchmarks.

BACKGROUND

ISC chum consist of 9 Conservation Units (CU) under the Wild Salmon Policy including two within the Fraser River (Figure 1a, and Table 1). These units stretch from the northern tip of Vancouver Island across to the mainland and to the southern tip of the Vancouver Island and the Fraser River. Historically, ISC chum were assessed and managed on the basis of 13 Management Units (MU) including one in the Fraser (Figure 1b and Table 1). These MUs generally align with DFO Pacific Fishery Management Areas (or Statistical Areas) 11-19 and 28, which facilitated the run reconstruction methodology at this scale. Those MUs outside the Fraser River are the basis for this analysis and reporting.

Note that the Certification Unit Profile (Van Will, et al., 2009) for ISC chum salmon provided additional detail about stock status, management reference points, management approach for fisheries in the area, assessment programs, and specific conservation measures. Included in this profile is an overview of allowable exploitation. Past reviews of ISC chum found that the sustainable exploitation rate (Umsy) for Fraser and the ISC chum aggregate is around 35-45% (Beacham 1984; Joyce and Cass 1992; Ryall et al. 1999 reported 39%-53% Umsy 80% CL).

ISC fall chum fisheries consist of a mixed stock fishery in Johnstone Strait and terminal fisheries generally targeting single stocks where surpluses have been identified. In the mixed stock fishing

area of Johnstone Strait, the history of the management strategies employed can be broken out into three periods: i) pre 1984, ii) 1984-2001 and iii) 2002-present.

Mixed Stock Fishery in Johnstone Strait

i) The Johnstone Strait fishery prior to 1984.

During the pre-1984 period, the Johnstone Strait mixed stock fisheries were managed to a fixed escapement strategy where the escapement goal was an aggregate of goals from each of the MUs. This period was wrought with acrimony when unreliable in season re-forecasts of returns did not provide fishing opportunities. The exploitation rate in this period averaged greater than 30% but was highly variable. The level of escapement was generally below goal.

ii) The Clockwork period 1984-2001

The issues encountered previously resulted in the initiation of a stepped exploitation rate approach (Clockwork), with ER ranging between 15% and 40% depending on improved monitoring and re-forecasts of aggregate return. This strategy provided more stable fishing opportunities and a higher escapement for the ISC chum aggregate (Figure 2 and 3) and was generally welcomed by industry. This strategy relied heavily on enhanced stock assessment and monitoring information with the main focus on the relationship between chum test fishery catch per unit effort and total return. Over time, reduced assessment and monitoring effort resulted in a reduced reliability of the re-forecasts and increased risk of a significant error in management. By 2001, the need for change was identified.

iii) Post Clockwork. The fixed effort period of 2002 to present.

To reduce the risk associated with implementation of the Clockwork strategy using unreliable information and to address industry concerns over increasing variability in fisheries, a fixed exploitation rate approach was initiated in 2002. It was agreed that the exploitation would be limited to a more conservative level of 20% implemented through a fixed effort approach, with 2 seine openings and limited gillnet and troll opportunities. This implementation approach was assessed through modeling and testing of assumptions by in season mark-recapture (conducted in 2000-2002) to estimate harvest rates, fleet efficiencies, and migration rates of chum through the mixed stock fishing area. Many of the parameters (run-timing and spread) required for the planning of these fisheries was obtained through the existing chum test fishery. Industries generally welcomed the more stable marketing opportunity but were still interested in increasing the exploitation on abundant returns. Currently, the fixed 20% ER approach is in place although variations in its implementation are being examined (i.e. Individual Transferable Quotas). This level of exploitation in Johnstone Strait and a critical abundance threshold of 1.0 million ISC chum used to manage both Canadian and US fisheries is identified within the Pacific Salmon Treaty revised Annex IV Chapter 6. The critical abundance threshold for the ISC chum aggregate including Fraser stocks provides a reference point to either initiate (>1.0 million) mixed stock fisheries in Johnstone Strait and US waters or suspend (<1.0 million).

Terminal fisheries

Once ISC chum pass through the Johnstone Strait mixed stock fishery they may be subject to terminal fisheries targeting an identified surplus to a specific river mouth (or approach area in front of a limited set of rivers or a MU). Generally these terminal fishing areas have been developed to target on specific rivers or MU and have minimal impact on passing stocks or other rivers within the same MU (unless specifically included). Surplus is defined as surplus return

above a specified fixed escapement target. The largest terminal fisheries exist in front of enhanced rivers such as Puntledge, Big Qualicum, and Little Qualicum rivers. These terminal harvests are included in the MU specific exploitation rates presented in this report but are not included in the exploitation rate on the total ISC chum aggregate within Johnstone Strait.

Methodology: Expansion of Escapement, Run Reconstruction, and Exploitation Estimates.

This report is based on an updated reconstruction of ISC chum stocks as outlined in Appendix A and B. Appendix A outlines the expansion of escapement data from indicators to unmonitored rivers. Appendix B provides details on the run reconstruction methodology used by English et al. 2009. The objective of the run reconstructions is to provide exploitation rate on the aggregate of ISC chum as well as exploitation rate by DFO Statistical Area.

One of the main components of the run reconstruction is catch. As the focus of this document is ISC chum excluding the Fraser, all historic catch data was filtered to remove out Fraser, US and WCVI components. This was accomplished by using weekly and area based stock compositions developed from past stock identification techniques such as allozyme and micro satellite DNA on commercial and test fishery samples (Van Will et al., 2009).

The available historic catch data associated with ISC fall chum fisheries was only available at the Statistical Area level. Run reconstructions were completed at that level, so that ER estimates for each Management Units are based on the Statistical Area that contributes the dominant portion of the Management Unit

Escapement Goals and Trends

In this report, we present revised benchmarks for MU escapement. Previously the sum of stream goals (SSGs) for a given MU was presented as the upper goal. These goals were criticized as having little value in understanding the status of chum populations.

Consequently, this report uses an emerging standard, namely the sustainable escapement goals (SEGs) proposed by Eggers and Heinl 2008, and used to assess Alaskan salmon stocks with similar quality of escapement data. The SEG method is a simple percentile approach recommended by Bue and Hasbrouck (*Unpublished*) for setting an SEG based on the time series of historic escapement data (Eggers and Heinl, 2008). The SEG range incorporates the upper SEG (75th percentile of escapement time series) and Lower SEG (25th percentile of the escapement time series). These SEGs represent interim fishery reference points similarly to what was presented in the Alaskan Assessment reports under MSC (http://www.msc.org/track-a-fishery/certified/pacific/alaska-salmon/assessment-downloads). Under the Fisheries & Oceans Canada's Wild Salmon Policy, the further development of benchmarks for chum salmon will be undertaken.

SEGs for the fall timed ISC chum stocks were calculated based on the expanded escapement time series and identified for each management unit (Table 2). These were then compared to the expanded escapement time series to evaluate status relative to those SEGs (Figures 3-15).

ANALYSIS / COMMENT

Exploitation and Escapement for Aggregate ISC Chum (with and without Fraser Stocks)

1. Exploitation

As described in the background section, ISC chum are harvested in the mixed stock fishing area of Johnstone Strait under a 20% ER objective on the aggregate and terminally only when surpluses are identified for that MU. The largest terminal fishery is in the Qualicum area targeting on enhanced returns.

The ER on the aggregate of ISC chum MUs is presented in Figure 2, including Fraser River stock in the catch. The ER includes total catch in the Johnstone Strait fisheries in the numerator and total catch in all fisheries and escapement in the denominator.

Including Fraser chum, the exploitation rate in the Johnstone Strait fishery has averaged around 17% since the inception of the 20% fixed ER approach in 2001 (Figure 2).

As the focus of this work is on ISC chum we also evaluated the ER not including Fraser chum. The exploitation rate in the Johnstone Strait fishery on ISC chum (not including Fraser) has averaged around 21% since the inception of the fixed exploitation rate approach (Figure 3). The slightly higher ER exhibited when the Fraser stocks are separated out is based on the generally earlier migration timing of the Fraser stocks relative to the other ISC chum populations.

2. Escapement Trend

The escapement trend over the entire time series has been fairly stable for the ISC chum stock aggregate (Figure 3). For a majority of the time series (1953-2009) escapement abundances have been within the SEG range (between the 25 percentile and the 75 percentile of the escapement time series). Rarely does the time series fall below the lower SEG. There is a significant amount of variability in the escapements over time. The initiation of a more conservative management strategy in the mix stock areas should work towards further rebuilding of this stock aggregate.

Exploitation and Escapement for ISC MUs

Management Units within Statistical Area 12

Management units that fall within this Statistical area are (Figure 1b):

- Upper Vancouver Island (Figure 4)
- Kingcome (Figure 5)
- Bond/Knight (Figure 6)
- Johnstone Strait (Figure 7)

1. Exploitation

The main assumptions made for chum stocks within Area 12 were 100% diversion through the northern route (Queen Charlotte Strait) and that they are 40% vulnerable to the fishery in Area 12. The later assumption is based on the fact that the systems in the northern portion of Area 12 such as Upper Vancouver Island, Bond/Knight and Kingcome migrate to their natal stream prior to entering the main fishing area in Johnstone Strait. The dominant portion of the Johnstone Strait MU, the Nimpkish River population, has a much later timing than most of the other ISC fall chum stocks and would not be vulnerable to the main October fisheries.

The estimated exploitation rates of the management units that are found within Statistical Area 12 have been extremely low over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 5% over the assessed period (Figures 4-7). Since inception of the fixed harvest rate approach in 2002 the ER has been reduced to an average of 3%.

2. Escapement trend

Upper Vancouver Island:

The stocks within this MU have seen fairly low abundance since the mid 70's. The recent time series demonstrates a stock compliment that is close to the lower SEG. This management unit is a prime candidate for moving away from focusing on the sum of stream goals as they have never been achieved over the entire time series (1953-2009). Review of modeled exploitation of stocks within the general area (Statistical Area 12) show that there is little fishing pressure on these populations and the impact of fall fisheries have little bearing on the status of these chum populations (Figure 4).

Kingcome Inlet, Bond-Knight Inlet and Johnstone Strait:

All of these three MUs follow a similar trend in escapement (Figures 5, 6 and 7) over the time series. There is little evidence that the low abundance (escapements hovering around the lower SEG) since the mid to late 80's are a result of impact of the fall fisheries (Modeled ER for Statistical Area 12 stocks).

Management Units within Statistical Area 13

Management units that fall within this Statistical area are (Figure 1b):

- Johnstone Strait (small Portion) (Figure 7)
- Loughborough/Bute (Figure 8)
- Mid Vancouver Island (small Portion) (Figure 9)

1. Exploitation

The main assumptions made for chum stocks within Area 13 were 100% diversion through the northern route (Queen Charlotte Strait) and that they are 70% vulnerable to the fishery in Area 13. The later assumption is based on the fact that a portion of these stocks in the Johnstone Strait and Loughborough/Bute will only be vulnerable to a portion of the fishing effort directed at Fall ISC chum.

The estimated exploitation rates of the management units that are found within Statistical Area 13 have been well below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 22% over the assessed period (Figure 8). Since inception of the fixed harvest rate approach in 2002 the estimated ER has declined slightly to an average of 21%.

2. Escapement trend

Loughborough to Bute Inlet:

The trend in chum escapement associated with the Loughborough to Bute MU has been highly variable with a significant increase in abundance from the early 70's through the mid 90's (Figure 8). Recent expanded escapements have been within the SEG range and showing some improvement. The exploitation rate associated with this MU is estimated around 21% since 2002.

Management Units within Statistical Area 14

Management units that fall within this Statistical area are (Figure 1b):

- Mid Vancouver Island (Figure 9)

1. Exploitation

The main assumptions made for chum stocks within Area 14 were 100% diversion through the northern route (Queen Charlotte Strait) and that they are 100% vulnerable to the fishery in Area 11, 12, and 13. Due to the terminal nature of this fishery targeting the main production out of the 3 enhanced facilities (Puntledge, Big Qualicum and Little Qualicum) it was assumed that 95% of the Area 14 chum stock was vulnerable to the Area 14 fishery. Estimated ER's for this area will be higher generally than many of the other MU mainly based on the vulnerability of the stock in the mixed stock fisheries in Johnstone Strait as well as the targeted terminal fisheries on the enhanced stocks of Puntledge, Little Qualicum and Big Qualicum all found within Area 14. Majority of the exploitation in the Area is directed and the enhanced stocks and is driven by the terminal escapement goal strategy.

The estimated exploitation rates of the Mid Vancouver Island management unit that is found within Statistical Area 14 have been similar to the estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 45% over the assessed period (Figure 9). Since inception of the fixed harvest rate approach in 2002 the ER has seen a decrease to an average of 36%. This decrease is driven both by a change in harvest strategy in Johnstone Strait, but also in a low abundance of Area 14 enhanced stock reducing terminal opportunities in recent years.

2. Escapement trend

Mid Vancouver Island

The production in this area is attributed mainly to the enhanced production from 3 facilities. Fisheries in the Area 14 target the enhanced surplus and are controlled by escapement goals. The trend in abundance over the time series has been increasing, with most of the escapement within the SEG range and many escapements since the early 80s well above the Upper SEG (Figure 9). The average modeled exploitation of 45% is heavily weighted to terminal fisheries on enhanced stocks. The recent year drop in modeled exploitation is likely due to lower abundances returning to the enhanced facilities within this MU.

Management Units within Statistical Area 15

Management units that fall within this Statistical area are (Figure 1b):

- Toba (Figure 10)
- Jervis (small Portion) (Figure 11)

1. Exploitation

The main assumptions made for chum stocks within Area 15 were 100% diversion through the northern route (Queen Charlotte Strait) and that they are 100% vulnerable to the fishery in Area 11 and 12, and only 50% vulnerable to the Area 13 fishery as stock move east out of the fishing area above typical concentrations of commercial effort.

The estimated exploitation rates of the management units that are found within Statistical Area 15 have been below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 25% over the assessed period (Figure 10). Since inception of the fixed harvest rate approach in 2002 the ER has seen a decrease to around 20%.

2. Escapement trend

Toba Inlet

Stocks within this MU have shown very low escapements since the mid 80's. Recent monitoring has been sparse but expanded abundance has shown an improvement since 2000 (Figure 10), driven by higher than average returns to a few monitored systems. Escapement 2006-2009 reverted back to the low status at or below the lower SEG. Modeled exploitations have been fairly conservative averaging in recent years around 20%.

Management Units within Statistical Area 16

Management units that fall within this Statistical area are (Figure 1b):

- Jervis (Figure 11)

1. Exploitation

The main assumptions made for chum stocks within Area 16 were 90% diversion through the northern route (Queen Charlotte Strait) and that they are 100% vulnerable to the fishery in Area 11, 12, and 75% vulnerable to the fishery in Area 13 to the North. Through the southern approach Area 16 stocks

would be 100% vulnerable to Area 20 and US fisheries and only slightly vulnerable to Area 21 fisheries. It was assumed that the vulnerability of Area 16 stocks would be 0% for both area 14 and 15 due to the terminal nature of fisheries in those respective areas.

The estimated exploitation rates of the Jervis management unit that is found within Statistical Area 16 have been below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 25% over the assessed period (Figure 11). Since inception of the fixed harvest rate approach in 2002 the estimated ER has seen a slight decrease to an average of 23%.

2. Escapement trend

Jervis Inlet

The trend in abundance for this MU has been similar to what we saw in Mid Vancouver Island. The trend in abundance was increasing since the 70s with many years well above the Upper SEG (Figure 11). Recent year abundances have declined but are still within the SEG range. Again modeled exploitation has been low around 23% in recent years.

Management units of Statistical Area 17

Management unit that fall within this Statistical areas are (Figure 1b):

- Lower Vancouver Island (Figure 12)

1. Exploitation

The main assumptions made for chum stocks within Area 17 were only a 90% diversion through the northern route (Queen Charlotte Strait) and that they are 100% vulnerable to the fishery in Area 11, 12 and 13. It was assumed that the vulnerability of Area 17 stocks would be 30% for Area 14 and 0% for both Areas 15 and 16 due to the terminal nature of fisheries in those areas. On the southern approach, Area 17 stocks would be only slightly vulnerable to Area 21, 19 and 18 fisheries (~20%) and fully vulnerable in Area 20 and US fisheries (100%).

The estimated exploitation rates of the Lower Vancouver Island management unit that is found within Statistical Area 17 have been at or below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). The average estimated exploitation of these stocks has been around 37% over the assessed period (Figure 12). Since inception of the fixed harvest rate approach in 2002 the ER has dropped to an average of 29%.

2. Escapement trend

Lower Vancouver Island

The trend in abundance over the time series for this MU has been variable but fairly stable. Recent year returns are showing some improvement and are well within the SEG range (Figure 12). Modeled exploitation in recent years averaging around 29% has not resulted in a negative trend in abundance for this MU.

Management Units within Statistical Area 18 and 19

Management unit that falls within this Statistical area is (Figure 1b):

- Southern Vancouver Island (Figure 12)

1. Exploitation

The main assumptions made for chum stocks within Area 18 and 19 were only a 50% diversion through the northern route (Queen Charlotte Strait), meaning the other 50% would divert through Juan De Fuca or the Southern route. Past GSI work in Area 20 and 21 has shown that both Fraser and Canadian South Coast Stocks migrated through those areas on the West Coast on their way to natal streams. It is assumed that the component migrating via the northern route will be 100% vulnerable to Area 11, 12 and 13 fisheries, 30% vulnerable to Area 14 fisheries as well as fisheries in Area 17 (20% vulnerable). The component of Area 18/19 assumed to migrate through the southern route; the stocks are slightly vulnerable to fisheries in WCVI Area 21 and fully vulnerable in Area 20 and US fisheries in Area 4b, 5 6c and 7/7A (100% vulnerable).

The estimated exploitation rates of the Southern Vancouver Island management unit that is found within Statistical Area 18 (42%ER) has been below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) and near that level in Statistical Area 19 (44%ER) over the time period of the analyses (1980-2009). Since inception of the fixed harvest rate approach in 2002 the ER has been reduced to 28% and 27%, Area 18 and 19 respectively (Figure 13).

2. Escapement trend

Southern Vancouver Island

The escapement time series associated with this MU has been increasing over the time series (1953-2009). Escapement abundance did encounter a decline from the early 90's through mid 2000's (Figure 13). More recent

years have reversed that decline to continue the overall increasing trend and well above the upper SEG. Historically the average modeled exploitation rate of 42% was reduced in recent years to around 28%.

Management Units within Statistical Area 28

Management units that fall within this Statistical area are (Figure 1b):

- Howe Sound (Figure 14)
- Burrard Inlet (Figure 15)

1. Exploitation

The main assumptions made for chum stocks within Area 28 were only an 80% diversion through the northern route (Queen Charlotte Strait), meaning the other 20% would divert through Juan De Fuca or the Southern route similar to Area 18 and 19. It is assumed that the component migrating via the northern route will be 100% vulnerable to Area 11, 12 and 13 fisheries as well as fisheries in Area 17 (20% vulnerable). The component of Area 17 assumed to migrate through the southern route, the stocks are slightly vulnerable to fisheries in WCVI Area 21, fully vulnerable in Area 20 and US fisheries in Area 4b, 5 6c and 7/7A (100% vulnerable) and partially vulnerable to fisheries in Area 18 and 19 (50%).

The estimated exploitation rates (34%ER) of the Howe Sound and Burrard management units that are found within Statistical Area 28 have been below past estimates of Umsy for ISC aggregate chum populations (Ryall et al, 1999) over the time period of the analyses (1980-2009). Since inception of the fixed harvest rate approach in 2002 the ER has been reduced to 24% (Figure 14-15)

2. Escapement trend

Howe Sound/ Sunshine Coast

The time series of data associated with this MU is highly sensitive to monitoring on the Cheakamus and Squamish Rivers. The trend in abundance for this MU was improving through till the mid 80's (Figure 14). Declining abundance continues through 2002 and then the expanded escapement demonstrates a significant improvement and resulting escapement higher than the upper SEG. Estimated exploitation (Statistical Area 28) of these stocks has dropped from and historic average of 34% down to 24% in recent years.

Burrard Inlet

The trend in escapement for this MU has been improving over the time series with a significant jump in abundance since the mid 90's (Figure 15). The modeled exploitation associated with this MU (Statistical Area 28) has seen a reduction and less variation since 2002.

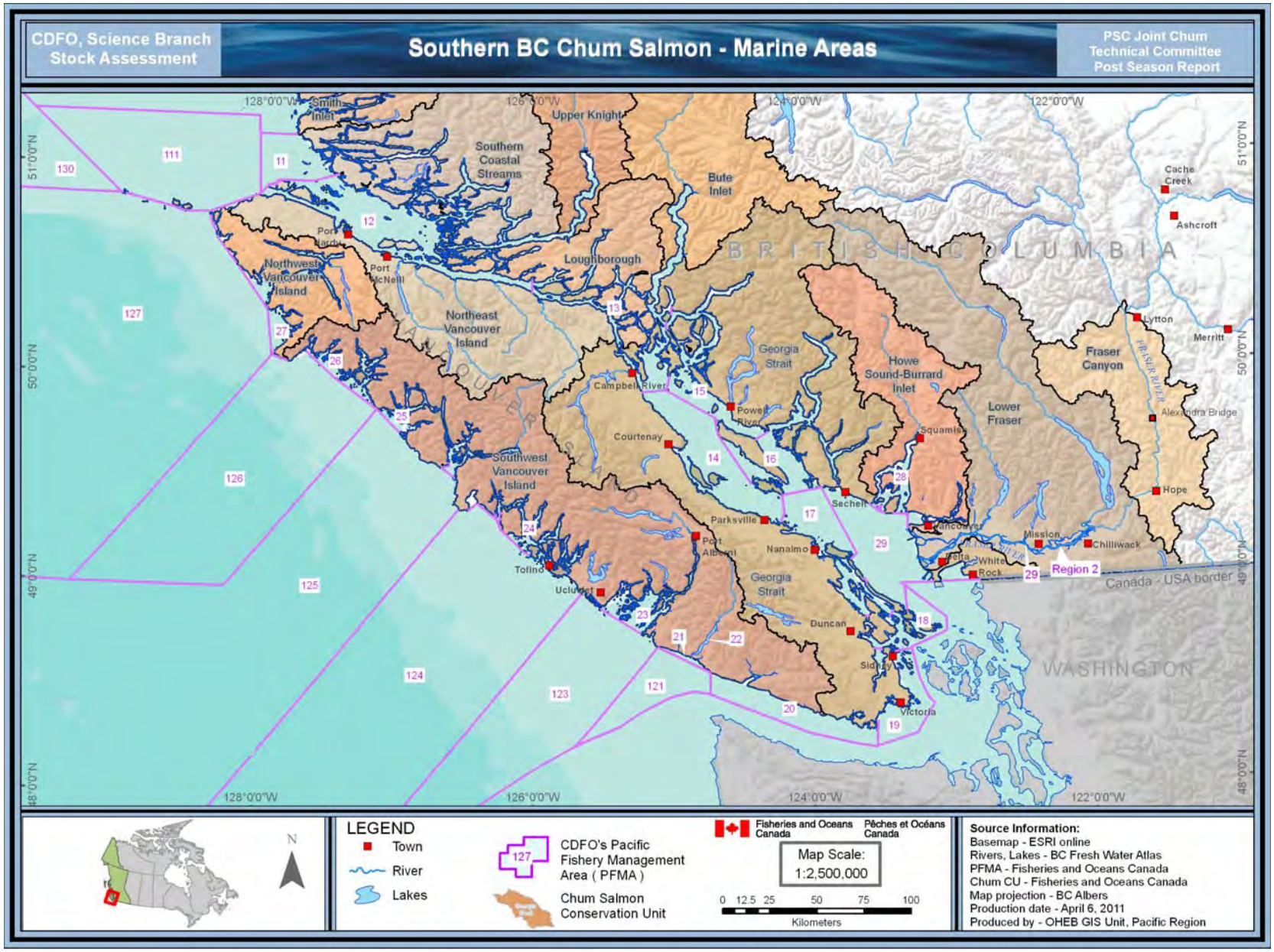

Figure 1a. Southern BC Chum Conservation Units and Statistical Areas (ISC chum Statistical Areas include 11-19 and 28)

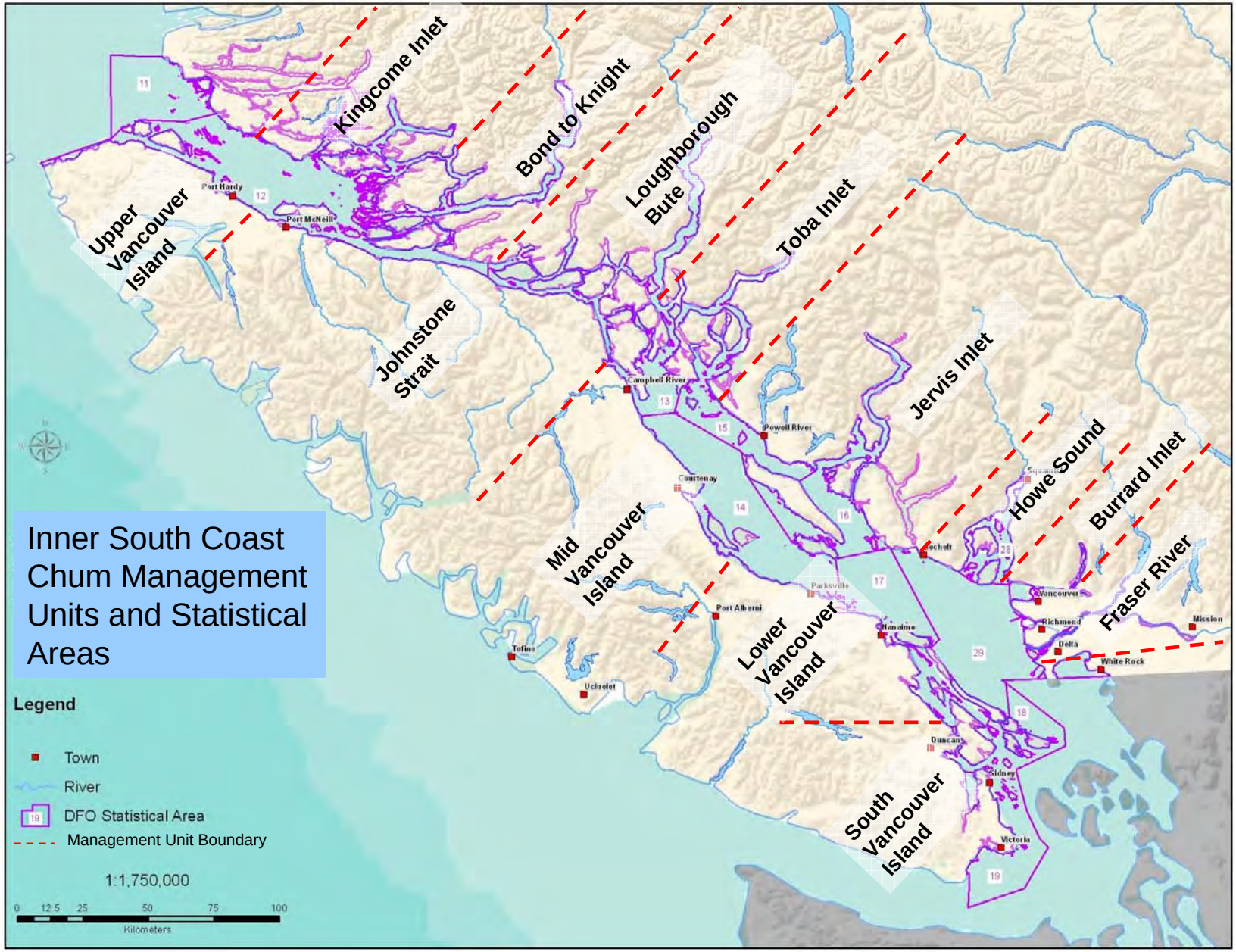

Figure 1b. Map of ISC Chum Management Units and Statistical Areas

Table 1. Population Structure of the Inner South Coast chum conservation unit

Bold font indicates systems for which four or more annual escapement observations are available over the period 1998 to 2006. Underlined fonts are summer run timed populations. *Italicized font with an asterisk** marks systems with active hatchery enhancement. Methods for identifying CUs are documented in Holtby and Ciruna (2007). A complete list of sites for each Conservation Unit (CU) is available at http://www-comm.pac.dfo-mpo.gc.ca/pages/consultations/wsp/CUs_e.htm.

Conservation Unit	Management Area	Stat Area	Spawning Sites
Southern Coastal Streams	Johnstone Strait	11/12	**Driftwood Creek** (Area 11), Waldon Creek (Area 12)
	Kingcome	12	Bughouse Creek, Charles Creek, Cohoe Creek, Embley Creek, Hauskin Creek, Jennis Bay Creek, Kenneth River, **Kingcome River**, **Mackenzie River**, Nimmo Creek, *Scott Cove Creek**, Shelter Bay Creek, Simoom Sound Creek, Sullivan Bay Creek, **Wakeman River**
	Bond/Knight	12	**Ahta River**, Ahta Valley Creek, , Gilford Creek, Hoeya Sound Creek, **Kakweiken River**, Kamano Bay Creek, Lull Creek, Maple Creek, Matsiu Creek, Mcalister Creek, **Shoal Harbour Creek**, ***Viner Sound Creek****, Wahkana Bay Creek
Upper Knight	Bond/Knight	12	Ahnuhati River, Franklin River, **Klinaklini River**, **Kwalate Creek**, Sim River
Loughborough	Bond/Knight	12	Boughey Creek, Call Creek, Cracroft Creek, **Glendale Creek**, Port Harvey Lagoon Creeks, Protection Point Creek, Shoal Creek
	Johnstone Strait	12	**Fulmore River**, Potts Lagoon Creek, Robbers Knob Creek, Tuna River
	Loughborough to Bute	13	**Apple River**, Bachus Creek, Cameleon Harbour Creek, Chonat Creek, Elephant Creek, Fanny Bay Creek, **Frazer Creek**, Frederick Arm Creek, **Granite Bay Creek**, **Grassy Creek**, **Gray Creek**, Hanson's Creek, Hemming Bay Creek, **Heydon Creek**, Kanish Creek, Knox Bay Creek, Owen Creek, **Phillips River**, **Read Creek**, St. Aubyn Creek, Stafford River, Thurston Bay Creek, **Village Bay Creek**, Waiatt Bay Creek, **Willow Creek**, **Wortley Creek**
Northeast Vancouver Island	Upper VI	12	Cluxewe River, Keogh River, Nahwitti River, ***Quatse River****, Shushartie River, Songhees Creek, Stranby River, Tsulquate River
	Johnstone Strait	12	**Adam River**, Hyde Creek, **Kokish River**, Mills Creek, New Vancouver Creek, ***Nimpkish River****, Tsitika River,
		13	**Amor De Cosmos Creek**, **Hyacinthe Creek**, **Salmon River**
	Mid-VI	13	Pye Creek
Strait of Georgia	Mid Vancouver Island	13	**Campbell River**, **Kingfisher Creek**, **Menzies Creek**, **Mohun Creek**, **Quinsam River**, **Simms Creek**
	Loughborough to Bute	13	**Bird Cove Creek**, **Drew Creek**, **Open Bay Creek**, **Quatam River**, **Whiterock Pass Creek**
Bute Inlet	Loughborough to Bute	13	Cumsack Creek, Homathko River, Orford River, **Southgate River**, Teaquahan River
Strait of Georgia	Mid Vancouver Island	14N	**Bob Creek**, Brooklyn Creek, **Chef Creek**, **Cook Creek**, **Cowie Creek**, **Hart Creek**, Kitty Coleman Creek, **McNaughton Creek**, **Millard Creek**, **Morrison Creek**, ***Oyster River****, Portuguese Creek, ***Puntledge River****, ***Rosewall Creek****, Roy Creek, Sandy Creek, Storie Creek, **Trent River**, **Tsable River**, **Tsolum River**, **Waterloo Creek**, **Wilfred Creek**, Woods Creek
		14S	Annie Creek, **Englishman River**, **French Creek**, ***Little Qualicum River****, **Nile Creek**, ***Qualicum River****
	Toba Inlet	15	Black Lake Creek, **Brem River**, Brem River Tributary, Filer Creek, Forbes Bay Creek, Forbes Creek, Klite River, Little Toba River, **Okeover Creek**, Pendrell Sound Creek, Refuge Cove Creek, **Store Creek**, Tahumming River, **Theodosia River**, Toba River, Twin Rivers

Conservation Unit	Management Area	Stat Area	Spawning Sites
	Jervis Inlet	15	***Lang Creek****, Lois River, ***Sliammon Creek****, **Whittall Creek**
		16	**Albion Creek**, **Angus Creek**, Baker Creek, **Brittain River**, **Burnet Creek**, **Carlson Creek**, Cranby Creek, Deighton Creek, **Deserted River**, Doriston Creek, Earle Creek, **Frock Creek**, Gray Creek, **Halfmoon Creek**, High Creek, **Hunaechin Creek**, **Jefferd Creek**, Mill Creek, Mouat Creek, **Park Creek**, Pender Harbour Creeks, Ruby Creek, Sechelt Creek, , **Skwawka River**, **Snake Bay Creek**, Storm Creek, Tsuahdi Creek, **Tzoonie River**, **Vancouver River**, West Creek
	Howe Sound / Sunshine Coast	16	Dakota Creek, Mcnab Creek, Mcnair Creek, Potlatch Creek, Rainy River, Twin Creek,
	Lower Vancouver Island	17	Beck Creek, Bloods Creek, **Bonell Creek**, ***Bonsall Creek****, **Bush Creek**, **Chase River**, Departure Creek, **Haslam Creek**, **Holland Creek**, Knarston Creek, **Millstone River**, ***Nanaimo River****, **Nanoose Creek**, **Napoleon Creek**, Porter Creek, **Stocking Creek**, Tyee Creek, **Walker Creek**
	South Vancouver Island	17	***Chemainus River****
		18	**Cowichan River**, Fulford Creek, Koksilah River, Shawnigan Creek
		19	***Goldstream River****
Howe Sound – Burrard Inlet	Jervis Inlet	16	**Bishop Creek**, **Shannon Creek**
	Howe Sound / Sunshine Coast	16	**Wilson Creek**
		28A	Avalon Creek, Centre Creek, Eagle Creek, Hutchinson Creek, **Langdale Creek**, Long Bay Creek, Mannion Creek, Nelson Creek, **Ouillet Creek**, Terminal Creek, West Bay Creek, Whispering Creek
	Burrard Inlet	28A	Brothers Creek, Capilano River, Hastings Creek, **Indian River**, Lynn Creek, Mackay Creek, Maplewood Creek, McCartney Creek, Mosquito Creek, Mossom Creek, Noons Creek, Richards Creek, Seymour River
Strait of Georgia	Howe Sound / Sunshine Coast	28A	Chapman Creek, **Chaster Creek**, Flume Creek, **Roberts Creek**, Wakefield Creek,
		28B	Ashlu Creek, B.C. Rail Spawning, Branch 100 Creek, Brennan Channel, Brohm River, Cheakamus River, Chuk-Chuk Creek, Dryden Creek, Fries Creek, Hop Ranch Creek, July Creek, Lower Paradise Channel, Mamquam River, Mashiter Creek, Mashiter Spawning Channel, Meighan Creek, Mission Creek, Moody Channel, Pillchuck Creek, Raffuse Creek. Shovelnose Creek, Spring Creek, Squamish River, Stawamus River, Stawamus Spawning Channel, Tenderfoot Creek, Thirty Seven Mile Creek, Thirty-Six Mile Creek, Tiempo Spawning Channel, Twenty Eight Mile Creek, Upper Paradise Channel, Wildwood Spawning Channel
	Burrard Inlet	29B	Serpentine River

Table 2. Upper and Lower Sustainable escapement goals by ISC fall chum management units

Management Unit	Upper SEG (75^{th} percentile)	Lower SEG (25^{th} percentile)
Upper Vancouver Island	12,536	1,183
Kingcome Inlet	13,575	1,312
Bond to Knight Inlet	67,144	4,660
Johnstone Strait	18,025	3,296
Loughborough to Bute Inlet	124,330	17,851
Mid Vancouver Island	352,489	121,521
Toba Inlet	24,541	4,726
Jervis Inlet	115,430	34,877
Lower Vancouver Island	82,774	30,731
Southern Vancouver Island	162,274	51,535
Howe Sound	199,509	51,081
Burrard Inlet	40,489	7,938

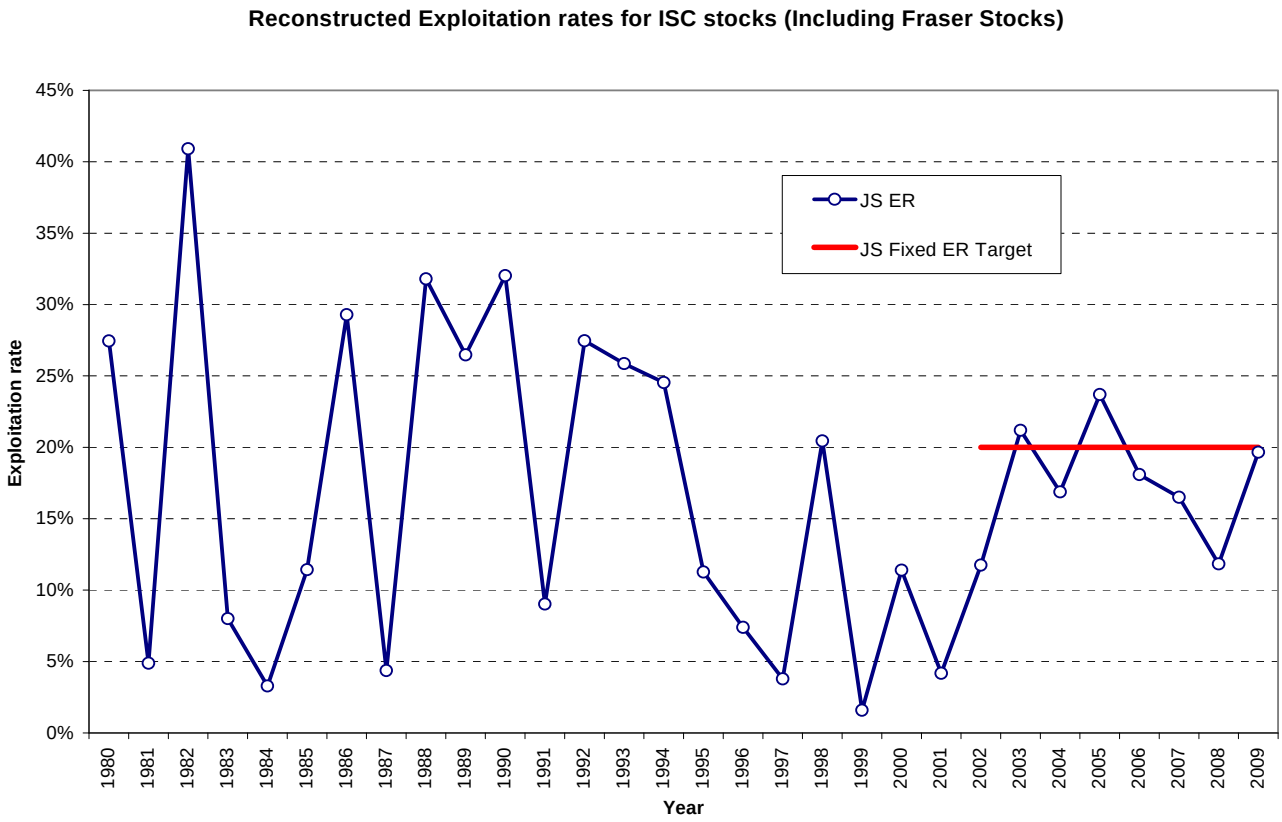

Figure 2. Reconstructed exploitation rates of ISC chum stock aggregate including Fraser River stocks in the Johnsotne Strait mixed stock area.

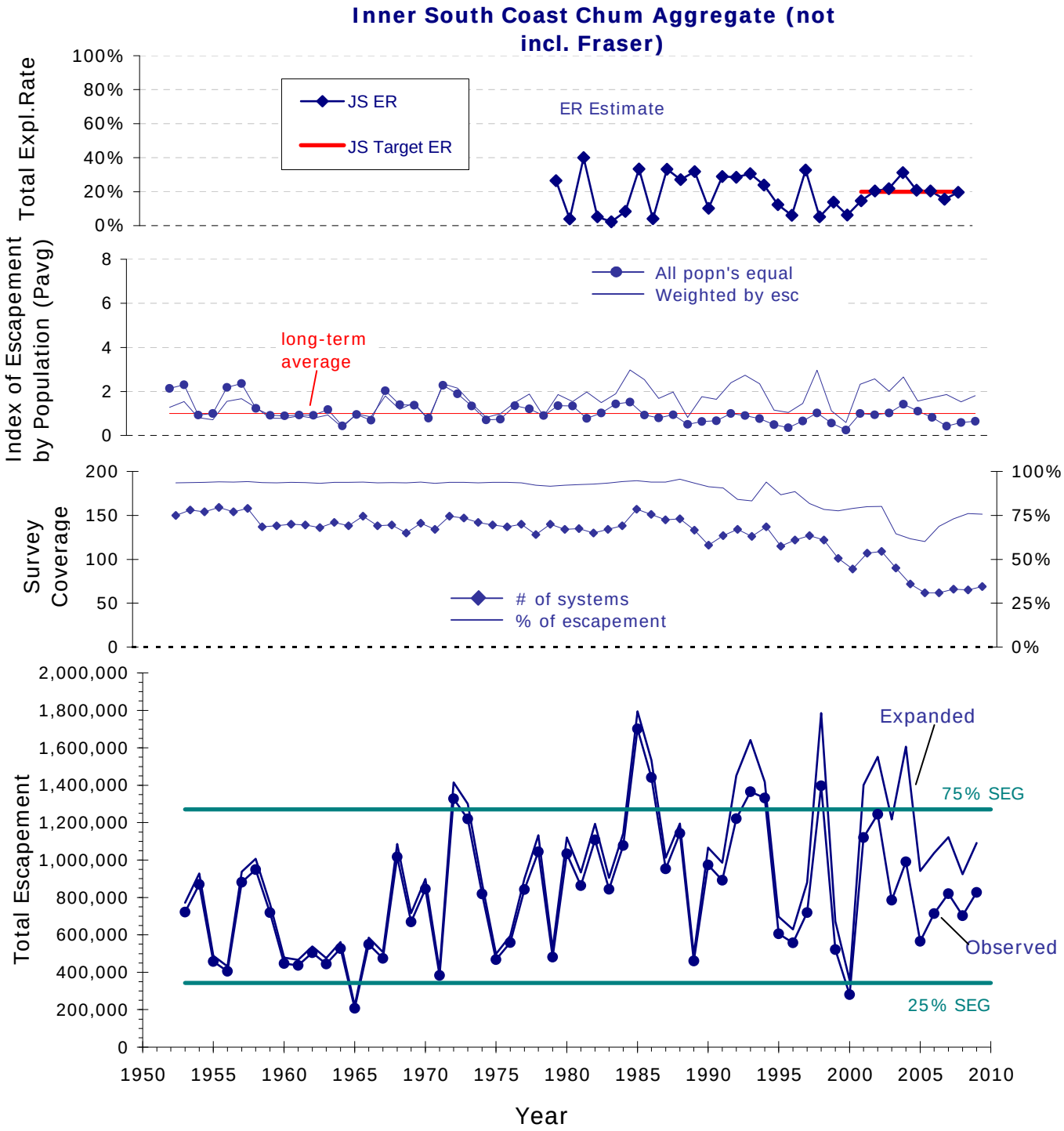

Figure 3: Aggregate escapement and exploitation rate trends for Inner South Coast chum salmon. Fraser River Stocks not included.

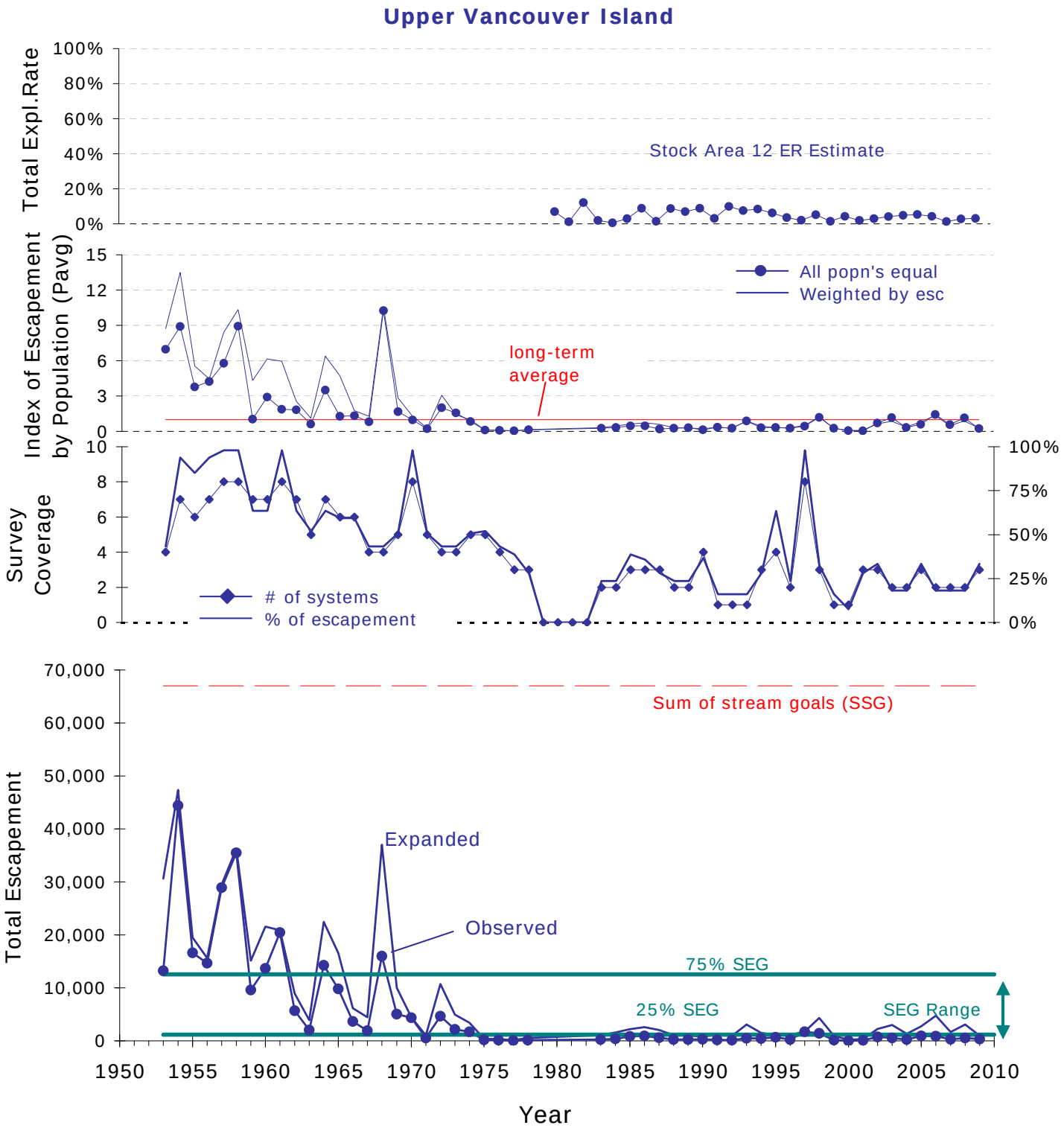

Figure 4: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Upper Vancouver Island.

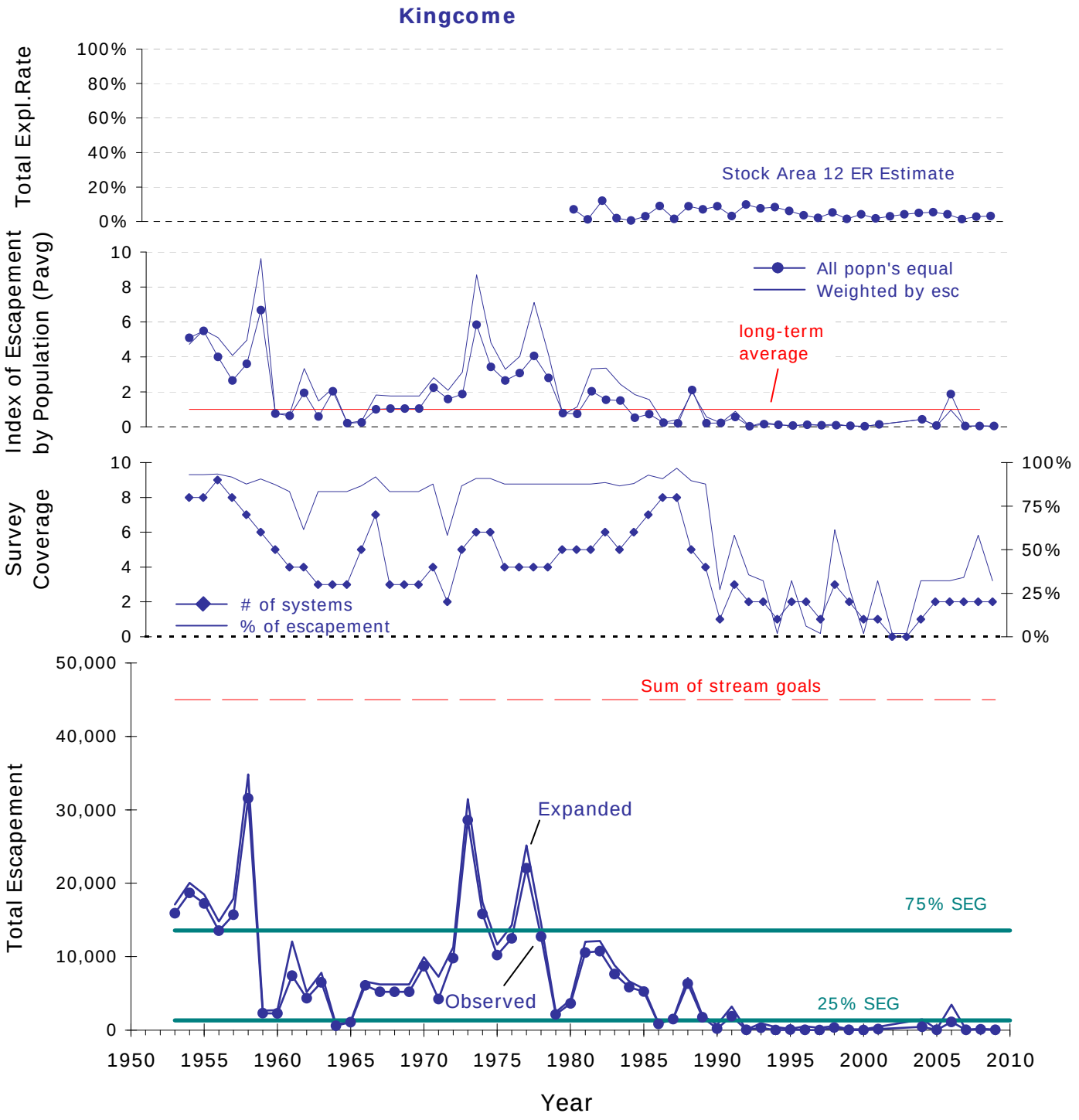

Figure 5: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Kingcome Inlet.

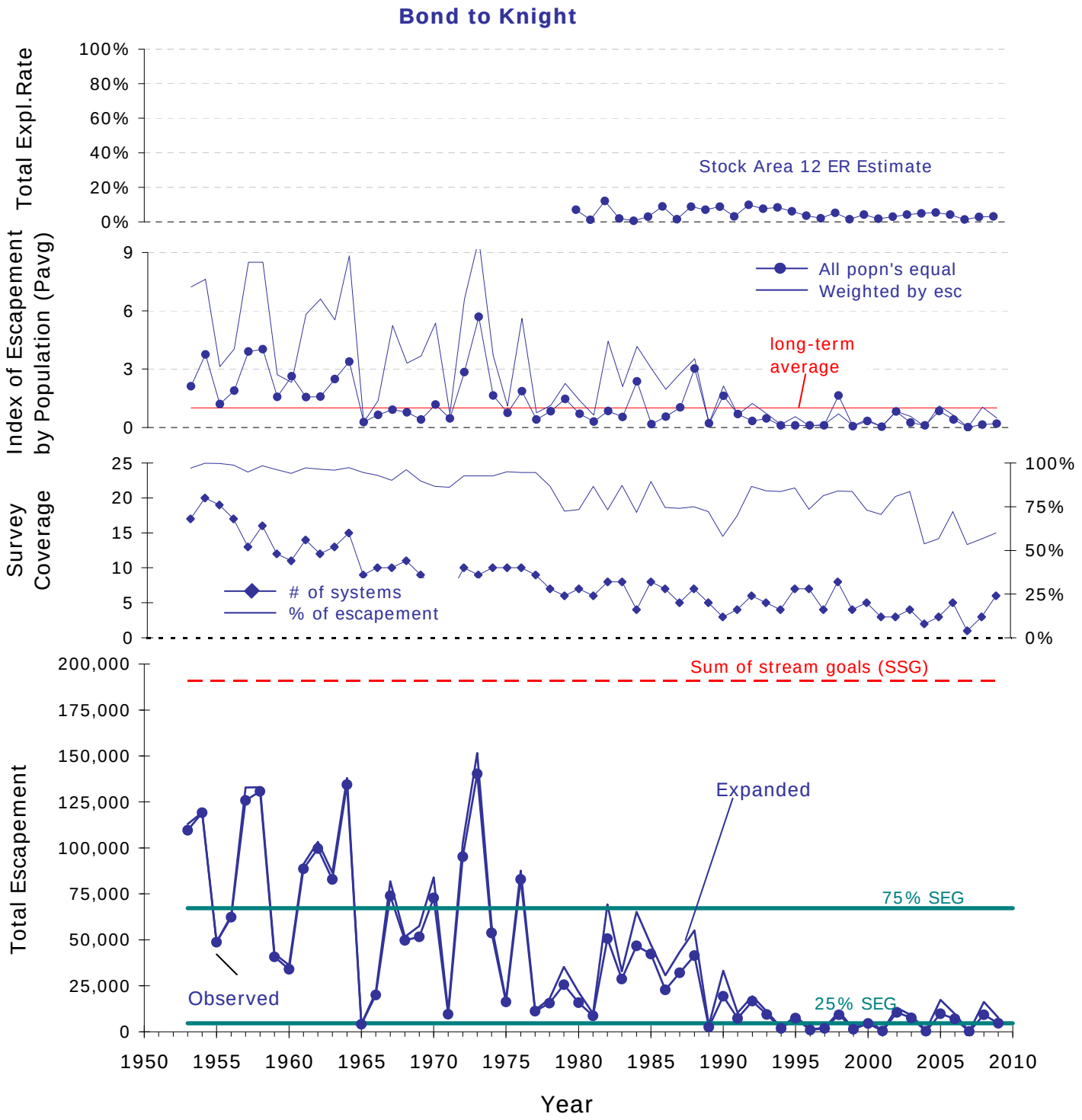

Figure 6: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Bond to Knight Inlet.

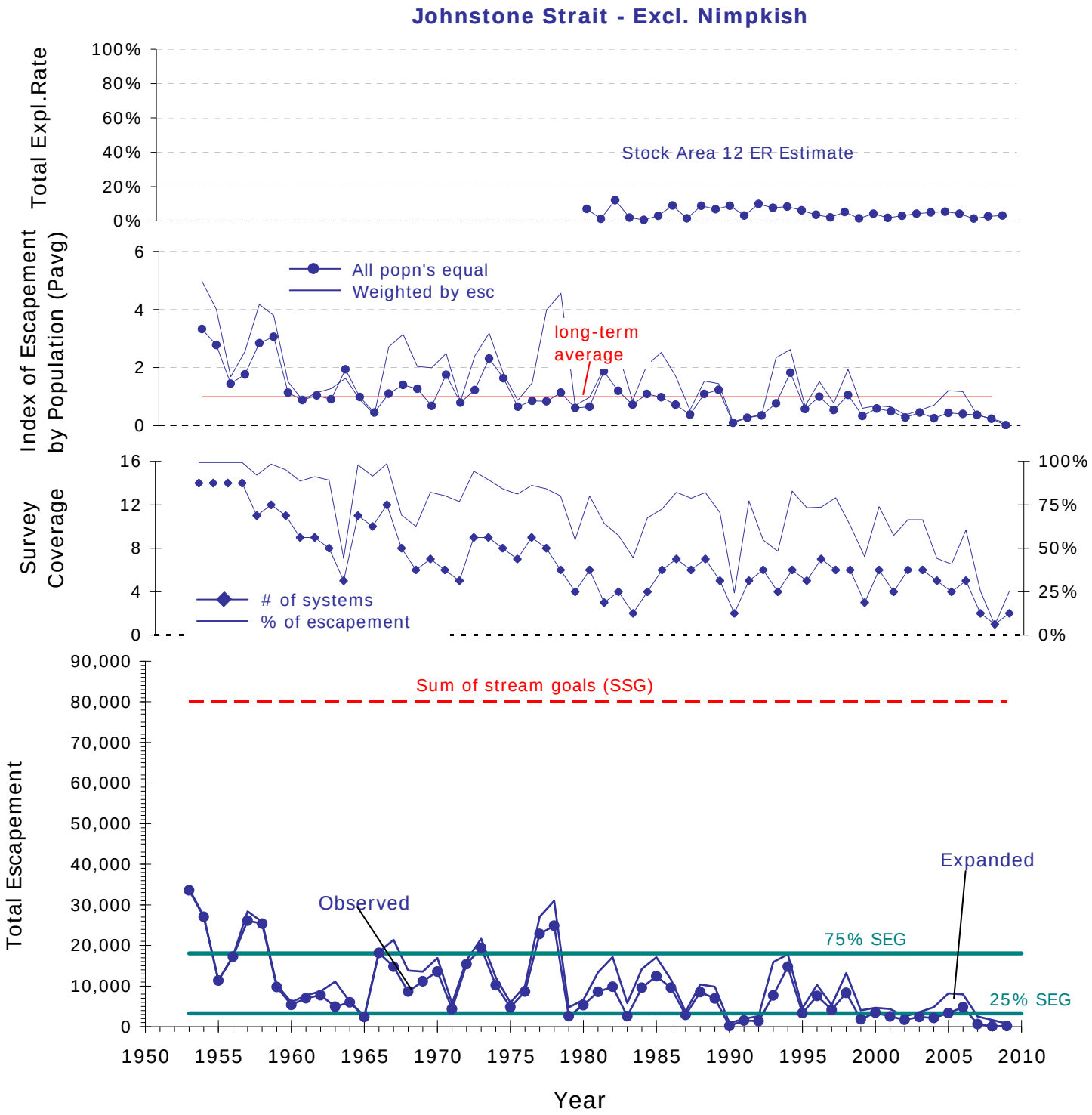

Figure 7: Estimated exploitation and escapement trend summary for ISC chum salmon – Johnstone Strait (excl. Nimpkish).

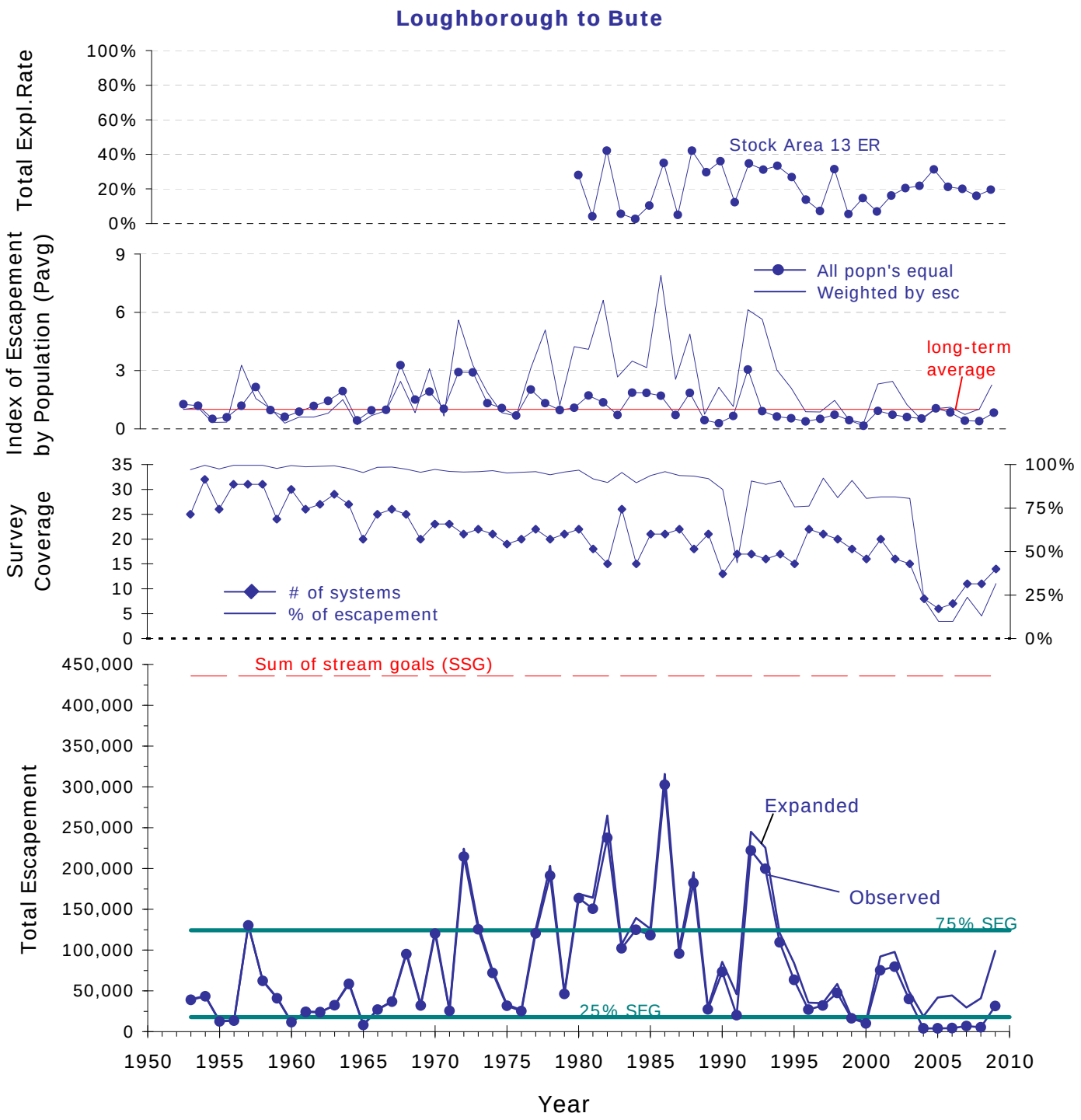

Figure 8: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Loughborough to Bute.

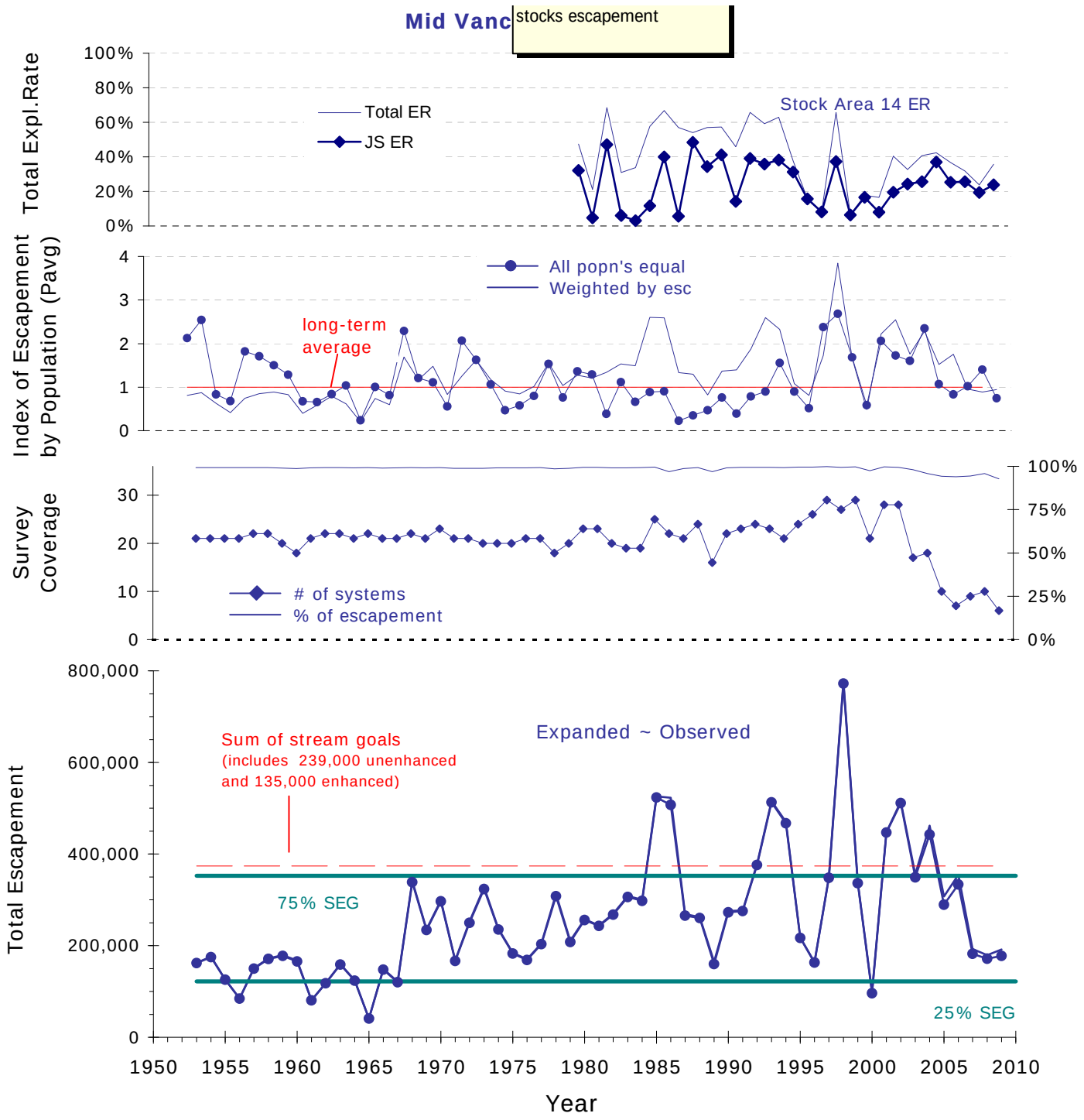

Figure 9: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Mid Vancouver Island.

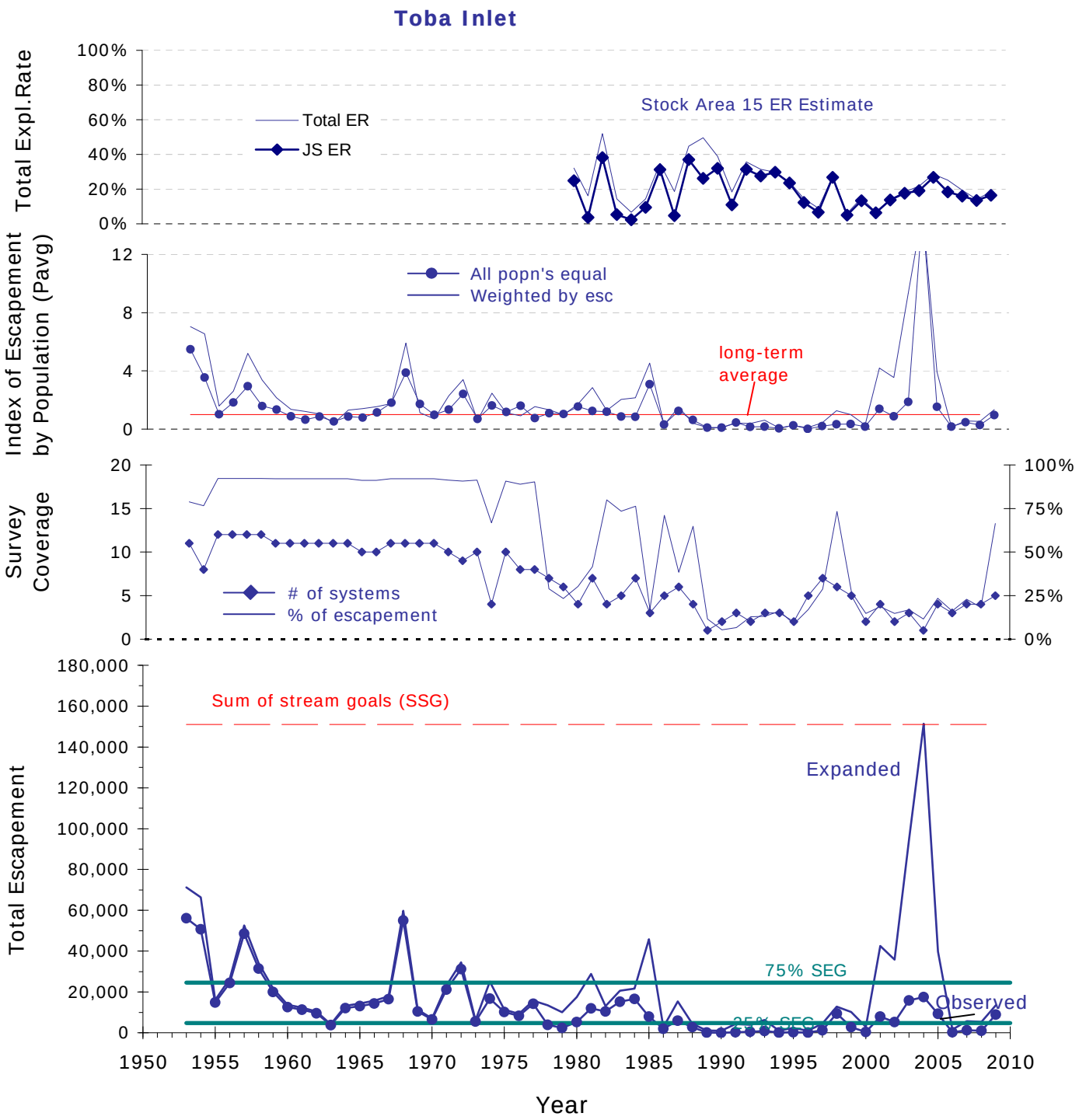

Figure 10: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Toba Inlet.

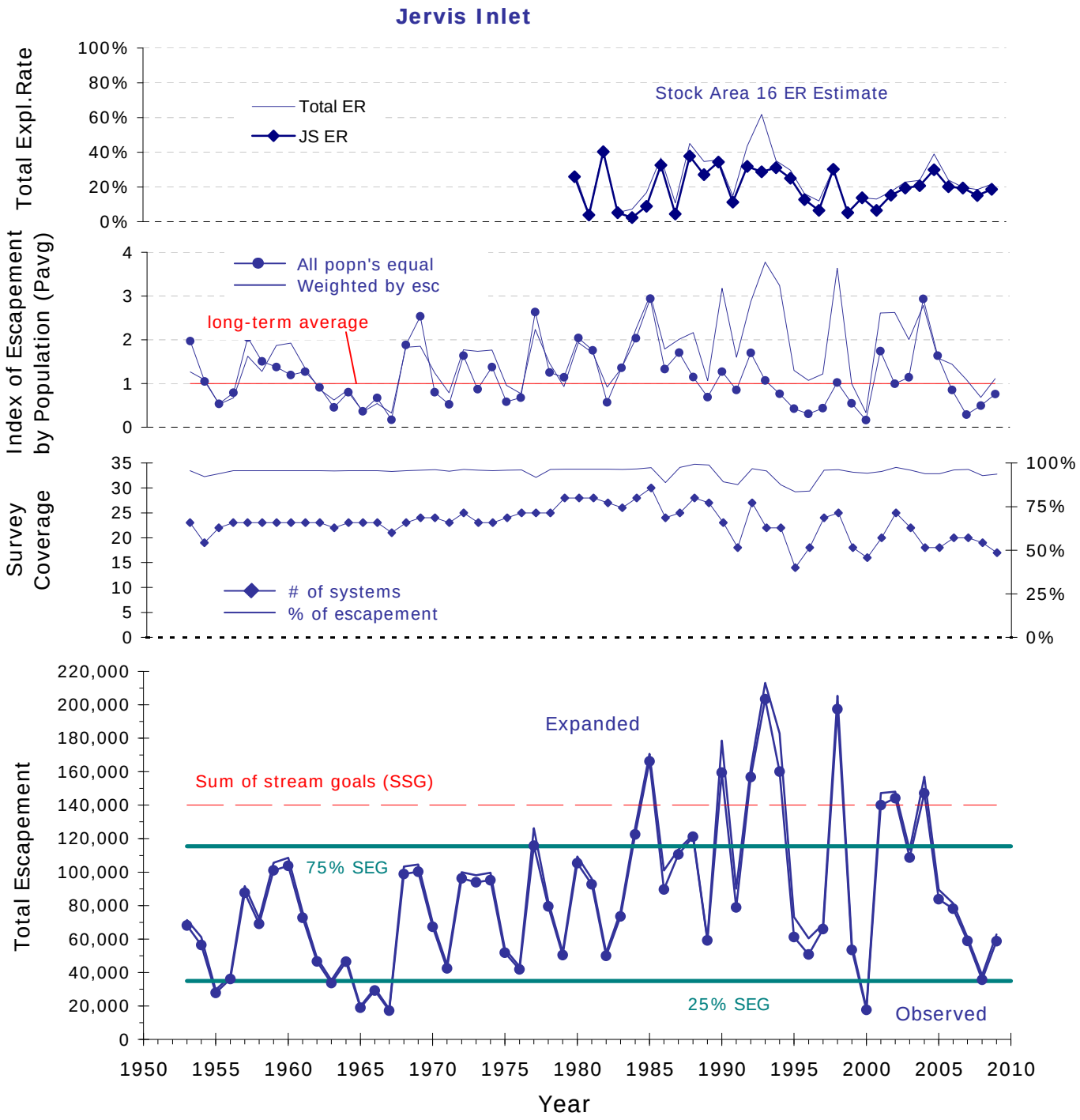

Figure 11: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Jervis Inlet.

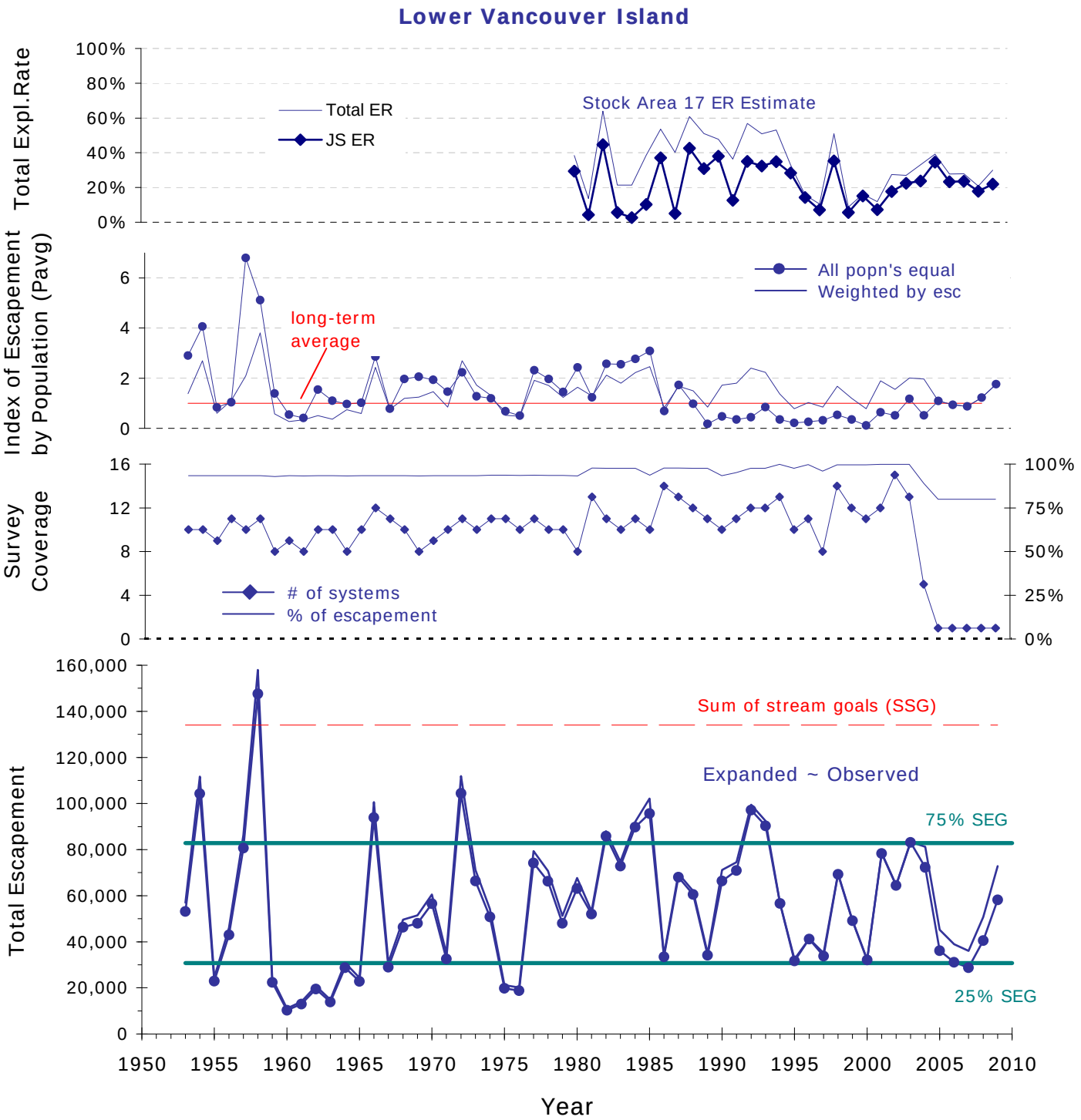

Figure 12: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Lower Vancouver Island.

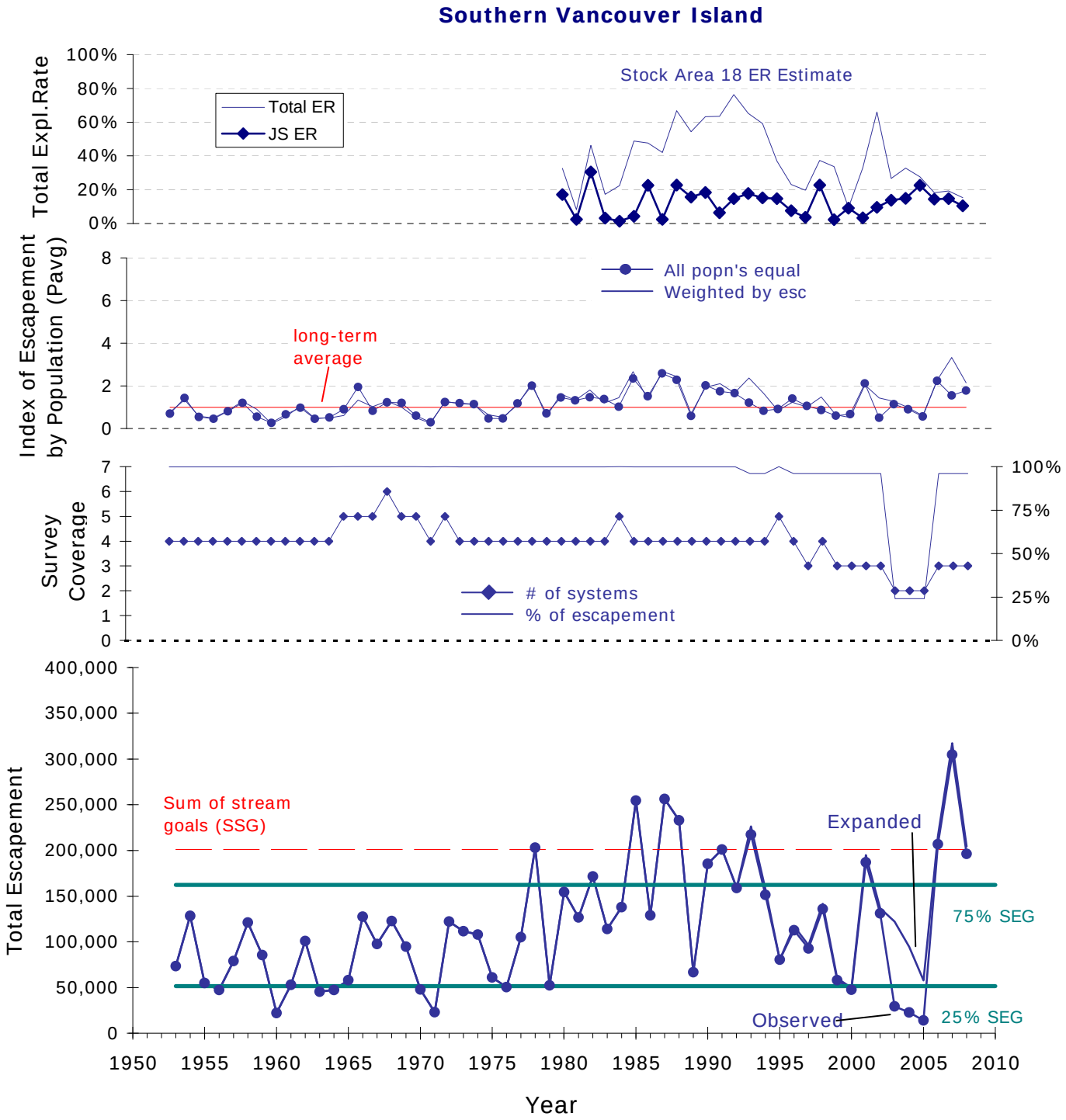

Figure 13: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Southern Vancouver Island.

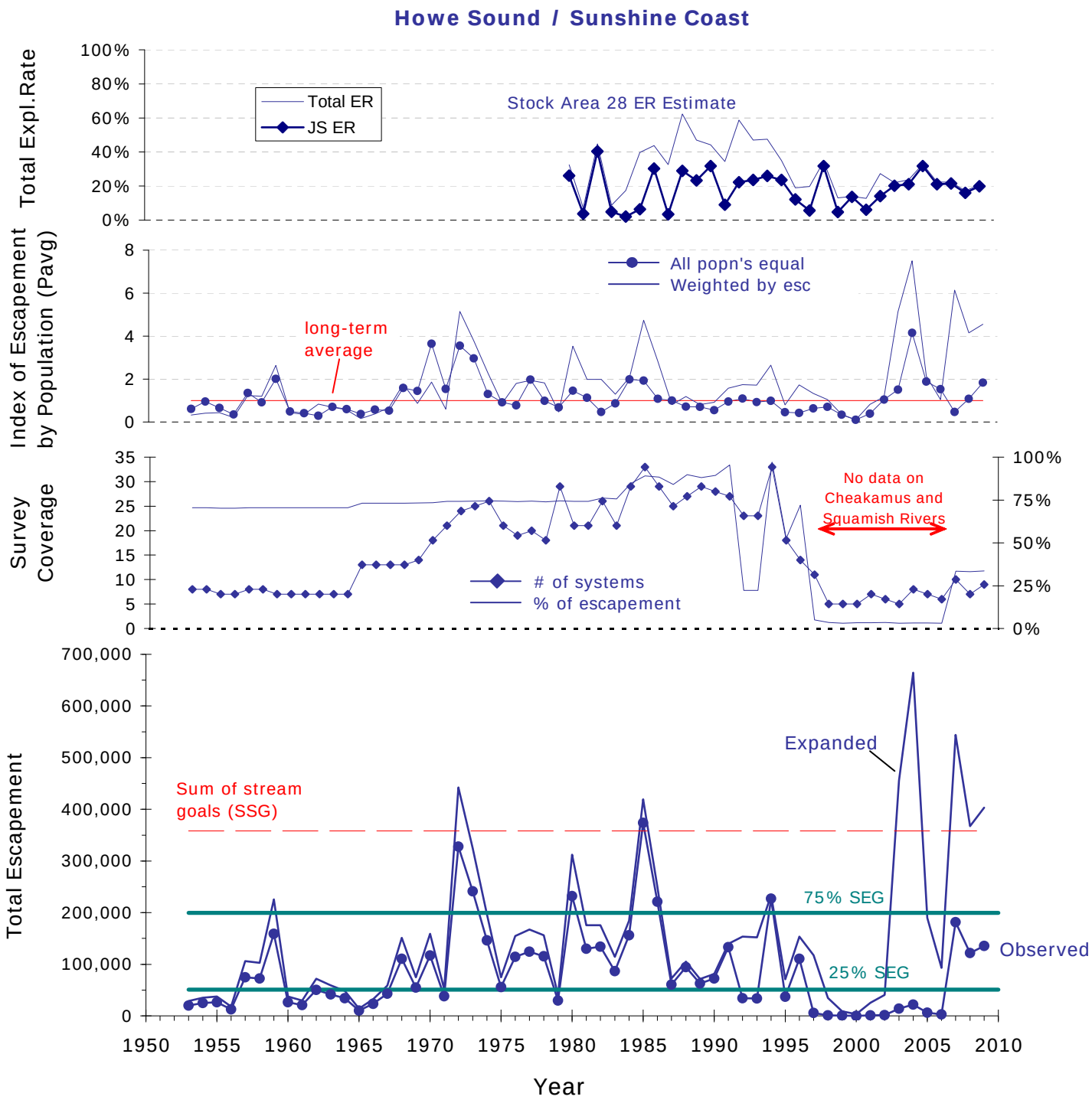

Figure 14: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Howe Sound / Sunshine Coast.

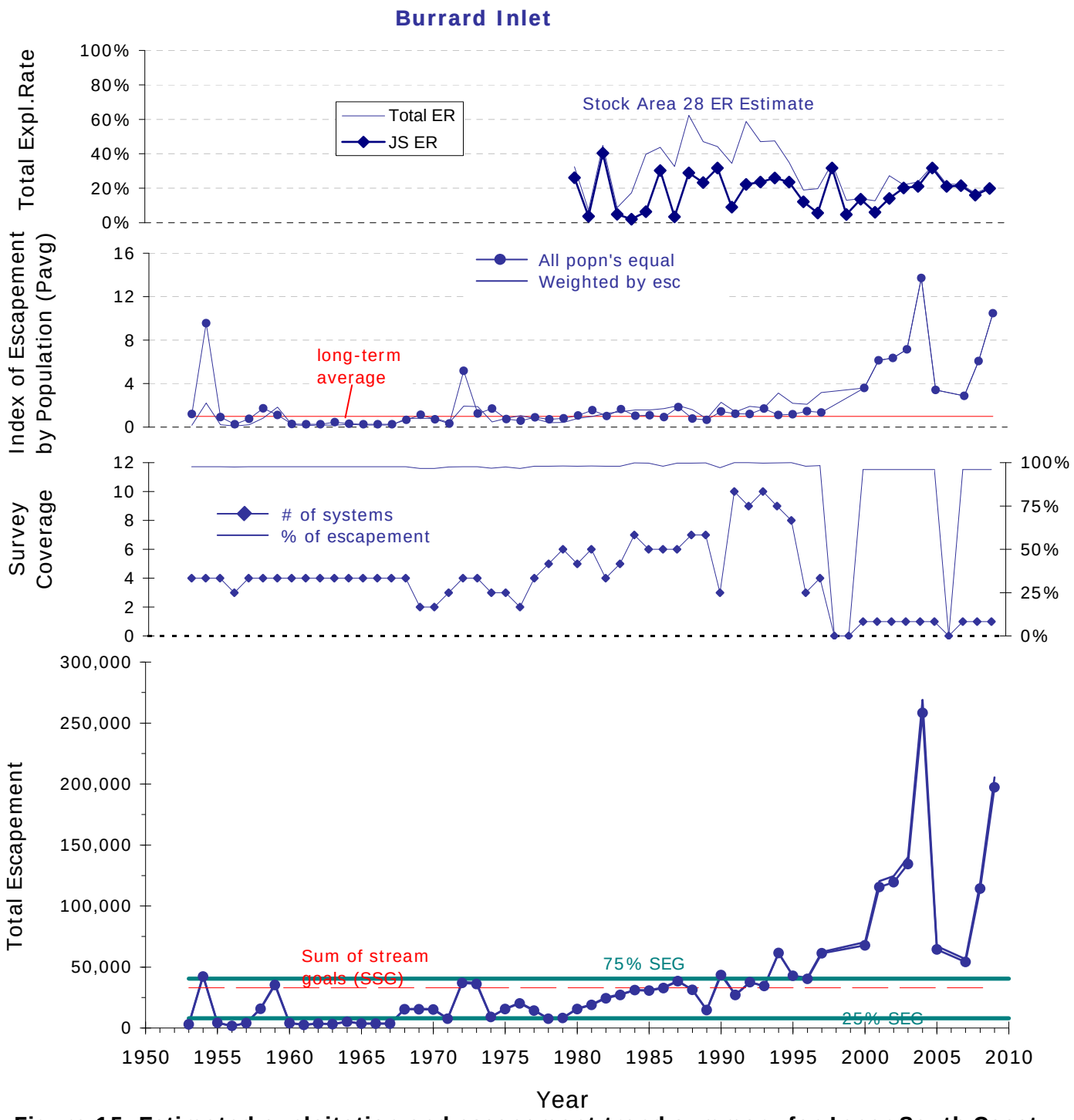

Figure 15: Estimated exploitation and escapement trend summary for Inner South Coast chum salmon – Burrard Inlet.

References

Beacham, T.D. 1984. Catch, escapement and exploitation of chum salmon in British Columbia, 1951-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1270: v + 201 p.

Eggers, D. M., and S. C. Heinl. 2008. Chum salmon stock status and escapement goals in Southeast Alaska. Alaska Department of Fish and Game, Special Publication No. 08-19, Anchorage..

English, K.K., D. Peacock and B. Spilsted. 2006. North and Central Coast Core Stock Assessment Program for Salmon. Prepared by LGL Limited for Pacific Salmon Foundation and Fisheries and Oceans, Canada. 78 p.

English, K.K., A.C. Blakley, T. Mochizuki and D. Robichaud. 2009 (draft). Coast-wide Review of BC Salmon Indicator Streams and Estimating Escapement, Catch and Run Size for each Salmon Conservation Unit. Report prepared by LGL Limited for Fisheries and Oceans Canada and Ecotrust. 79 p.

English, K.K. A. Blakley, C. Sliwinski and S. Humble. 2006. Fisheries Resource Manuals: South Coast. Prepared by LGL Limited for Department of Indian Affairs and Northern Development, Vancouver, BC. 59 p. plus appendices.

Ryall, P., C. Murray, V. Palermo, D. Bailey and D. Chen. 1999. Status of Clockwork Chum Salmon Stock and Review of the Clockwork Management Strategy. C.S.A.S. Research Document 99/169. Department of Fisheries and Oceans Canada, Nanaimo.

Van Will P. R. Brahniuk, L. Hop Wo and G. Pestal . 2009. Certification Unit Profile:
Inner South Coast Chum Salmon (Excluding Fraser River). Can. Man. Rep. Fish. Aquat. Sci. 2876: vii + 63p.

APPENDIX A

Description of the approach used to estimate annual escapements and the total return to Canada for South Coast salmon stocks.

Reference:

English, K.K., D. Peacock and B. Spilsted. 2006. North and Central Coast Core Stock Assessment Program for Salmon. Prepared by LGL Limited for Pacific Salmon Foundation and Fisheries and Oceans, Canada. 78 p.

English, K.K. A. Blakley, C. Sliwinski and S. Humble. 2006. Fisheries Resource Manuals: South Coast. Prepared by LGL Limited for Department of Indian Affairs and Northern Development, Vancouver, BC. 59 p. plus appendices.

The assessment of long-term trends in abundance is critical for determining stock status, setting annual fisheries management goals and defining harvest sharing agreements for First Nations, sport and commercial fisheries. The first task in any stock assessment is to define the stocks to be assessed. For salmon populations, the resolution of stock units range from specific run-timing groups for a specific spawning area to numerous spawning streams within a geographic region. While sound biological and genetic rationale are available to define some of these stock groups, the practical constraints on our ability to assess long-trend trends in abundance for specific salmon stocks is largely determined by the quantity and quality of the available catch and escapement data. For all salmon stocks, the minimum requirement for stock specific assessments is information on the number of adults returning to the spawning area (i.e. spawning escapement). Escapement data are available for a large number of streams but not all streams and all species within each statistical area. Since both escapement and catch data are routinely organized by statistical area, we used the south coast statistical areas (Areas 11-29) as the basic units for our initial assessment. Within these statistical areas there are a number of instances where the assessment is limited to a specific stock or stock group because of data quality or limitations (e.g. Fraser sockeye, Chinook and coho). For Areas 11-28, our goal was to provide systematic estimates of the total escapement, harvest rate and total return to Canadian waters for each salmon species by statistical area.

The major sources of data and estimates used in these analyses were:

- Annual escapement data for all monitored streams within a statistical area;
- Weekly catch data for sockeye, pink and chum by gear type for each statistical area;
- Annual harvest rate estimates for Chinook and coho from PSC models; and
- Annual estimates of the catch and escapement by stock from the PSC for Fraser sockeye stocks and Barkley Sound sockeye.

The procedures used for each combination of species and statistical area were determined by the quantity and quality of the available data. The most common approach used to estimate total escapement was the index stream method, where a series of expansions were used to convert the observed escapement for frequently monitored streams into a series of annual escapement estimates for a statistical area. The procedures and equations used to estimate the total annual escapement are described below.

Symbols and notation

a = index denoting a statistical area
i = index denoting an index stream or river (sum = I)
j = index denoting a non-index stream or river (sum = J)
s = index denoting a species
d = index denoting a decade (1=1980-89, 2=1990-99)
y = index denoting a year in a decade with escapement survey data (max. 10)
Y_{siad} = total years of escapement survey data, by stratum
w = weighting factor
C = catch
$\bar{E}_{siad}$ = observed index stream escapement, averaged over years with survey data, by stratum
$\bar{E}_{sjad}$ = observed non-index stream escapement, averaged over years with survey data, by stratum
E_{siady} = observed escapement to an index stream, by stratum
E'_{sady} = adjusted observed escapement to all index streams, by stratum
$\hat{E}_{sady}$ = total estimated escapement by stratum
P = portion of total mean escapements of all streams accounted for by stream r
F'_{sady} = correction factor for missing index stream survey data, by stratum
F''_{sady} = correction factor non-index stream contributions, by stratum
F'''_{sa} = correction factor for observer efficiency, by species and area
H_{sady} = harvest rate (i.e exploitation) in year y, of species from one statistical area
R_{sady} = total return to Canada by species, statistical area, year and decade

Description of estimators

The observed escapement of a species to an index stream, average over all years with survey data between 1980 and 2009 (the current time series of escapement data) is:

$$\overline{E}_{siad} = \frac{\sum_{y=1}^{Y_{srd}} E_{siady}}{Y_{siad}}$$

The index stream escapement contribution to that of all index streams in a stratum is:

$$P_{siad} = \frac{\overline{E}_{siad}}{\sum_{i=1}^{I} \overline{E}_{siad}}$$

An expansion factor is used to weight the contributions of index streams with missing survey data, and give an adjusted observed escapement to all index streams in a stratum:

$$F'_{sady} = \frac{1}{\sum_{i=1}^{I} \left(P_{siad} \cdot w_{siady} \right)} \qquad \begin{cases} w_{siady} = 0 \text{ if } E_{siady} = 0 \\ w_{siady} = 1 \text{ if } E_{siady} > 0 \end{cases}$$

$$E'_{sady} = F'_{sady} \sum_{i=1}^{I} E_{siady}$$

The overall observed escapement to all streams in an area is obtained by accounting for the contribution of non-index streams in the first decade [d=1 only 1980-89], due to large survey data gaps in the second decade.

$$F''_{sady} = \frac{\sum_{i=1}^{I} \overline{E}_{siady} + \sum_{j=1}^{J} \overline{E}_{sjady}}{\sum_{i=1}^{I} \overline{E}_{siady}}$$

$$E_{sady} = E'_{sady} \cdot F''_{sady}$$

Finally, the total estimated escapement to a statistical area is obtained by accounting for observer efficiency, as determined by the regional DFO staff familiar with the escapement monitoring techniques used in each statistical area (Table A1). In the current analyses, the correction factors are considered to be constant over all years for each species, but vary both between species and in some instances between survey areas

$$\hat{E}_{sady} = E_{sady} \cdot F'''_{sa}$$

The stock-specific harvest estimates were derived from indicator stocks for Chinook and coho salmon or by combining catch and escapement data for individual or groups of statistical areas for sockeye, pink and chum salmon. For those statistical areas and species where the available data was not adequate to compute a harvest rate, an initial estimate of the harvest rate was provided by the regional DFO biologists. A summary of the methods and sources of these harvest rate estimates is provided in Table A2.

The Total Run (TR) in a given year for each species and statistical area was estimated by combining the estimated total escapement (TE) with an estimate of the annual exploitation rate for all fisheries (ER_{Total}) in the following equation:

$$TR = TE / (1\text{-}ER_{Total})$$

The Total Return to Canada (TRTC) in a given year for each species and statistical area was estimated by combining the estimated total escapement (TE) with an estimate of the annual exploitation rate for Canadian fisheries (ER_{CDN}) in the following equation:

$$TRTC = TE + TR * ER_{CDN}$$

For a few area-species combinations, the desired estimates were derived from PSC databases, DFO summary tables or recent run reconstruction analyses. These instances include: Fraser and Barkley Sound sockeye and Fraser Chinook.

Appendix Table A1. Summary of observer efficiency expansion factors, by species and statistical area.

Stat. Area	Sockeye	Pink	Chum	Chinook	Coho
11	na	na	1.0	na	1.0
12	1.0	1.0	1.0	1.0	1.0
13	1.0	1.0	1.0	na	1.0
14	na	na	1.0	1.0	1.0
15	na	na	1.0	na	1.0
16	1.0	na	1.0	na	1.0
17-20	na	na	1.0	1.0	1.0
21-27	na	na	1.0	1.0	1.0
28	na	na	na	1.0	na
29 Lower	DFO/PSC	1.0	1.0	1.0	1.0
29 Upper	DFO/PSC	1.0	na	1.0	IFCRT

DFO/PSC = Department of Fisheries and Oceans & Pacific Salmon Commission databases
IFCRT = Interior Fraser Coho Recovery Team (2005).

Appendix Table A2. Summary of assumptions, method and sources for the estimated exploitation rates used to estimate the total harvest and total return to Canada for by species and Statistical Area.

Stat. Area	Sockeye	Pink	Chum	Chinook	Coho
11	Na	Na	TC&E (Area 11-17,29)	Na	Black Creek
12	Inside HR	TC&E (Area11,12,29)	TC&E (Area 11-17,29)	Quinsam	Black Creek
13	Inside HR	TC&E (Area11,12,29)	TC&E (Area 11-17,29)	Quinsam	Black Creek
14	Na	Na	TC&E (Area 11-17,29)	Puntledge	Black Creek
15	Na	Na	TC&E (Area 11-17,29)	Na	Big Qualicum
16	Inside HR	Na	TC&E (Area 11-17,29)	Na	Big Qualicum
17	Na	Na	TC&E (Area 11-17,29)	Nanaimo	Big Qualicum
18	Na	Na	TC&E (Area 18,19)	Cowichan	Big Qualicum
19	Na	Na	TC&E (Area 18,19)	Cowichan	Big Qualicum
20	Na	Na	TC&E	Cowichan	Carnation
21-22	Na	Na	TC&E (Area 21,22,29)	Robertson	Carnation
23	TC&E	Na	TC&E	Robertson	Robertson
24-27	Na	Na	TC&E	Robertson	Robertson
28	Na	Na	Na	Na	Na
29Lower	Na	C&E (Fraser)	C&E (Fraser)	RR Model	Inch+Salmon
29Upper	DFO/PSC	Na	Na	RR Model	Interior Fraser

TC&E = ER derived from terminal catch (TC) and escapement (E) estimates for that statistical area, where ER = TC / (TC+E)
TC&E (Fraser) = ER derived from catch and escapement data for Fraser stocks
TC&E (Area 11,12,29) = ER derived from terminal catch and escapement data for statistical areas 11,12 and 29.
TC&E (Area 11-17,29) = ER derived from terminal catch and escapement data for statistical areas 11-17 and 29.
TC&E (Area 18,19,29) = ER derived from terminal catch and escapement data for statistical areas 18,19 and 29.
TC&E (Area 21,22,29) = ER derived from terminal catch and escapement data for statistical areas 21,22 and 29.
Chinook and coho Lists the indicator streams used by DFO and PSC Technical Committees

APPENDIX B

Description of the approach used to estimate the total run size, total return to Canada and exploitation rates for South Coast chum salmon stocks.

English, K.K., A.C. Blakley, T. Mochizuki and D. Robichaud. 2009 (draft). Coast-wide Review of BC Salmon Indicator Streams and Estimating Escapement, Catch and Run Size for each Salmon Conservation Unit. Report prepared by LGL Limited for Fisheries and Oceans Canada and Ecotrust. 79 p.

Area 11-22, 28 and 29 chum salmon stocks

Chum salmon returning to the Fraser River (Area 29) and other South Coast streams are harvested in mixed stock fisheries from Area 11-22 as well as terminal fisheries in Area 28 and 29. Consequently, run reconstruction analyses are required to estimate the contribution of south coast stocks to each of these fisheries and derive catch and run size estimates for each chum stock. The input data and parameters for these analyses included:

1. total annual escapement estimates for chum stocks in each statistical area derived using the methods outlined in Appendix A;
2. total annual catch estimates for Fraser chum and all other fall run-timing Canadian chum stocks for each fisheries conducted in each statistical area (i.e. all summer chum catch and harvest of US chum stocks were excluded);
3. the portion of chum returns to South Coast non-Fraser stocks that migrate through Johnstone Strait (i.e. the average diversion rate); and
4. the portion of each stock that is vulnerable to each fishery.

The reconstruction of chum returns to the Fraser River (Area 29) was completed by simply adding the estimated catch and escapement for Fraser chum. The run reconstruction analyses for ISC non-Fraser chum stocks that return to Areas 11-19 and 28 were conducted by working backward through the chum migration from Area 28 to Area 11. Estimates of the number of chum available for harvest in each South Coast fishery required assumptions regarding diversion rate (Appendix Table B1) and migration patterns. The diversion rate was assumed to be 100% for Area 11-15 chum stocks, 90% for Area 16-17 stocks, 50% for Area 18 and 19 and 80% for Area 28 stocks. The portion of each stock that was vulnerable to each fishery is provided in Appendix Table B2. For example: given the assumptions of an 80% diversion rate for Area 28 stocks and 50% of these fish were vulnerable to the Area 18 fisheries. For example, 40% of the total return to Area 28 (80% diversion rate * 50% vulnerability rate) were assumed to migrate through the Area 18 fisheries and available for harvest in these fisheries along with 100% of the Area 18 chum stocks. Using the assumption that stocks are harvested in proportion to their abundance in the fishery (equal vulnerability), the Area 18 catch was divided up between the Area 18 stocks and Area 28 stocks in proportion to their relative abundance. A similar analysis was conducted to partition the Area 14, 17 and Area 18 catch between local stocks and Area 28 chum stocks. The Area 15 and 16 fisheries were assumed to be a terminal in nature and only harvested stocks destined for Area 15 and 16 streams. Once these Strait of Georgia and Area 28 chum stocks had been reconstructed through the Area 14-28 fisheries, these reconstructed abundances were combined with the escapement estimates for Area 11-13 stocks to compute the contribution of each stock to the Area 13, Area 12 and Area 11 fisheries, in that order.

A similar analysis sequence was used to reconstruct the portion of the Inner South Coast (ISC) chum run that enters through Juan de Fuca Strait along with the Area 16-19 and 28 chum stocks. The total run size estimates for Area 16-19 and Area 28 chum were derived by summing the reconstructed runs for the both approach routes. The total run size estimates for the other ISC stocks were the runs reconstructed through Area 11 and Area 21. A

summary of the annual harvest rates for each of the chum stocks included in the above run reconstruction analysis are provided in Appendix Table B3.

Appendix Table B1. Stock diversion (Northern Approach) parameters used in chum run reconstruction analysis

Diversion Rate

	Stock Area 11	Stock Area 12	Stock Area 13	Stock Area 14	Stock Area 15	Stock Area 16	Stock Area 17	Stock Area 18	Stock Area 19	Stock Area 20	Stock Area 21	Stock Area 22	Stock Area 28	Stock Area 29
1980	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1981	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1982	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1983	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1984	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1985	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1986	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1987	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1988	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1989	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1990	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1991	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1992	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1993	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1994	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1995	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1996	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1997	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1998	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
1999	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2000	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2001	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2002	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2003	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2004	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2005	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2006	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2007	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2008	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%
2009	100%	100%	100%	100%	100%	90%	90%	50%	50%	0%	0%	0%	80%	80%

Appendix Table B2. Stock Area contribution by fishing area parameters used in chum run reconstruction analysis.

Fishery	Stock Area 11	Stock Area 12	Stock Area 13	Stock Area 14	Stock Area 15	Stock Area 16	Stock Area 17	Stock Area 18	Stock Area 19	Stock Area 28
Area 11	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Area 12	0%	40%	100%	100%	100%	100%	100%	100%	100%	100%
Area 13	0%	0%	70%	100%	50%	75%	100%	100%	100%	100%
Area 14	0%	0%	0%	95%	0%	0%	30%	20%	20%	0%
Area 15	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%
Area 16	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Area 17	0%	0%	0%	0%	0%	0%	80%	20%	20%	20%
Area 18	0%	0%	0%	0%	0%	0%	20%	100%	100%	50%
Area 19	0%	0%	0%	0%	0%	0%	20%	100%	100%	50%
Area 20+US	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
Area 21	0%	0%	0%	0%	0%	20%	20%	20%	20%	50%
Area 22	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Area 29	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Area 28	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

Appendix Table B3. Annual harvest rate estimates for South Coast chum stocks from run reconstruction analysis.

												ISC Stock (Incl. Fraser)		ISC Stock (No Fraser)	
Year	Stock Area 11	Stock Area 12	Stock Area 13	Stock Area 14	Stock Area 15	Stock Area 16	Stock Area 17	Stock Area 18	Stock Area 19	Stock Area 28	Stock Area 29	Total ER	Johnstone Strait ER	Total ER	Johnstone Strait ER
1980	0%	7%	28%	47%	32%	29%	38%	33%	33%	33%	66%	47%	27%	36%	26%
1981	0%	1%	4%	21%	16%	5%	14%	8%	7%	7%	13%	13%	5%	13%	4%
1982	0%	12%	42%	69%	52%	41%	64%	46%	51%	45%	55%	54%	41%	53%	40%
1983	0%	2%	6%	31%	14%	5%	21%	17%	20%	9%	22%	21%	8%	20%	5%
1984	0%	1%	3%	34%	7%	7%	21%	22%	22%	17%	14%	18%	3%	20%	2%
1985	0%	3%	10%	58%	14%	17%	39%	49%	54%	40%	31%	38%	11%	43%	8%
1986	0%	9%	35%	67%	35%	37%	54%	48%	48%	44%	40%	47%	29%	52%	33%
1987	0%	2%	5%	57%	19%	11%	40%	42%	41%	33%	30%	37%	4%	40%	4%
1988	0%	9%	42%	54%	45%	45%	61%	67%	62%	62%	57%	55%	32%	53%	33%
1989	0%	7%	30%	57%	50%	35%	51%	54%	57%	47%	42%	45%	26%	49%	27%
1990	0%	9%	36%	57%	39%	36%	48%	63%	73%	44%	47%	48%	32%	50%	32%
1991	0%	3%	12%	46%	18%	15%	36%	64%	59%	34%	26%	35%	9%	43%	10%
1992	0%	10%	35%	66%	36%	43%	57%	76%	80%	59%	36%	51%	27%	59%	29%
1993	0%	8%	31%	59%	31%	62%	51%	65%	62%	47%	35%	49%	26%	55%	29%
1994	0%	8%	33%	63%	30%	35%	53%	59%	71%	47%	28%	42%	25%	52%	31%
1995	0%	6%	27%	38%	24%	30%	33%	37%	43%	35%	12%	18%	11%	32%	24%
1996	0%	4%	14%	16%	14%	16%	16%	23%	25%	19%	9%	13%	7%	18%	12%
1997	0%	2%	7%	8%	9%	12%	11%	20%	20%	20%	8%	10%	4%	13%	6%
1998	0%	5%	31%	66%	27%	31%	51%	37%	44%	34%	13%	30%	20%	51%	33%
1999	0%	2%	6%	6%	6%	6%	9%	34%	49%	13%	4%	6%	2%	13%	5%
2000	0%	4%	15%	18%	15%	14%	16%	9%	9%	14%	12%	13%	11%	14%	14%
2001	0%	2%	7%	17%	7%	13%	12%	33%	44%	13%	7%	10%	4%	15%	6%
2002	0%	3%	16%	40%	14%	17%	28%	66%	62%	27%	17%	25%	12%	32%	15%
2003	0%	4%	20%	33%	18%	23%	27%	27%	23%	22%	30%	27%	21%	24%	20%
2004	0%	5%	22%	41%	22%	24%	33%	33%	28%	24%	20%	23%	17%	27%	22%
2005	0%	5%	31%	42%	29%	39%	39%	28%	27%	33%	27%	30%	24%	34%	31%
2006	0%	4%	21%	37%	25%	24%	28%	18%	18%	22%	29%	28%	18%	26%	21%
2007	0%	1%	20%	32%	19%	20%	28%	19%	19%	22%	25%	24%	16%	23%	20%
2008	0%	3%	16%	24%	14%	18%	21%	15%	16%	17%	22%	20%	12%	18%	15%
2009	0%	3%	20%	36%	18%	22%	30%	19%	20%	21%	33%	27%	20%	23%	20%
Average ER	0%	5%	22%	45%	25%	25%	37%	42%	44%	34%	29%	33%	17%	37%	19%
Post 2001 ER	0%	4%	21%	36%	20%	23%	29%	28%	27%	24%	25%	26%	17%	26%	21%

Appendix C – Peer Review and IMM Response

PEER REVIEWER 1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Yes/No Yes	Conformity Assessment Body Response
Justification: **See General Comments**		

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	Yes/No Yes	Conformity Assessment Body Response
Justification: **See General Comments**		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	Yes/No	Conformity Assessment Body Response
Justification: ***See General Comments***		

For reports using the Risk-Based Framework please follow the link.

For reports assessing enhanced fisheries please follow the link.

General Comments on the Assessment Report (optional)

Fishery Assessment

The BC Chum salmon fishery is clearly complex and challenging to assess against MSC Principles for Sustainable fishing. The large temporal and spatial extent over which chum population and fisheries occur is largely responsible for the many challenges arising at practically all levels of the management system, ranging from the policy frameworks governing the fisheries to fishery-specific goals and objectives to the details of catch and escapement monitoring for both target and non-target species.

Fisheries and Oceans Canada, along with the Pacific Salmon Commission, expend considerable resources managing these fisheries and much of this effort is documented in this report.

The assessment team has diligently investigated the conduct of BC chum salmon fisheries and provided a well-organized and coherent set of summaries and scores against MSC criteria. The large majority of scores are adequately justified given the available information.

In reviewing the assessment report, I found no real concerns with the way information was presented and interpreted. Nevertheless, there appear to be some recurring issues that I summarize into the following observations:

1. High-level DFO policies and frameworks for setting goals and objectives, managing ecosystem impacts, etc. are sometimes used in place of plans specifically designed for these chum salmon fisheries. In most cases, the assessors recognize these disparities and impose conditions to create chum-specific plans.

2. Monitoring non-target species bycatch does not appear to measure up to standards required in other types of BC fisheries such as groundfish. Chum fisheries intercept several species/stocks that appear on various levels of Species-at-Risk (SARA) and COSEWIC listing. Concern about similarly listed groundfish species (e.g., *Sebastes* spp), in combination with IVQ management schemes, recently prompted detailed electronic monitoring 100% of all commercial groundfish activity. It is therefore unclear why DFO's monitoring standards are not applied consistently across fisheries. The assessment team has clearly identified this monitoring gap, which seems to reoccur within all three MSC principles.

3. Conditions on 20 – 33% (10 – 16 out of 48) of the indicators across the four fisheries raises concerns about (i) a substantial initial gap between BC chum fishery management practice and MSC criteria and (ii) the feasibility of meeting these conditions by the 1st or 2nd surveillance audits as required by the assessment. In most cases, incremental progress on conditions over the certification period (5 yrs?) is probably more practical. But, overall the conditions imply a substantial, and probably costly, revision of the entire fishery management system.

Action Plan

I realize that DFO is updating the Action Plan given revisions to the assessment, so hopefully the references and works-in-progress can be updated as well. This is important because if the studies cited in the Plan (e.g., Holt et al) have not been completed, then it is unreasonable to expect timely progress as required under most of the Conditions.

It is difficult to comment on several aspects of the Action Plan because it refers to larger frameworks (e.g., Resource Assessment Framework) and plans (e.g., IFMPs) that are also not completed yet. The Action Plan needs to show, specifically, how these plans specifically address the conditions – the current version seems a bit too general in some places (e.g., Research Plans, Cond 3.6).

Action for Condition 3-2: The proposed action is to continue to work with MOE on model-based estimation of fishery impacts on steelhead. The condition, however, specifically requires "scientifically defensible" estimates of steelhead bycatch by the first audit. This seems like a short timeline for either the model-based approach or establishment of a data collection protocol.

Action for Condition 3.3: The proposed action stops short of ensuring reliable estimation of steelhead bycatch due to high cost of onboard observers. There are no specifics on what level of precision is possible for alternatives. Gillnet fisheries could implement electronic monitoring (i.e., video) at lower cost than observers.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.2	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.3	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.4	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.5	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2.1	Yes	No	Yes	The "independent observer monitoring" seems over-stated given this reference. Occasional observers are not adequate to provide quantitative estimates of bycatch especially. If this reference is at all representative of actual bycatch, then I would be concerned about potential levels of cumulative coho and steelhead mortality. Is the timeline for meeting SG80 feasible given (i) typical PSARC (now CSAP) process, (ii) scale of the catch monitoring problem, and (iii) possible lack of resources to address the issue?	The reference to "independent observer monitoring" occurs in the materials provided in the Client Submission and not the Scoring Rationale section. The peer reviewer did not realize that he was not required to raise points in reference to the Client Submission. In retrospect, the assessment team agrees that the timeline for this condition is tight. The team agree that the timeline should be ammended to be deliverable at the third surveillance audit. There were no changes to the score or scoring rationale for this PI.
1.1.2.2	Yes	Yes	Yes	Is the timeline for meeting SG80 feasible given (i) typical PSARC (now CSAP) process, (ii) scale of the escapement monitoring problem, and (iii) possible lack of resources to address the issue?	The client and management agency have provided an action plan in accordance with proposed timelines. No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2.3	Yes	Yes	Yes	Is the timeline for meeting SG80 feasible?	The client and management agency have provided an action plan in accordance with proposed timelines. No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.2.4	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.3.1	Yes	Yes	Yes	The basis for choosing an LRP = 25% of the escapement goal is unclear. I could understand 25% of unfished, but 25% of MEG is extremely low. Is there evidence that stock could actually recover from these levels? Is the timelines for meeting SG80 feasible given (i) typical PSARC (now CSAP) process, (ii) multi-agency nature of the problem, and (iii) possible lack of resources to address the issue?	The assessment team considered that if the MEG was in fact the optimum spawning stock, then the target escapement goal range would approximately range from 0.5 to 1.5 the MEG. Given the historical variabilty of chum salmon, the team considered that an LRP of 25% of the MEG is reasonable. The client and management agency have provided an action plan in accordance with proposed timelines.
1.1.3.2	Yes	Yes	Yes	Is the timelines for meeting SG80 feasible given (i) typical PSARC (now CSAP) process, (ii) multi-agency nature of the problem, and (iii) possible lack of resources to address the issue?	The client and management agency have provided an action plan in accordance with proposed timelines. No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.1	Yes	Yes	Yes	Similar concern about timelframe for conditions	The client and management agency have provided an action plan in accordance with proposed timelines. No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.2.2	No	No	Possibly	NCC – specualtion about El Nino effects do not seem warranted given quality of information (pg 112). Isn't SARA also relevant here? Some information is outdated given typical MSC requirements. Is a 1998 report "recent"?	The peer reviewer cites references provided by the client as evidence supporting their candidature of the fishery. The team's response is listed solely under the Scoring Rationale section.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	No	No	NA	Has SG80 really been met? Not sure if I understand MSC's distinction between "knowledge" and "information". Are effects of fishing on run timing known? For "component stocks", there seem to be substantial unexplained and persistent declines for NCC unenhanced stocks.	The team suggests in the context of this PI that "knowledge" is designated as the body of information available on the effects of fishing affecting size,age, sex to such a degree as to have concerns for the stock. Specific "information" from the fishery would relate to harvest selectivity on timing, sex, age for the UoC. Given the harvest rates for these stocks, the team considers that there is no reason to believe the persistent declines in NCC stocks are due to changes in size, age, sex etc. and such declines in stocks in different places and times are pretty common.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	No	No	NA	Too much emphasis on policies here and not enough on what is actually being done in this fishery. The two SG80 issues are: • A monitoring program exists that provides estimates of bycatch. • In known problem areas of high bycatch, there is an ongoing monitoring program. Other parts of the report indicate a lack of bycatch monitoring and, in fact, place conditions to create these programs. At best, I would say the existing programs are partial and not particularly reliable.	The team interpreted these SG80 guidelines as policy, as opposed to the details of the quality of the fishery. Bycatch monitoring does exist, through the log book program, as defined in Conditions of License (see response in Peer Review 1 comments). We will need to interpret the guidelines where it states "estimates of bycatch" as "scientifically defendable estimates of bycatch and mortality". If we wish to go this way, then the conditions provided for other Principles would apply here. Since a "condition of license" requires recording bycatch, it is difficult to say the programs are partial. If we are going into the "quality" of the program, then we can repeat the condition previously provided under Principle 1. In our original scoring, we chose not to address this issue and stuck to the literal language of the scoring guidelines, which in my opinion, the language of the two SG80 guideposts are met. Modification of the scores and applying conditoins would be an effort in redundancy and I'm not sure it is warranted.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.2	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.3	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.4	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.5	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.2.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.1	No	No	Unclear. Possibly not feasible.	Rationale doesn't make clear what conservation concerns are relevant to chum Rationale doesn't support any SG80. Even with one partial SG80, a score of 70 seems high. Not clear what monitoring exists for non-target stocks/species and whether it is adequate to establish a recovery pattern. For low abundance stocks, this would mean a relatively intensive monitoring program. The rationale seeks to cite existing monitoring for chum only.	Upon review of the scoring rationale, the team agree with the Peer Reviewer that the scores issued were not incorrect. New scores and a revised scoring rationale have been issued. After further consideration, all UoCs now score 62. The team resconsider that only the fourth SG80 scoring issue was partially met, on the basis of existing monitoring.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
Revised Scoring Rationale: The state of many of the chum fisheries in British Columbia has been in decline and there are conservation issues with a variety of other species such as the late Fraser sockeye, (including Cultus sockeye), Sakinaw sockeye, interior Fraser coho, steelhead, WCVI Chinook, Lower Georgia Strait chinook, and coho. The current non-target chum stocks of the North Coast are of concern and directed fisheries have been terminated. This criterion requires a significant investment by the management agency to enable the recovery of depleted non-targeted fish stocks to the LRP's. Although the management system has provisions for recovery of the stocks through the Wild Salmon Policy and passes the 60SG scoring elements, the more stringent provisions of the scoring elements of 80SG and 100SG have not been met based on information provided. The client submissions for each of the UoC lack evidence of recovery plans for depleted non-target stocks that have been identified by DFO as impacted by the chum fisheries in the various districts. Specifically, the management system lacks elements of a recovery plan such as; the objectives for recovery consider historic stock abundance information (second scoring issue), and analysis to ensure that the fishery is executed such that recovery of depleted non-target stocks is highly likely to occur in a reasonable time period (third scoring issue). Also lacking is assurances that would be contained in a recovery plan that monitoring and assessment programs have been established to determine, with a high degree of confidence and in a timely manner that recovery is occurring. A recovery plan is specifically needed for the Skeena and the Nass for chum recovery. All of the fisheries have been given partial credit for element 4 because of existing monitoring programs but we note the trend of monitoring has been consistently downward over the past decade. All of the other SG80 scoring issues (1,2,3,5,6) refer to recovery plans that have not been prepared for non-target stocks that are well below their LRP's and intercepted in the chum fisheries. The team has awarded a score of 62 for all units of certification, based on partially meeting the fourth scoring issue.					
3.1.1	Yes	Yes	Yes	Cond 3-1: "LRPs" does not belong in the wording of this condition.	The team agrees, the term "LRP" has been removed from the condition wording.
3.1.2	Yes	Yes	Yes		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.3	Yes	Yes	Yes		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.4	Yes	Yes	Yes		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.5	Yes	Yes	Yes		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.6	Yes	Yes	Yes	Earlier sections seem consistenly concerned about steelhead bycatch. Don't subsidies increase the risk of over-exploiting non-target species? Also, are artificial enhancements considered subsidies?	The team responds that the concerns regarding steelhead catch are more asssociated with the reliability of the commercial catch estimates than over-exploitation. The assessment team did not consider artificial enhancements to be subsidies. There are other indicators that directly address artificial enhancements.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.7	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.8	Yes	No	Yes	Unclear how small bites create clear incentives for selective fishing. Small bites, if I understand correctly, seems to be a control tactic rather than an incentive.	Small bite fisheries are definitely a tactic to reduce the potential for exceeding target catches or exploitation rates. They do not create an incentive for sustainable fishing as much as they ensure that catches are within or close to defined sustainable levels. Additional clarification has been added to the scoring rationale.
3.1.9	Yes	Yes	NA		
3.2.1	Yes	Yes	NA	Most of the research plans described here are high-level DFO priorities.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.2.2	Yes	Yes	NA		

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.3.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.4.1.1	Yes	Yes	Yes		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.4.1.2	Yes	No	No	The SG80 does not ask for effectiveness at preventing depletion – it requires a procedure for restoration. The condition might need to apply to all fisheries.	The score was based on the assessment teams conclusion that the measures currently in place to restore depleted populations of the target stock to the TRP or equivalent high level, are not adequate for Area 3 and 4 chum stocks. This condition was not applied to other fisheries because either the stocks associated with these other fisheries are not depleted or the management measures we viewed to be adequate for these fisheries.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.4.2.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.4.2.2	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.5.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.5.2	Yes	Yes	Yes	Issue #3 under SG100 seems less stringent than #3 under SG80. So, why would that apply beyond SG80? It is also not clear that any review has taken place over the last 10 years. Similar concerns about feasibility of condition timeline.	The team accepted the various reviews listed in the client submission as fulfilling the requirements of the SG60 scoring issue. The client and management agency have provided an action plan in accordance with proposed timelines.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.5.3	Yes	Yes	NA		
3.6.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.6.2	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.6.3	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.7.1	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.7.2	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.7.3	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.7.4	Yes	No	No	If NCC and Fraser have no data, how do they score 70? Feasibility of timelines not clear.	The fishery was given a partial score because DFO has estimates of bycatch for some species. The available estimates of bycatch for Skeena steelhead and Fraser steelhead and sturgeon are not reliable because, in the team's assessment, the number of harvesters that comply with requests for data on catches and discards of these two non-target species is not sufficient to ensure that estimates of catch and discards for these species are reliable. The client and management agency have provided an action plan in accordance with proposed timelines.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.7.5	Yes	Yes	NA		No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Any Other Comments

Comments	Conformity Assessment Body Response
See General Comments at top.	

PEER REVIEWER 2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: The Department of Fisheries and Oceans Canada (DFO) provided informative documents in support of the chum salmon review. The assessment team considered this information and developed appropriate scores and rationale for the scores for most of the indicators. I raised a few scoring questions, but overall the scoring was appropriate and my comments on scores would not likely change overall conclusions. See specific comments below.		

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: When indicator scores were less than 80, conditions were developed by the assessment team that would raise the score to the 80 level or higher (passing), if fully implemented by DFO. See specific comments below.		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes/No**	**Conformity Assessment Body Response**
Justification: The action plan was not reviewed at this time.		

For reports using the Risk-Based Framework please follow the link.

For reports assessing enhanced fisheries please follow the link.

General Comments on the Assessment Report (optional)

DFO prepared highly relevant and useful documents for the MSC review process (e.g., management summaries and regional chum salmon profiles). These documents facilitated the review of a complex salmon management system. The data plots in the appendix were particularly helpful in the evaluation of the fishery and its management, but it would have been useful to also show the percentage of hatchery chum in each region. These documents

provide a very useful summary of salmon population trends and management and it would be worthwhile to update the documents on a regular basis.

The assessment team typically provided text that specifically addressed each of the scoring guideposts based on the DFO reports and other documents and information. The direct attention by the team to each specific scoring guideline facilitated the review of how the team arrived at the score. The report was well organized.

Details for each scoring guidepost often focused on north and central coast chum (NCCC), perhaps as an indicator of the type of information provided by DFO to the team, rather than on each Unit of Certification (UoC). Nevertheless, the scoring rationale adequately covered rationale for each UoC.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
Example:1.1.2	*No*	*No*	*NA*	*The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks for a target reference point that is consistent with maintaining the stock at Bmsy or above, however the target reference point given for this fishery is Bpa, with no indication of how this is consistent with a Bmsy level.*	
1.1.1.1	Yes	Yes	NA	The DFO management summary and the chum salmon certification unit profiles provide key information on chum stock units.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.2	Yes	Yes	NA	Good rationale and a list of supporting documents, including external review reports were provided in support of stock unit descriptions.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.3	Yes	Yes	NA	Detailed rationale was provided on the geographic range of chum. Most chum are taken in terminal areas and genetic stock ID has been used to identify stocks in fisheries but GSI is not done on an annual basis.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1.4	Yes	Yes	NA	The rationale identifies the description of indicator stocks as described in the core stock review and the chum profile documents. As noted, quantitative comparisons of indicator stocks has not been completed but the indicator stocks appear to be sufficient for fisheries management.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.1.5	Yes	Not completely	NA, but see review comment	The scoring rationale notes that harvest of enhanced chum salmon occurs in terminal areas except for the Fraser fishery where hatchery and wild chum are captured together. I did not see information indicating that straying of hatchery chum to the spawning grounds was insignificant (80 guidepost). In mixed stock fisheries, harvest rates are reportedly set low enough to allow for spawning escapement; however, reduced harvest rates on hatchery chum might lead to increased straying in areas such as the Fraser. The lack of information on the contribution of hatchery chum to mixed-stock fisheries (marking of Fraser hatchery chum reportedly ended in 2001 or earlier) could confound stock recruitment analyses that might be used to develop more formal escapement goals. However, hatchery production of Fraser chum reportedly declined in recent years (see PI 3.1.9). Harvests of hatchery and natural chum should be estimated in each area where hatchery harvests may be more than minimal.	The team's perspective was that exploitation rates are so low that escapement of wild fish should be minimally impacted. The 2011 IFMP indicates that total expected adult returns from the 2010 brood year chum releases from Fraser River hatcheries (Chilliwack, Inch and Weaver) is 37,500. The total run size for Fraser chum is typically in the 1-2 Million range so, hatchery chum would represent less than 5% of the total return. No changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2.1	Yes	Yes	Yes	The assessment team provided detailed information on catch monitoring. Although some catch reporting evaluations have been conducted, the 80 guidepost requires an evaluation every 5 years to ensure accurate reporting. Thus, the condition is reasonable for this guidepost.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
1.1.2.2	Yes	Yes	Yes	Although much of the text provided details about chum in the north and central coasts, the scoring rationale provide information justifying the score for escapement monitoring in each UoC. A condition was developed for NCC and ISC chum salmon where some stocks are not directly monitored. Although the condition of an externally reviewed escapement report is reasonable, the scoring guideposts did not specify this review requirement. The assessment team (and Appendix) raised the issue that the level of effort for escapement monitoring has been declining over the years, yet justification of what level of effort is needed (% of stream, number of visits) has not been completed. An evaluation of escapement monitoring effort would be worthwhile. The effect of lower escapement effort in recent years should be carefully reviewed to determine whether this has compromised stock evaluation.	The peer reviewer is correct, there is no requirement for an externally reviewed escapement report. The last sentence of the condition, which states "A publically available, externally reviewed report on escapement monitoring programs should be available for review by the second surveillance audit." has been deleted. The team agrees that a careful review is necessary, however, recognizes that imposing the requirement for an external review was outside the requirement for the performance indicator and 80 scoring guideposts. There were no changes made to the scoring rationale.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2.3	Yes	Yes	Yes, but see comment	The condition raised to collect age and size data is reasonable. As noted by the assessment team, chum age data are needed to build brood tables, which in turn can be used to better estimate stock productivity and escapement goals (see below). This condition states that a scientific review of the monitoring program may specify that additional monitoring is needed. Therefore, the condition should also specifiy that recommendations of the review are implemented.	While this recommendation is logical, IMM's opinion is that this additional requirement would exceed the bounds of the PI and SG. However, were deficiences to be identified in the course of the review, the PI could not be rescored if deciencies were not sufficiently addressed in order to allow the team to agree that there is a sound scientific basis for the frequency of the monitoring program, as required in the second SG80 scoring issue.
1.1.2.4	Yes	Yes	NA, but see comment	The rationale provided for meeting the 80 guideposts is generally reasonable. Expert opinion provided by decades of managers on escapement goals is probably sufficient to ensure the chum populations have a reasonable chance to remain productive. However, the first bullet under SG 80 states there is information available to maintain high productivity. While it is reasonable to provide an 80 score for this indicator, given the scoring guideposts, it would be worthwhile for the management agency to at least examine the available data and attempt to develop more rigorous escapement goals based on spawner recruitment relationships. The 80 score for this indicator is at odds somewhat with the target reference point PI (1.1.3.2), which requires a condition for this issue. Nevertheless, Condition 1-5 (below) is reasonable and it is applicable my concerns about PI 1.1.2.4.	Recommendation noted and will be communicated to the client. The team's interprets the intention of this PI as focussing on information collection and potential uses (i.e. that collected information is used) as opposed to the potential products, particularly the development of reference points, which as the PR has pointed out, is evaluated under PI 1.1.3.2.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.3.1	Yes	Yes	Yes	The rationale provided for the BC chum limit reference point and the the scoring of this PI are reasonable. The condition to develop more formal LRP values is appropriate, based on the scoring guideposts. However, LRPs are rarely if ever set for salmon fisheries (until this review). The definition used here for an LRP is somewhat arbitrary. Yet, the consequences of defining the LRP for MSC certification are significant. Presently, any fishery that is below the LRP at the time of evaluation will not be certified by MSC. This review, which uses a scoring tree from 2002, apparently does not follow the current MSC LRP rules: CB2.4.1.4 Stocks whose status is currently below the point at which recruitment is impaired shall not be eligible for certification even if there are recovery plans or programmes in place which are effectively increasing the status of the stock, until such time as the stock status meet SG60. However, if the fishery is certified, it will likely need to be re-examined in five years in relation to the new and current LRP scoring guidelines, as noted above. The significance of the current MSC rule was probably not considered when the iterim BC chum LRP (25% of the MEG) was established for guidance. A number of the management areas failed to meet the LRP in all years. The level at which a population becomes endangered might be considered an LRP. However, if this definition of an LRP was used, then fishing should cease well before the LRP is approached, rather than the current approach where the harvest rate declines steadily below the MEG until reaching the LRP. DFO states that the the current LRP	Advice regarding LRP development will be communicated to the client and DFO. It is also important to note that each UoC includes a mixture of stock, some of which are substantially above their interim LRPs and some that are close to or below their LRPs. For future evaluations under the new MSC rules, it will be important to define what the LRPs are for each UoC. No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.3.2	Yes	Yes	Yes	The operational equivalent TRP for BC chum is the Management Escapement Goal (MEG), which is an estimate based on the expert opinion of managers rather than a quantitative stock recruitment (SR) relationship. The condition to formally review the adeqacy of these MEG goals is reasonable. This review should consider the adequacy of available data for developing SR relationships so that variability in the productivity in the stock can be incorportated into the escapement goal analysis. Escapement goals should be based on natural salmon production and productivity.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.1	Yes	Yes	Maybe	The rationale and low scores for this indicator on depleted stocks is appropriate. The detailed charts in the Appendix show that a number of stocks are falling below the MEG. While harvest rates are often reduced on these stocks, there are some stocks that continue to have somewhat high harvest rates (~20-40%) for a stock that is approaching the assumed LRP. The recovery plan needs to address this issue. The condition is generally appropriate. However, in this case, it would not appear appropriate to allow a fishery to target a depleted stock once it reaches 150% of the LRP because the LRP is defined as 25% of the MEG. In otherwords, a stock reaching 150% of the LRP would still be well below the MEG. Directed or targeted fisheries should stop as the MEG is approached, i.e., well above the LRP. Perhaps incidental harvests might be allowed when a stock initially falls below the MEG if it can be shown that the incidental harvest rate on the depleted stock is low.	The team notes the peer reviewers comments however, it should be noted that the assessment is against the scoring guideposts as defined and approved, which are very clear regarding this matter. Furthermore, the team does not agree with the statement that directed fishing should stop as the MEG is approached – this ignores the idea of escapement goal ranges, and even when stocks reach ½ of the true optimum escapement, there is very little decline in productivity. Perfectly sustainable harvest strategies would have directed harvest down to perhaps 0.5 the MEG. There were no changes made to the scoring rationale or condition.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.2	Yes	Yes	Maybe	The rationale and scoring of this indicator are reasoanble. The text notes that one stock fell below the LRP for 3 of 5 recent years, but the harvest rate was very low and the cause of the low returns and escapement were related to environmental variability. The condition applied to each fishery is reasonable. However, the critique on escapement methodology should consider the level of effort (number of streams and number of surveys per season) that are needed. Appendix A and B show some alarming declines in survey effort during the past decade. This raises the question of whether current escapement methodology is sufficient for maintaining productive and sustainable chum fisheries.	Advice regarding escapement methodology review will be communicated to the client and DFO. There were no changes made to the scoring rationale or condition based on these comments.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	Yes	Largely	NA	The rationale and scoring of this indicator are reasonable but additional discussion could have been made on the specific methods of how the hatcheries are minimizing genetic impacts of hatchery fish on wild stocks in those areas where hatchery production is relatively large. For example, are the hatcheries using an integrated broodstock approach so that genetic composition of hatchery fish will be somewhat similar to local wild fish, and if so where does the wild brood stock come from?	The team comments that the only location where hatchery production is relatively large compared to the size of the wild stocks in a UoC is the WCVI Nitnat Hatchery. DFO has indicated under Indicator 1.1.1.5 that "management measures are in place to avoid interception of wild stocks" for the Nitinat fishery and there is monitoring of the abundance of wild stocks to assess the success of these actions. The team can not comment on the extent of possible genetic impacts of hatchery fish on wild stocks within the Nitinat wateshed but is of the opinion that the numerous other wild chum stocks in the WCVI UoC should not have been impacted by the Nitinat chum hatchery production due to the isolation of that stock. There were no changes made to the scoring rationale or condition based on these comments.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Incomplete	NA	The 80SG indicates that a bycatch monitoring program exists and it is ongoing for problem areas. However, the scoring rationale notes that non-target species must be released as required by the license so that bycatch cannot be directly counted. Logbooks are used in some areas. Bycatch of Skeena steelhead and Fraser steelhead and sturgeon is largely undocumented (see Principle 3). The selective fishery policy on bycatch is good, but it is unclear to what extent fishes and other species are released unharmed. Given that most chum are taken by purse seines, most bycatch could be release alive if the fishermen are vigilant.	The team notes that bycatch issue for chum salmon has had a lot of attention by interested NGO stakeholders in 2011, because of the large bycatch of chums in pink and sockeye fisheries in the North Central Coast (see http://www.skeenawild.org/news/archive/chum-bycatch-and-discards-on-the-central-north-coast/). Despite the large volume of chum bycatch, the condition of license requires such large discards. The scoring issues under the SG80 requires the following: • A monitoring program exists that provides estimates of bycatch. • In known problem areas of high bycatch, there is an ongoing monitoring program. The issue raised by NGO stakeholders and the reviewer are that the exisiting log book program and limited observer coverage does not adequately account for discard mortality. The high reported bycatch of chum salmon and their discards, suggests the log book monitoring program is sufficient to identify the degree of discards that are occurring but does not address the mortality of these discards. Although this isn't a targetted chum fishery, the example does demonstrate that DFO's monitoring porgram is meeting these criteria. The performance indicator evauates whether the management plan for the the directed fishery provides high confidence that direct impacts on non-target sepceis are identified. The team is convinced that the SG 80 scoring guideposts have been met and the score is appropriate. The 2011 North Coast IFMP

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.2	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.3	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.4	Yes	Yes	NA	The scoring and rationale are reasonable. Research on carcass nutrients and contribution to predators is specific to topics rather than to each fishery. This approach is reasonable and it provides a basis for the contribution of salmon to the ecosystem.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.1.5	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
2.2.1	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.1	Yes	Yes	Yes	The scoring and rationale are reasonable. The condition is appropriate in that recovery plans should be developed for each of the depleted chum stocks.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.1	Yes	Yes	Yes	The scoring and rationale are reasonable. The conditions are appropriate and they will represent a major effort by the management agency to improve management objectives and bycatch estimates.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.2	Yes	Yes	NA	The scoring and rationale are reasonable. DFO provided useful review documents for this analysis, e.g., species profile and management summary in addition to the annual management reports for northern and southern BC.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.3	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.4	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.5	Yes	Yes	Yes	The scoring and rationale are reasonable, although it is not uncommon for mangement agencies to take longer than 12 months to implement changes.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.6	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.7	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.
3.1.8	Yes	Yes	NA	The scoring and rationale are reasonable.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.9	No	No	NA	The text and rationale implies that marking is sufficient on hatchery chum for identifying contribution to catch and escapement. However, I did not see estimates of adult chum salmon originating from hatcheries versus natural spawners in each UoC, or region shown in the Appendices. Some large production hatcheries are thermally marked (e.g., Nitinat), which is is good. But these marks should be used to evaluate the contribution of strays to streams in the region since chum are known to stray long distances (e.g., 50 km). Identification of hatchery versus natural chum is important to run reconstruction estimates, which are important when evaluating stock status, productivity and harvest rates.	Hatchery production of chum within the NCCC and Fraser UoC's is very small relative to wild production. The UoCs with significant hatchery production (WCVI and ISC) have marking programs in place to assess the returns of hatchery produced chum (see Client Submissions and 2011 IFMP). It is our assessment that these marking programs are sufficient to provide reliable and meaningful estimates of contribution of hatchery chum to catches and escapements within these UoCs. There was no change to scoring rationale.
3.2.1	Yes	Yes	Yes	The scoring and rationale are reasonable. The condition states, in part, that the chum research plan should evaluate alternative management approaches for reducing bycatch and estimate the survival of discarded non-target species in non-retention fisheries. As part of this effort, the plan should include efforts for monitoring bycatch in the non-retention fisheries. The condition meets the intent of SG80.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.2	Yes, but see comment	Yes, but see comment	NA	The scoring and rationale are reasonable in that the management agency typically shares research findings. However, recent research by a DFO scientist on sockeye salmon was reportedly withheld from the public (newspapers). While this issue involved sockeye salmon rather than chum salmon, the management agency should be willing to share accurate reseach findings involving a controversial subject. Although this information was shared in the scientific community (publication, science workshop), the lack of openess with the press led to distrust of the management system by the general public.	This concern will be communicated to the client and DFO. No change was made to the score or scoring rationale.
3.3.1	Yes	Yes	NA	The scoring and rationale are reasonable in that management of the fisheries is an open and inclusive rather than exclusive process.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.4.1.1	Not completely	Yes	Yes, but see comment	The rational for the condition in for NCC chum is reasonable but it should be mentioned that Areas 5 & 6 also had somewhat high harvest rates (25-40%) given that escapement was well below the MEG according to the Appendix. The Appendix also indicates somewhat high harvest rates in some inner south coast areas and for example Nitinat (hatchery area) such that harvest control rule may not be sifficient in all of these areas. It would be worthwhile to document the relationship between harvest rate and escapement to see if harvest rate declines when the escapement approaches and falls below MEG.	The most recent analyses for Area 5 and 6 chum indicates that Canadian exploitation rates (ERs) have been less than 10% in recent years when chum escapements have been below the MEGs for these areas. The high harvest rates for Nitinat chum reflect the focus of this fishery on the enhanced stocks. We would need to examine the escapement time series for the wild stocks in Area 22 to determine if DFO management strategies used to avoid wild stocks are working. With regard to ISC chum management areas, the ERs in virtually all these areas have been at or below the 20% level in recent years and there have been no targeted fisheries for chum stocks that have been substantially below their MEGs. The team did not make changes to scores or scoring rationales based on this comment.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.4.1.2	Yes	Yes	Yes	The scoring and rationale are reasonable. The condition for NCC chum is reasonable, but as noted above there are some stocks in other UoC where escapement is below the MEG in some years but harvest rate is moderate. It was difficult to assess whether harvest rates were declining in response to lower escapements or run in some fisheries.	Most fisheries for ISC chum stocks occur in terminal areas only when returns are adequate to achieve escapement goals. When returns are not adequate to support terminal fisheries, harvests are restricted to a maximum of 20% in mixed stock fishing areas that target Fraser stocks and thus harvest for ISC chum are generally much less than 20% when no terminal fisheries are permitted. No changes to score, scoring rationale or condition (where prescribed) is necessary
3.4.2.1	Yes	Yes	NA	The scoring and rationale are reasonable. The management system appears to have adequate enforcement.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.4.2.2	Yes	Yes	NA, but see comment	The scoring and rationale are reasonable in that the managementt system has monitoring in place, in general. But as noted above (other condtions) some systems lack escapement monitoring (Areas 3 & 4) and escapement survey effort has declined in some areas.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.5.1	Yes	Yes	NA	The scoring and rationale are reasonable. DFO has a good internal review process.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.5.2	Yes	Yes	Yes	The scoring and rationale are reasonable. Although DFO has a good external review process, in general, it has not had an external review of the chum management system every five years. The condition is appropriate. Does the MSC review count as an external review?	Previous certification assessments have not accepted the MSC assessment process as a valid external review No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.5.3	Yes	Yes	NA	The scoring and rationale are reasonable. Recommendations from reviews are usually but not always used to make changes in management.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.5.4	Yes	Yes	NA	The scoring and rationale are reasonable with regard to dispute resolution.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.6.1	Yes	Yes	NA	The scoring and rationale are reasonable with regard to compliance with international agreements.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.6.2	Yes	Yes	NA	The scoring and rationale are reasonable with regard to the evaluation of whether DFO fishery management is compliant with domestic laws and regulations.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.6.3	Yes	Yes	NA	The scoring and rationale are reasonable with regard to the legal and customary rights of the First Nations.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.7.1	Yes	Yes	NA	The scoring and rationale are reasonable with regard fishing gear and practices.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.7.2	Yes	Yes	NA	The scoring and rationale are reasonable with regard to the use of explosives and poisons.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.7.3	Partially	Yes	NA	The scoring and rationale are mostly reasonable with regard to operational wastes. The guidelines for lost fishing gear are good, but I did not see evidence that there is an active system for reporting and removal of lost fishing gear such as gillnets. We know from other salmon gillnet fisheries that many nets are lost by commercial fisheries, e.g., Puget Sound.	The Canadian Code of Conduct for Responsible Fishing Operators addresses all the scoring guide posts associated with this indicator. It has been reported that over 80% of Canada's fishing organizations have signed on and ratified this Code. Our assessment was based on the assumption that at least 80% of west coast salmon fishing organizations are included in the groups that have ratified the Code. 2010/ 2011 Conditions of License for gillnet fisheries require that nets be completely retrieved from the water upon completion of each set. This legal requirement should greatly reduce or eliminate the loss of gill nets. No changes were made to the score or scoring rationale for this PI.
3.7.4	Yes	Yes	Yes	The scoring and rationale are reasonable. The conditions to provide bycatch estimates in the NCC chum fishery and Fraser chum fishery are reasonable for meeting the SG80 guideposts.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary
3.7.5	Yes	Yes	NA	The scoring and rationale are reasonable with regard to impacts of the fishery on habitat.	No response is necessary, no changes to scoring rationale or condition (where prescribed) is necessary

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Somewhat**	**Conformity Assessment Body Response:**
Justification: Please see specific comments above. The report notes that most hatchery chum are harvested in terminal areas. The Fraser chum fishery is one exception. Harvest data for hatchery and natural chum should be reported in each management area, but I did not see this information. For example, how many hatchery chum were included in the data charts shown in the Appendices? Even though hatchery chum are often harvested in terminal areas where harvest rates may be high, straying of hatchery fish to streams could occur and it could be significant when hatchery chum returns are large. Straying of chum can be high up to 50 km from the release site. I did not see information on the contribution of hatchery chum to the spawning areas in those areas where hatchery production is relatively high. Some effort is needed to see if straying is an issue. The report did note that marking of hatchery chum in the Fraser area has been minimal for the past 10 or so years. Although hatchery releases in the Fraser have declined in recent years, it still may be important to mark juveniles and identify hatchery chum in the fishery so that production and productivity of the natural stock can be more accurately estimated.		The team's perspective was that exploitation rates are so low that escapement of wild fish should be minimally impacted. The 2011 IFMP indicates that total expected adult returns from the 2010 brood year chum releases from Fraser River hatcheries (Chilliwack, Inch and Weaver) is 37,500. The total run size for Fraser chum is typically in the 1-2 Million range so, hatchery chum would represent less than 5% of the total return.

Appendix D – DFO Action Plan

Fisheries and Oceans
Pêches et Océans

Regional Director General
Pacific Region
Suite 200 - 401 Burrard Street
Vancouver, B.C.
V6C 3S4

Directrice générale régionale
Région du Pacifique
Pièce 200 - 401 rue Burrard
Vancouver (C.-B.)
V6C 3S4

Your file *Votre référence*

Our file *Notre référence*

MAR 19 2012

Mr. Steve Devitt
Operations Manager
Moody Marine Ltd.
815 - 99 Wyse Road
Dartmouth, Nova Scotia
B3A 4S5

Dear Mr. Devitt:

SUBJECT: ACTION PLAN TO ADDRESS
CONDITIONS FOR MSC CERTIFICATION OF B.C. CHUM SALMON

I'm pleased to submit our action plan for B.C. chum salmon fisheries in order to complete the certification process. The action plan provides a detailed response outlining our commitment to meeting the conditions within a 5-year period.

Many of these conditions are similar across the fishery units and will be met through implementation of regional and national policy and programs, such as the Wild Salmon Policy and National Sustainable Fisheries Framework. Actions proposed to meet general conditions across all four fishery units are described in our action plan followed by actions proposed to meet fishery-specific conditions for Fraser River, Inner South Coast, North/Central Coast and West Coast Vancouver Island chum salmon fisheries.

The action plan provides a guideline for completion and will be reviewed on an annual basis to ensure proper alignment to DFO's priorities and planned activities. As a result, timelines may be re-assessed and shifted.

We will make every effort to meet the timelines contained in our action plan. If there are any requirements to deviate from the proposed timeline these can be reviewed during the annual audit process.

Canada

Thank you for the hard work you have undertaken on reviewing British Columbia's chum salmon fishery and look forward to completion of this process.

Yours sincerely,

Susan Farlinger
Regional Director General
Pacific Region

cc: R. Reid
L. Richards

Attachment 1

ACTION PLAN TO ADDRESS CONDITIONS FOR MARINE STEWARDSHIP CERTIFICATION OF BRITISH COLUMBIA CHUM FISHERIES (Fraser River, Inner South Coast (excluding Fraser River), West Coast Vancouver Island, North Coast and Central Coast)

February 27, 2012

This action plan provides a detailed response outlining our commitment to meeting the Marine Stewardship Certification (MSC) conditions within a 5-year period.

Many of these conditions are similar across the fishery units and will be met through implementation of regional and national policy and programs, such as the Wild Salmon Policy (WSP) and National Sustainable Fisheries Framework. The WSP describes how Fisheries and Oceans Canada (DFO) will meet its responsibilities for the conservation of wild Pacific salmon. It identifies the following four basic principles:

- Conservation of wild salmon and habitats is the highest priority;
- Honour obligations to First Nations;
- Sustainable use; and
- Open and transparent decision making.

The WSP separates conservation from sustainable use and identifies the primacy of conservation over use. The intent of the policy is to protect the biological foundation of wild salmon in order to provide the fullest benefits to Canadians. It must be noted though that there will be exceptionable circumstances where it is not possible to address all risks.

"Where an assessment concludes that conservation measures will be ineffective or the social or economic costs to rebuild a CU are extreme, the Minister of Fisheries and Oceans may decide to limit the range of measures taken. Such a decision will be made openly and transparently."

We do not believe that this statement is inconsistent with the MSC standard. Many DFO harvest decisions favour conservation (e.g. Thompson coho, Cultus and Sakinaw Lake sockeye, WCVI chinook, Cowichan chinook) despite great social and economic costs.

Third-party assessment of the Fraser River, Inner South Coast (excluding Fraser River), West Coast Vancouver Island, North Coast and Central Coast chum fisheries against the MSC standard has resulted in conditions that must be addressed for continued certification. Conditions related to these criteria must be met within a 5-year period. Many of these conditions are similar across the fishery units and will be met through implementation of regional and national policy and programs, such as the WSP and National Sustainable Fisheries Framework. The action plan contains significant commitments for DFO to implement over the next five years. All of these actions are consistent with plans already underway within the department. It is important to note that implementation of the following action plan assumes there will be no requirement for

additional departmental resources. However, as we initiate implementation of the action plan, we may discover that this assumption was flawed and a re-evaluation of the original assumption is required.

Actions proposed to meet conditions general across all four fishery units are described below followed by actions proposed to meet fishery-specific conditions for Fraser River, Inner South Coast (excluding Fraser River), West Coast Vancouver Island, North Coast and Central Coast chum fisheries. The following table summarizes the key deliverables of this action plan referenced by condition:

Condition	Unit	Deliverable	Lead	Audit Timeline	Timeline
General	All	CSAP paper: *Conservation Units for Pacific Salmon under the Wild Salmon Policy* (B. Holtby, K. Circuna) http://www.dfo-mpo.gc.ca/csas-sccs/publications/resdocs-docrech/2007/2007_070-eng.htm	Science - Region		Completed
General	All	CSAP Peer Review Workshop on Indicators of Status and Benchmarks for Conservation Units under Canada's Wild Salmon Policy (http://www.dfo-mpo.gc.ca/csas-sccs/Schedule-Horraire/2010/11/11_15-18-eng.html)	Science - Region		Completed
General	All	CSAP paper: *Indicators of Status and Benchmarks for Conservation Units under Canada's Wild Salmon Policy* (C. Holt, B. Holtby, A. Cass, B. Riddell) http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2009/2009_058-eng.htm	Science - Region		Completed
General	All	Report to Certifier: Regional Framework for Integrated Planning	FAM - Region		December, 2010
1-1	NCCC	Report to Certifier: Catch Monitoring Framework. Report on exploitation rate estimates.	Science – Area	2nd audit	May 2014
1-1	WCVI	Report to Certifier: Catch Monitoring Framework	Science – Area	2nd audit	May 2014
1-1	ISC	Report to Certifier: Catch Monitoring Framework	Science – Area	2nd audit	May 2014
1-1	Fraser	Report to Certifier: Catch Monitoring Framework	Science – Area	2nd audit	May 2014
1-2	NCCC	Report to Certifier: Rationale on escapement monitoring	Science - Area	2nd audit	May 2014
1-2	ISC	Report to Certifier: Rationale on escapement monitoring	Science - Area	2nd audit	May 2014
1-3	NCCC	Report to Certifier: Rationale for biological sampling	Science - Area	2nd audit	May 2014
1-3	WCVI	Report to Certifier: Rationale for biological sampling	Science - Area	2nd audit	May 2014
1-3	ISC	Report to Certifier: Rationale for biological sampling	Science - Area	2nd audit	May 2014
1-3	Fraser	Report to Certifier: Rationale for biological sampling	Science - Area	2nd audit	May 2014
1-4	NCCC	Report to Certifier defining lower reference point	Science – Area	2nd audit	May 2014

Condition	Unit	Deliverable	Lead	Audit Timeline	Timeline
1-4	WCVI	Report to Certifier defining lower reference point	Science – Area	2nd audit	May 2014
1-4	ISC	Report to Certifier defining lower reference point	Science – Area	2nd audit	May 2014
1-4	Fraser	Report to Certifier defining lower reference point	Science – Area	2nd audit	May 2014
1-5	NCCC	Report to Certifier defining target reference point	Science – Area	2nd audit	May 2014
1-5	WCVI	Report to Certifier defining target reference point	Science – Area	2nd audit	May 2014
1-5	ISC	Report to Certifier defining target reference point	Science – Area	2nd audit	May 2014
1-5	Fraser	Report to Certifier defining target reference point	Science – Area	2nd audit	May 2014
1-6	NCCC	Recovery Plan Template and Revised IFMP	FAM, Science Area	2nd audit	May 2014
1-6	WCVI	Recovery Plan Template and Revised IFMP	FAM, Science Area	2nd audit	May 2014
1-6	ISC	Recovery Plan Template and Revised IFMP	FAM, Science Area	2nd audit	May 2014
1-6	Fraser	Recovery Plan Template and Revised IFMP	FAM, Science Area	2nd audit	May 2014
1-7	NCCC	CSAP Paper – Stock Status	Science – Area	2nd audit	May 2014
1-7	WCVI	CSAP Paper – Stock Status	Science – Area	2nd audit	May 2014
1-7	ISC	CSAP Paper – Stock Status	Science – Area	2nd audit	May 2014
1-7	Fraser	CSAP Paper – Stock Status	Science – Area	2nd audit	May 2014
2-1	NCCC	WSP Strategy 4 Implementation and Revised IFMP	FAM, Science Area	2nd audit	May 2014
2-1	WCVI	WSP Strategy 4 Implementation and Revised IFMP	FAM, Science Area	2nd audit	May 2014
2-1	ISC	WSP Strategy 4 Implementation and Revised IFMP	FAM, Science Area	2nd audit	May 2014
2-1	Fraser	WSP Strategy 4 Implementation and Revised IFMP	FAM, Science Area	2nd audit	May 2014
3-1	NCCC	Revised IFMP. Refer also to Condition1-4 and 1-6 response.	FAM, Science Area	2nd audit	May 2014
3-1	WCVI	Revised IFMP. Refer also to Condition1-4 and 1-6 response.	FAM, Science Area	2nd audit	May 2014
3-1	ISC	Revised IFMP. Refer also to Condition 1-4 and 1-6 response.	FAM, Science Area	2nd audit	May 2014
3-1	Fraser	Revised IFMP. Refer also to Condition1-4 and 1-6 response.	FAM, Science Area	2nd audit	May 2014
3-2, 3-10	NCCC	Report to Certifier: Catch Monitoring Framework - Bycatch Estimates	Science – Area	1st audit	May 2013
3-3, 3-11	Fraser	Report to Certifier: Catch Monitoring Report – Bycatch estimates	Science – Area	1st audit	May 2013
3-4	NCCC	WSP Strategy 4 Implementation and Revised IFMP Report to Certifier: Skeena Chum Management Plan	FAM, Science – Area Science – Area	2nd audit	May 2014
3-5	NCCC	Report to Certifier on current programs to not exceed catch Report to Certified on new initiatives to not exceed catch	FAM FAM	1st audit 2nd audit	May 2013 May 2014
3-6	NCCC	Resource Assessment Framework Revised IFMP	Science, Science Area, FAM ,	2nd audit	May 2014

Condition	Unit	Deliverable	Lead	Audit Timeline	Timeline
3-6	WCVI	Resource Assessment Framework Revised IFMP	Science, Science Area, FAM	2nd audit	May 2014
3-6	ISC	Resource Assessment Framework Revised IFMP	Science, Science Area, FAM	2nd audit	May 2014
3-6	Fraser	Resource Assessment Framework Revised IFMP	Science, Science Area, FAM	2nd audit	May 2014
3-7, 3-8	NCCC	Recovery plan for NCCC chum	Science Area, FAM	2nd audit	May 2014
3-9	NCCC	Report on chum salmon fisheries management performance	Client	2nd audit	May 2014
3-9	WCVI	Report on chum salmon fisheries management performance	Client	2nd audit	May 2014
3-9	ISC	Report on chum salmon fisheries management performance	Client	2nd audit	May 2014
3-9	Fraser	Report on chum salmon fisheries management performance	Client	2nd audit	May 2014

Conditions related to implementing DFO's Wild Salmon Policy:

The goal of DFO's WSP (2005) is to restore and maintain diverse salmon populations and their habitat. The elements of the WSP are consistent with the MSC standard and several conditions of BC chum certification will be met through implementation of the policy. Actions and rationale for actions to meet these conditions are described below.

Defining Lower and Upper Benchmarks Points:

There are several conditions common to all four fishery units that require defining lower and upper benchmarks for conservation units.[1] These are:

Condition 1-4: *For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish limit reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the LRPs chosen to formulate management decisions for the fisheries.*

Condition 1-5: *For all chum salmon UoCs. - By the second surveillance audit, the client or management agency must formally establish target reference points for the appropriate assessment units within each unit of certification through a scientific process, and this process must be peer-reviewed through PSARC to ensure scientific agreement regarding the TRPs chosen to formulate management decisions for the fisheries.*

[1] Benchmarks are reference points that identify when the biological production status of a stock unit has changed significantly, but does not prescribe specific restrictions. For the purposes of this report lower and upper benchmarks are as defined in the DFO's Wild Salmon Policy (2005) page 16-18.

Condition 1-7: *By the second surveillance audit, the client or management agency must attain general agreement that the methods of estimating escapement and exploitation rates for all target stocks are scientifically defensible and the management agency must formally establish the LRPs, as required under condition 1-4. The status of each target stock should be reviewed, and where the stock is approaching the defined LRP, the exploitation rate on the stock should be estimated. The management agency must report what actions have been taken to reduce fishing as the target stocks approach the LRP and must demonstrate that 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.*

Condition 2-1*: The proposed recovery plans, including a commitment to stock monitoring and assessment must be developed and implemented by the second surveillance audit. These recovery plans must meet the requirements of the scoring elements under the 80SG scoring level.*

Condition 3-1*. Certification of all chum fisheries will be conditional until management objectives (e.g., maximum harvest rates, escapement goals and LRPs) are clearly defined for most of the target chum stocks harvested in these fisheries. Objectives will be provided to the Certification Body by the second surveillance audit.*

To satisfy these conditions DFO will implement 'Strategy 1' of our WSP. 'Strategy 1' of the WSP requires standardized monitoring of wild salmon status, including identification of upper and lower benchmarks to represent biological status and guide harvest decisions. Implementing this strategy requires identification of Conservation Units (CUs)[2] for salmon: the scale at which the WSP aims to maintain biodiversity and at which lower and upper benchmarks (LRPs and TRPs) will be defined. There are various definitions of lower and target reference points in relation to resource management. There is no single rule to use for determination of the lower benchmark. Rather, it will be determined on a case by-case basis, and depend on available information, and the risk tolerance applied…." The upper benchmark (TRP) will be established to identify whether harvests are greater or less than the level expected to provide, on an average annual basis, the maximum annual catch for a CU, given existing environmental conditions.

The following table describes milestones for implementing Strategy 1 of the WSP. DFO will provide a progress report on Strategy 1 implementation to the MSC certifying body by May 2014.

Action	Description	Timeline
Identify Conservation Units	Paper defining conservation units regionally for all salmon species based on biological criteria (Holtby and Ciruna, 2007)	Paper reviewed and approved by CSAP, published 2008

[2] A Conservation Unit (CU) is defined by the policy as, "a group of wild salmon sufficiently isolated from other groups that, if lost, is very unlikely to re-colonize naturally within an acceptable timeframe (e.g., a human lifetime or a specified number of salmon generations)."

Action	Description	Timeline
Develop standardized assessment criteria	Paper defining general methodology for determining reference points for salmon populations and assessment criteria (Holt et al., *in prep*) Workshop to facilitate application of methods in Holt et al.	CSAP Workshop, January 2009 Finalized methodology: October, 2009
Define Lower benchmarks for each target stock (CU)	Apply criteria and methods of Holt et al. (*in prep*) to specific CUs.	Through May 2014
Define Upper benchmarks for each target stock (CU) and corresponding harvest strategy	Recognizing Target Benchmarks inherently involve trade-offs, determine Target Benchmarks through participatory decision-making (co-management) – see below.	Through May 2014

Rebuilding Plan:

There are several conditions common to all four fishery units related to acceptable harvest limits on non-target stocks and development of rebuilding plans for these stocks:

For salmon fisheries, the question of how to manage fisheries targeting mixed-stock complexes of weak and strong populations is central. DFO has a proven track record of implementing 'weak stock' management for salmon conservation. Over the last decade, we significantly reduced the harvest rate of mixed stock fisheries in order to conserve stocks of concern. For example:

- In 2001, impacts on Interior Fraser coho were limited to a maximum of 3% Canadian exploitation rate. Since then, this limit has been maintained to allow rebuilding, even in years when the stock was well above the provisional LRP. A rebuilding program is in place for Interior Fraser River coho.
- Mixed-stock fisheries targeting productive Fraser River sockeye populations are managed to avoid stocks of concern, including but not limited to Sakinaw and Cultus Lake sockeye. Rebuilding programs are in place for both these sockeye stocks.
- Fraser River pink fisheries are managed to take Late Run sockeye and Interior Fraser coho conservation constraints into account.
- Fraser chum fisheries are managed within Interior Fraser coho and Fraser steelhead conservation constraints.
- Chinook fisheries coast-wide are managed to limit impacts on low-status WCVI chinook. The maximum allowable exploitation rate in Canadian fisheries is maintained between 10 to 15%. Measures include weekly monitoring of the catch composition of the Northern Troll fishery through DNA analysis, resulting in closures of the fishery with remaining TAC in years when the interception rate of WCVI chinook was too high. Also, there are significant time-area closures off the

WCVI for sport and commercial fisheries during periods when WCVI chinook is prevalent.

- Similarly, fisheries are managed to avoid lower Strait of Georgia (LGS) chinook stocks. There have been two management strategies in effect to protect LGS chinook. Up until 2007 catch composition of the WCVI troll was monitored with a ceiling placed on the encounters of Cowichan coded wire tags. When the ceiling was reached the troll fishery is closed. In 2008 an alternative management strategy was introduced to protect LGS chinook. Under this strategy the overall WCVI harvest rate was reduced by 20%.
- In 2008, chinook fisheries were managed to avoid early timed and spring/summer Fraser chinook stocks due to poor recruitment from the 2005 sea-entry year. Again, time and area closures were implemented during periods when these stocks were vulnerable to mixed-stock commercial and sport fisheries.
- Also since 2009, the objective for Skeena River sockeye has been to reduce the Canadian commercial exploitation rate on Skeena sockeye to begin rebuilding individual sockeye stocks of concern by maintaining significantly reducing the commercial harvest impacts.
- The 2008 Pacific Salmon Treaty (PST) recently negotiated between Canada and the USA resulted in further harvest reductions in Canadian 'AABM' fishing areas to reduce interception of low status US-origin chinook stocks.

The 80% scoring guidepost for Indicator 1.2.1, 2.3.1 and 3.1.5 under the chum assessment tree requires that the management system has the respective conditions:

Condition 1-6: *By the second surveillance audit, the client or management agency must develop and implement recovery plans to facilitate the recovery of depleted stocks to the MEG within three cycles given average rate of productivity. It is recognized that if stocks encounter a series of poor productivity years, even with little, if any, exploitation, stocks may not recover in three cycles. The recovery plans must be defined to allow the stocks to recover more than 150% of the defined limit reference point prior to allowing any fishery to target the depleted stocks and the stocks should be expected to recover to the MEG under the rebuilding plan. A recovery plan template must be developed and submitted for review and approval by the second annual surveillance audit.*

Team Suggestion*: The team suggests that DFO formally adopt a harvest strategy and provide the scientific evidence to show that this strategy would lead to rebuilding above the 150% LRP mark. The team does not have an expectation that specific "rebuilding plans" for each stock be established however, the Team does expect that scientific review would examine the stocks which have been consistently well below the LRP and make specific comment and evaluation on what measures are necessary to rebuild them.*

Condition 3-4 *– NCC - By the second surveillance audit, DFO must document how it has responded to management and conservation concerns such as estimation of bycatch and development of recovery plans for Area 3 and 4 chum stocks. DFO should provide evidence that they have established an effective process for responding to new information and making necessary changes within 12 months of the information becoming available. .*

Condition 3-7, 3-8 - *Certification of the NCCC chum fishery will be conditional until DFO implements a recovery plans to restore Area 3 and 4 chum stocks to productive levels and provides evidence that Canadian fisheries are not impeding the recovery of these stocks, by the second surveillance audit. Evidence that recovery plans have been implemented to be provided to the certifier by the second surveillance audit.*

The newly standardized MSC assessment trees (2008) provide much needed guidance regarding the assessment of species fished as stock complexes, such as Pacific salmon. Specifically, species fished as stock complexes "may be considered analogous to multi-target species considered under the guidance of performance indicator 2.3.1." This distinction is important because it allows for a pragmatic approach to the central problem of weak stock management, recognizing that factors other than harvest may cause a stock to decline. A non-target stock within the fishery may be below the point at which recruitment is impaired. *The critical factor for certification is whether or not the fishery is 'hindering' recovery of the stock.*

Our WSP prescribes a systematic approach to salmon management, essentially moving DFO from a reactive to a pro-active approach for maintaining the biodiversity of salmon populations within Canada.

To ensure that fisheries have acceptable harvest limits on non-target stocks and that the management system allows for rebuilding of depleted non-target stocks, DFO will:

- Implement 'Strategy 1' of the WSP: Define lower and upper benchmarks (LRPs and TRPs) for non-target stocks (CUs) and monitor their status. The objective for fishery management shall be to maintain CUs above their lower benchmarks (LRPs) unless otherwise determined by the Minister.
- Implement 'Strategy 4' of the WSP: Create a regional framework for integrated planning that will be used to articulate salmon management choices that consider social, economic and biological consequences. Consensus based advisory processes will be used to assist in defining these trade-offs and also to assist in developing strategic plans for the management of salmon CUs; including harvest strategies designed to maintain the biodiversity of stocks within the CU. A report will be provided to the certifier by the second audit that chronicles these efforts.
- Benchmarks will be used to guide management response. For example, if a CU is below its lower benchmark and in the 'Red Zone' this will trigger consideration for ways to protect the fish, increase their abundance and reduce the risk for loss. Biological considerations will be the primary consideration for CU below the lower benchmark and in the 'Red Zone'. Page 17 of the WSP identifies additional guidance on how response would be taken for CU between the lower and upper benchmark.
- Implement Strategy 5 of the WSP. Review annual performance against measurable objectives, particularly with regards to stock status and rebuilding objectives.

Specifically, DFO will also define lower benchmarks (LRPs) or their equivalent for NCCC, WCVI, ISC and Fraser River, chum salmon CUs. A rebuilding plan consistent with the WSP will have been developed and implementation initiated within 2 years for stocks harvested in fisheries targeting NCCC, WCVI, ISC, and Fraser River chum salmon that are below their lower benchmarks (LRPs). On the Skeena and Nass Rivers the proposed rebuilding plan will include measures to rebuild chum salmon stocks if they are below their lower benchmark (LRP) contingent upon determining whether harvest pressure is found to have a significant risk for chum rebuilding. This rebuilding plan will demonstrate how the fisheries management strategy will assist in ensuring rebuilding objectives are met. Fishery actions may only be one component of a rebuilding plan and could include enhancement, habitat and other measures to enable rebuilding objectives being met. It must recognize though, that there will be instances that rebuilding is not possible even where the appropriate management actions are implemented. Rebuilding may not be possible due to a variety of events that are beyond our control (e.g. low marine survival, habitat changes, environmental conditions, etc.)

The following table describes milestones for implementing elements of the WSP required to meet the Rebuilding Plan Conditions of Principle 1 and Principle 2 conditions for MSC certification of BC chum fisheries.

Action	Description	Timeline
Define lower benchmarks for non-target stocks (CUs)	Apply criteria and methods of Holt et al. (*in prep*) as well as other approaches under development to specific CUs.	May 2014
Implement WSP Strategy 4: Design and implement a fully integrated planning process for salmon conservation.	Define a regional framework for integrated planning.	May 2014
Implement WSP Strategy 4: Develop fishery-specific integrated management plans.	Initiate integrated strategic planning processes to develop integrated management plans for salmon CUs that will: - Define lower benchmarks for target and non-target stocks - Define precautionary harvest strategies and decision rules - Determine rebuilding strategies - Define performance measures	NCCC (May 2014) ISC (May 2014) Fraser River Pink (May 2014)
Implement WSP Strategy 5: Annual Performance review	Annually review and report on performance of fishery and management system against defined performance measures for salmon conservation.	Starting 2015 for CU status measures and fishery performance review indicators.

Research Plans:

All four of the chum fishery units face the same general MSC condition regarding developing a research plan for the fishery that addresses impacts of the fishery on the ecosystem and socio-economic issues that result from the implementation of management plans.

Condition 3.6 *- Certification of all chum fisheries will be conditional until DFO develops a research plan for chum fisheries which incorporates the existing elements under 80SG and address impacts of the fishery on the ecosystem, socioeconomic issues that result from management decisions and is responsive to changes in the fishery. The research plan must also include an evaluation of alternative management approaches to reduce bycatch or determine the survival rate of discarded non-target species for non-retention fisheries. This research plan must be provided to certification body by the second surveillance audit.*

The requirement to include ecosystem values and objectives in planning process is an element of the WSP. Work is currently underway to develop ecosystem objectives and indicators in order to assess the status of salmon ecosystems, as defined under Strategy 3 of the WSP. In addition, Strategy 4 indicates that information on the status of conservation units, habitats, ecosystems and socio-economic values will inform strategic plans for conservation units.

Over the next two-three years, DFO will be implementing the revised format for Integrated Fisheries Management Plans (IFMPs). The revised IFMP template is much more fishery specific and requires elements not included in past IFMPs, such as stock status, a socio-economic overview and summary of management issues. Implementation of the new IFMP template will require many of the gaps identified in the conditions to be addressed.

To addresses the need to include other objectives (ecosystem, socio-economic) in the planning process and assess performance against these objectives, we will need to re-align our current reporting and/or re-allocate research resources. DFO has developed a Resource Assessment Framework (RAF) for Fraser River sockeye (CSAP review in May 2008) to help guide assessment priorities based on the biological status and knowledge gaps for each CU. Over the next year DFO will be developing a comprehensive salmon RAF. The RAF will serve as a template for all salmon research and stock assessment planning in the Pacific Region.

MSC Principle 1

Condition 1-1: *For all UoCs - The reliability of the catch estimates derived from the catch monitoring systems shall be evaluated by the second surveillance audit and the client or management agency shall commit to conducting similar catch monitoring reporting evaluations at a period of not more than every 5 years in order to meet the performance requirement identified by the third scoring element in the 80 scoring guidepost. The management agency must implement catch monitoring systems that will produce scientifically defensible estimates of exploitation rates for Area 4 chum stocks in*

Area 3-5 salmon fisheries or chum stock composition estimates for Area 3-5 salmon fisheries need to be provided within 2 years to determine the relative magnitude of the harvest/mortality of Area 4 chum stocks in these fisheries, as required in the second 80 SG scoring element. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest.

Under DFO's Pacific Integrated Commercial Fisheries Initiative (PICFI) the Enhanced Accountability element has provided further focus and resources to develop and implement a framework to improve the monitoring and catch reporting in Pacific fisheries. Under this framework fisheries information requirements are categorized as requiring low, moderate or enhanced levels of information according to consistent criteria, largely based on evaluating risk to conservation.

The current and desired monitoring levels for all Pacific salmon fisheries are currently being evaluated utilizing this consistent framework and a report being prepared for release by July 2012. This strategy calls for subsequent updates of the regional evaluation of all salmon fishery monitoring programs every two years.

DFO will provide defensible estimates of exploitation rates for Area 4 chum stocks in Area 3-5 salmon fisheries within 2 years to determine the relative magnitude of the harvest/mortality of Area 4 chum stocks in these fisheries, as required in the second 80 SG scoring element.

Condition 1-2: *For NCC and ISC chum salmon UoCs - An escapement monitoring program that is adequate to estimate the status of target stocks harvested in the NCCC and ISC chum salmon fisheries must be implemented by the second surveillance audit. Fishery independent indicators of abundance for non-target species harvested in these fisheries must be available for each year and area where fisheries are permitted to target chum salmon. The rationale for the monitoring program must be described and demonstrate the adequacy of the monitoring is sufficient to meet the management needs in relation to the level of harvest. A publically available, externally reviewed report on escapement monitoring programs should be available for review by the second surveillance.*

As most of the escapement programs for chum are based on visual enumeration in the ISC Chum region, biological sampling for chum is opportunistic. In recent years with the push to improve the genetic baseline for Southern Chum, increased sampling has taken place but not in a consistent manner.

A report outlining the rationale for the chum salmon escapement monitoring will be developed and it will include how it meets the management needs for NCCC and ISC chum salmon stocks by May 2014. This report will be supported by a companion report that will outline the over all salmon evaluation framework.

Condition 1-3: *By the second surveillance audit, the client must meet the requirements of the 80 scoring guideposts. This shall include demonstration of the justification of the*

sampling program through scientific analysis. ***Team Suggestion*** *The team envisions an evaluation of the issues where size monitoring might be important, for instance declining average size affecting average egg production and changing spawner recruit relationships, and evaluation of the extent to which the existing opportunistic sampling would capture that.*

Sampling in the test fisheries, commercial harvest, escapement programs and hatcheries is specifically designed to attempt to capture the stock structure of the chum salmon populations returning to the NCCC, WCVI, ISC and the Fraser River at any given time. These programs have been designed to not only provide information on abundance but collect data on age, sex, stock composition and size distribution.

Additional details and justification of the sampling program will be provided by May 2014.

MSC Principle 3

Condition 3-2, 3-10. *Certification of North-Central Coast chum fisheries will be conditional until scientifically defensible estimates of non-target species bycatch are obtained annually for North-Central Coast chum fisheries. Bycatch estimates will be reported to the certification body by the first surveillance audit..*

Under DFO's Pacific Integrated Commercial Fisheries Initiative (PICFI) the Enhanced Accountability element has provided further focus and resources to develop and implement a framework to improve the monitoring and catch reporting in Pacific fisheries. Under this framework fisheries information requirements are categorized as requiring low, moderate or enhanced levels of information according to consistent criteria, largely based on evaluating risk to conservation.

The current and desired monitoring levels for all Pacific salmon fisheries are currently being evaluated utilizing this consistent framework and a report being prepared for release by July 2012. This strategy calls for subsequent updates of the regional evaluation of all salmon fishery monitoring programs every two years.

DFO will provide estimates of non target species by-catch for NCC chum fisheries by May 2013.

Condition 3-3, 3-11*. Certification of Fraser chum salmon fisheries will be conditional until scientifically defensible estimates of non-target bycatch are obtained annually for steelhead and sturgeon caught in Fraser pink and chum fisheries. Bycatch estimates will be reported to the certification body by the first surveillance.*

Programs are in place to estimate the number of sturgeon and steelhead encountered in fisheries directed at Fraser River chum salmon. A mandatory release requirement for both of these species is in effect, therefore, estimates of releases are currently based on unverified reports of releases from fishery participants. In addition, several test-fisheries are conducted in the fishery area, which provide independent data on the presence and

scope of any sturgeon and steelhead by-catch issues. Improving estimates of fishery impacts on these species would require the implementation of an on-board observer program to provide direct, validated, observations of encounters of steelhead and sturgeon. With sufficient funding, implementing an observer program would be feasible for fisheries with larger vessels. However, fisheries using smaller vessels (e.g. FN Economic Opportunity fisheries and approximately a third of the commercial fleet) could not accommodate on-board observers. These fisheries could potentially be monitored with on water roving observers, an approach that was piloted in the 2007 Area E chum fishery. The 2007 Area E commercial fisheries also had new census-based catch reporting programs, which should meet the 100% reporting requirement for sturgeon releases.

For consideration, to address the potential impacts on salmon fisheries on sturgeon, an alternative approach could be to use Albion, Cottonwood and Whonnock sturgeon encounters as a proxy.

To satisfy this condition DFO will develop a program (e.g. modelling, test fishery expansion, census based and/or observer based) to estimate the impact of Fraser River sockeye, pink and chum fisheries on steelhead and sturgeon beginning in 2012. The need for further work will be assessed according to the results of this program. A report summarizing the work will be completed in May 2013 and provided to the Certifier.

Condition 3-5 *- Certification of North-Central Coast chum fisheries will be conditional until DFO provides evidence that DFO has implemented programs in the NCC that create incentives for harvesters not to exceed target catches in chum fisheries and that these incentives are working. If DFO has evidence of implementing these types of fisheries in the past, this evidence should be provided within 1 year. Evidence of new incentives or initiatives implemented on the NCC should be provided by the end of the second surveillance audit.*

DFO will provide a review and provide evidence that DFO has implemented programs in the NCC that create incentives for harvesters not to exceed target catches if there are any fisheries where harvesters exceed target catches.

Condition 3-9 *- Certification of all chum fisheries will be conditional until an external review for chum salmon fisheries management performance completed and there is commitment to conducting a similar review at least once every five years. The results of the first external review will be provided to the certification body by the second surveillance audit.*

External reviews are conducted on an annual basis through the departments Integrated Harvest Planning Committee. This Committee is comprised of representatives from First Nations, and commercial, recreational and environmental organizations. The Terms of Reference for this Committee require a post-season evaluation be conducted and reported on an annual basis.

DFO considers the MSC process to be the external review process.