A review of the December 7, 2011 draft MSC assessment of B.C. pink salmon fisheries

January 19, 2011

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Executive Summary

This paper provides an evidentiary-based critique of the Public Certification Draft Report (PCDR) for Marine Stewardship Council (MSC) certification of BC's pink salmon fisheries. The PCDR is an assessment of British Columbia's pink salmon fisheries prepared by Moody International for the Canadian Pacific Sustainable Fisheries Society (CPSFS). The CPSFS is seeking MSC Certification of British Columbia's pink salmon fisheries.

This paper challenges some of the scores given by the Assessment Team, speaks to the inadequacy of specific conditions as well as DFO commitments to meeting some conditions in their action plan. The authors recommend (1) changes in specific scores and conditions, (2) improvements to the DFO action plan to ensure that conditions are met if certification is granted, and (3) that certification be withheld until fishery performance is improved, especially for the eight performance indicators where fishery performance is insufficient to award passing scores based on an objective and precautionary interpretation of available information

The major obstacles to sustainability in BC's commercial pink salmon fisheries include significant problems associated with the bycatch and discarding of sockeye, coho, chum, chinook and steelhead. This paper provides evidence that bycatch and discards may be impeding the rebuilding and recovery of salmon stocks. It also provides evidence that commercial pink salmon fisheries are killing an unknown number of salmon stocks that DFO has defined as being of special conservation concern. DFO does not have scientifically defensible estimates of the numbers of salmon of non-target species caught and killed in commercial pink salmon fisheries, underreporting of bycatch is significant, and compliance with selective fishing measures is often poor. The PCDR does not adequately address these issues, and is particularly negligent in the case of chum salmon. As such, the proposed certification of BC's commercial pink salmon fisheries will not lead to the long-term protection of co-migrating salmon species that often share the same marine and freshwater habitats.

Management of the target stock itself represents another major obstacle to sustainability for this fishery. Specific shortcomings include DFO's insufficient assessment of target (pink) stocks, lack of biologically defensible escapement goals and exploitation rate targets, poor status of several pink salmon stocks in recent years, and failure to adequately protect pink stocks from anthropogenic impacts such as those arising due to open net cage salmon farms on juvenile pink salmon migration routes. Overfishing of both target and non-target stocks by the pink salmon fishery can have negative impacts on salmon-dependent riparian and freshwater ecosystems, and progress towards understanding these impacts and minimizing them when setting fishing plans is extremely slow.

Introduction

This paper provides an evidentiary-based critique of the Public Certification Draft Report (PCDR) for Marine Stewardship Council (MSC) certification of BC's pink salmon fisheries. The PCDR is an assessment of British Columbia's pink salmon fisheries prepared by Moody International for the Canadian Pacific Sustainability Fisheries Society (CPSFS). The CPSFS is seeking Marine Stewardship Council (MSC) Certification of British Columbia's pink salmon fisheries. It challenges some of the scores given by the Assessment Team (AT), speaks to the inadequacy of specific conditions, and recommends changes in specific scores and conditions.

The paper is divided into 4 major sections:

1. A discussion of salmonid bycatch and discards in BC's pink salmon fisheries (p.3)
2. Analysis of the PCDR (p.17)
3. Conclusions and recommendations (p.57)
4. References (p.62)

Acronyms used

AT – Assessment Team
C&P – DFO Conservation and Protection branch
CPSFS – Canadian Pacific Sustainability Fisheries Society
CPUE – Catch Per Unit Effort
CUP – Certification Unit Profile
DFO – Department of Fisheries and Oceans
FAO – Food and Agriculture Organization of the United Nations
IFMP – Integrated Fishery Management Plan
IHPC – Integrated Harvest Planning Committee
ISC – Inner South Coast
MEG – Management Escapement Goal
MSC – Marine Stewardship Council
NCCC – North Coast and Central Coast
PCDR – Public Comment Draft Report
PI – Performance Indicator
SG – Scoring Guidepost

Discussion of salmonid bycatch and discards in British Columbia's pink salmon fisheries

This section examines the Public Certification Draft Report's (PCDR) treatment of Salmonid bycatch and discards in British Columbia's pink fisheries.

Bycatch and discards are a problem across the world's fisheries. They confound sustainable management as

"Bycatches in their various forms can have significant consequences for populations, food webs, and ecosystems. The economic effects of bycatches can influence not only the levels of yields to individual fisheries, but also may have major effects on allocations among competing fisheries. The lack of comprehensive monitoring programs in most areas to assess bycatches and integrate them into population and multispecies models seriously impedes a full understanding of bycatch consequences and the efficacy of measures for their amelioration". (Crowder, 1998)

FAO (The Food and Agriculture Organization of the United Nations) guidelines call for gathering accurate data on bycatch and discards, ensuring compliance of fishers, reducing bycatch through using more selective gear and fishing strategies, and developing incentives and disincentives that will change fishermen's behavior towards bycatch and discards (FAO, 1997).

The bycatch and discarding of sockeye, coho, chum, chinook and steelhead is a significant problem in British Columbia's commercial pink salmon fisheries. In order to maximize commercial pink fishing opportunities in areas and times where non-target species are present, DFO permits the bycatch of stocks of concern and allows fishermen, through Conditions of License, to discard some or all of their bycatch.

DFO does not have scientifically defensible estimates of the numbers of salmon of non-target species caught and killed in commercial pink salmon fisheries. This paper provides evidence that bycatch and discards may be impeding the rebuilding and recovery of stocks. It also provides evidence that commercial pink salmon fisheries are killing an unknown number of salmon stocks that DFO has defined as being of special conservation concern, and that compliance with selective fishing measures is often poor.

MSC's Mandate, Principles and Criteria for Sustainable Fishing and Objectives

The Marine Stewardship Council's mandate "is the long-term protection of the world's marine fisheries and *the associated ecological components*". It is the second element of

the mandate – *associated ecological components* - which this section concerns itself with. It provides evidence that the proposed certification of BC's commercial pink salmon fisheries will not lead to the long-term protection of co-migrating salmon species that often share the same marine and freshwater habitats.

MSC's Principles and Criteria for Sustainable Fishing set the standard for MSC's fisheries assessments. Any assessment that is awarded MSC certification must meet this standard. Listed below are the key Principles and Criteria that speak to bycatch.

1) 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.

    a. Principle 2, Criterion 2 of MSC's Principles and Criteria for Sustainable Fishing ensures that MSC Certified fisheries are "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".
    b. Principle 2, Criterion 3 MSC states that "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".

2) 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.

    a. Principle 3, Criterion 10 (a) states that a Certified fishery should set "catch levels that will maintain the target production and ecological community's high productivity relative to its potential productivity, and account for the non-target species captured and landed in association with, or as a consequence of, fishing for target species.
    b. Principle 3, Criterion 11: MSC demands that "appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specific corrective actions be taken in the event that they are".

c. Principle 3, Criterion 12: the fishing operation should "make use of fishing gear and practices designed to avoid the capture of non-target species; minimize mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive."
d. Principle 3, Criterion 17: the fishing operation should "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".

MSC's objectives in terms of bycatch, as communicated to the authors, is represented by this wording at the 80 guidepost in a similar fishery: "bycatch species are highly likely to be within biologically based limits or if outside those limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery or rebuilding". MSC described their objective as being to encourage fisheries seeking certification to adopt global best practices. They further described their objective as not to encourage fisheries to adopt the global "average", but to seek out and adopt leading edge initiatives in sustainability (pers. comm. MSC).

Bycatch and Discard Issues Associated with B.C. Pink Salmon Fisheries

This section focuses on chum bycatch and discards in pink salmon fisheries in Areas 3 through 8 on BC's North Coast. But most of the same issues, such as scientifically defensible estimates of bycatch catch and mortality, compliance, enforcement and mitigation, are applicable to south coast (including Fraser River) pink salmon fisheries.

No exploitation rate objectives for bycatch stocks

The Client's Management Summary (1.3.2 and 2.5.4) describes the inadvertent catch of different species of concern as bycatch. DFO's stated objective is to keep the exploitation rates on stocks of concern within the limits described in the fishery management objectives. Unfortunately, neither the Client's Management Summary nor Certification Unit Profile for Area 3 – 6 specifies any exploitation rate objectives for stocks of concern caught as bycatch in these fisheries.

Chum bycatch ignored in PCDR

The bycatch of chum salmon is largely ignored in the PCDR even though north coast chum salmon in areas 3 through 6 are categorized by DFO as being depressed and of special conservation concern (DFO Management Summary 3.4.1.5). The AT's failure to substantively address chum bycatch issues is all the more mysterious given that until

the release of the PCDR the assessment also included four units of certification for BC chum salmon.

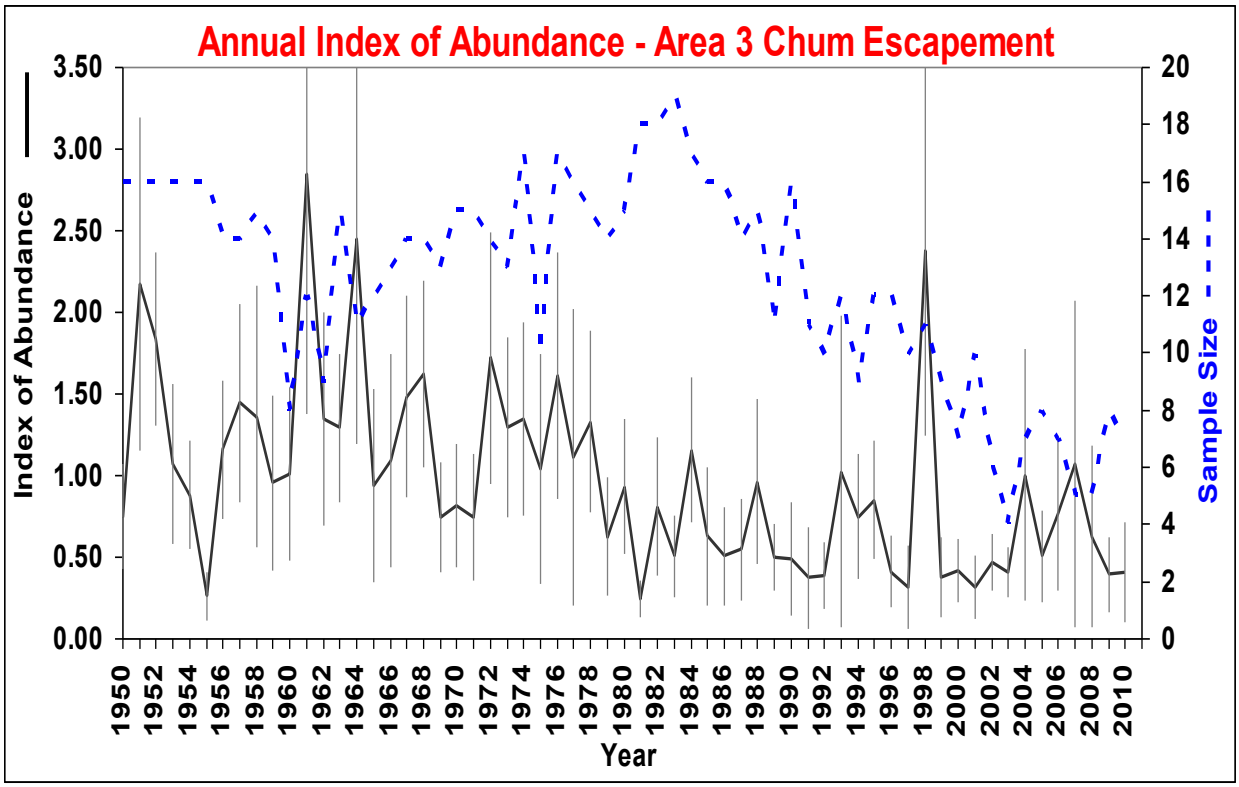
At the 2009 IFMP meeting DFO distributed their stocks of concern which described Area 3 and 4 chum stocks as experiencing, “a long term depression among wild stocks” and Areas 5 and 6 stocks as showing evidence of “widespread long term decline among small and medium wild stocks (DFO: Stocks of Concern for 2009, November IFMP meeting). This categorization remains in place in the 2011 salmon outlook. (DFO, November 2010 IHPC Meeting).

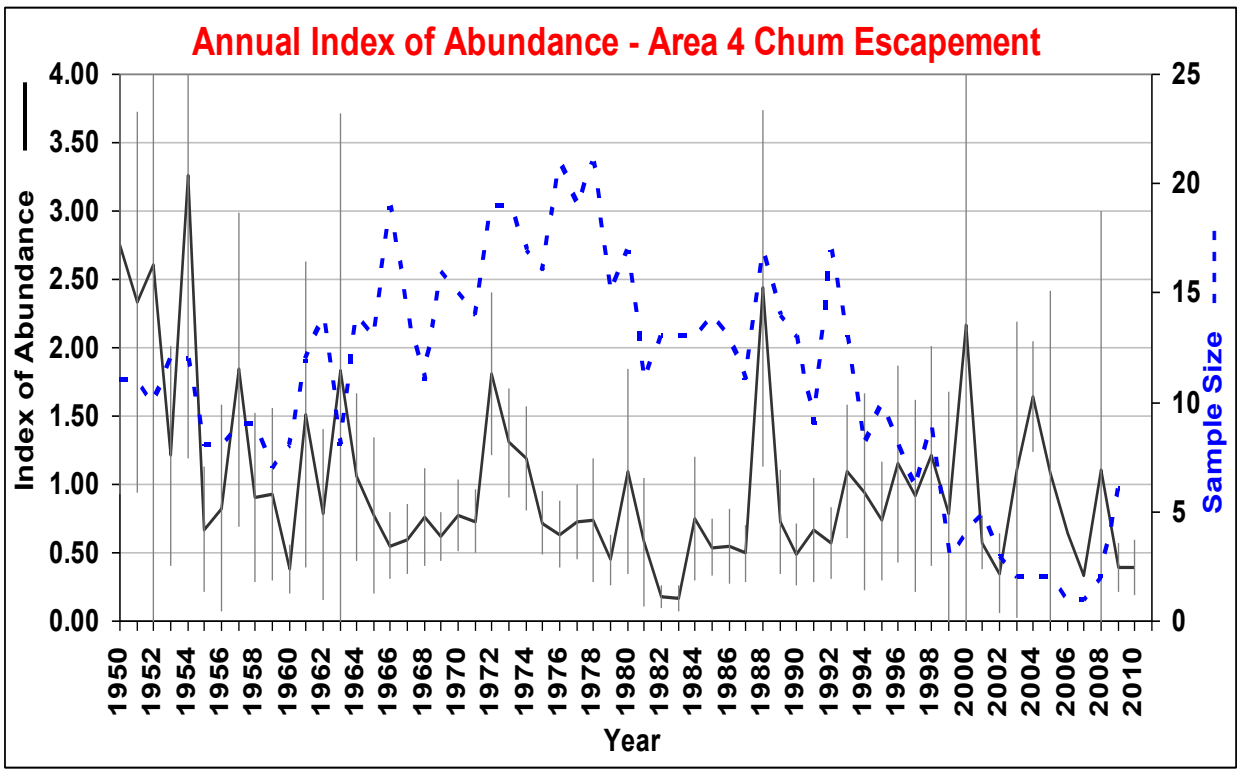
A recent Canadian Science Advisory Secretariat paper describes Area 3 chum stocks as follows

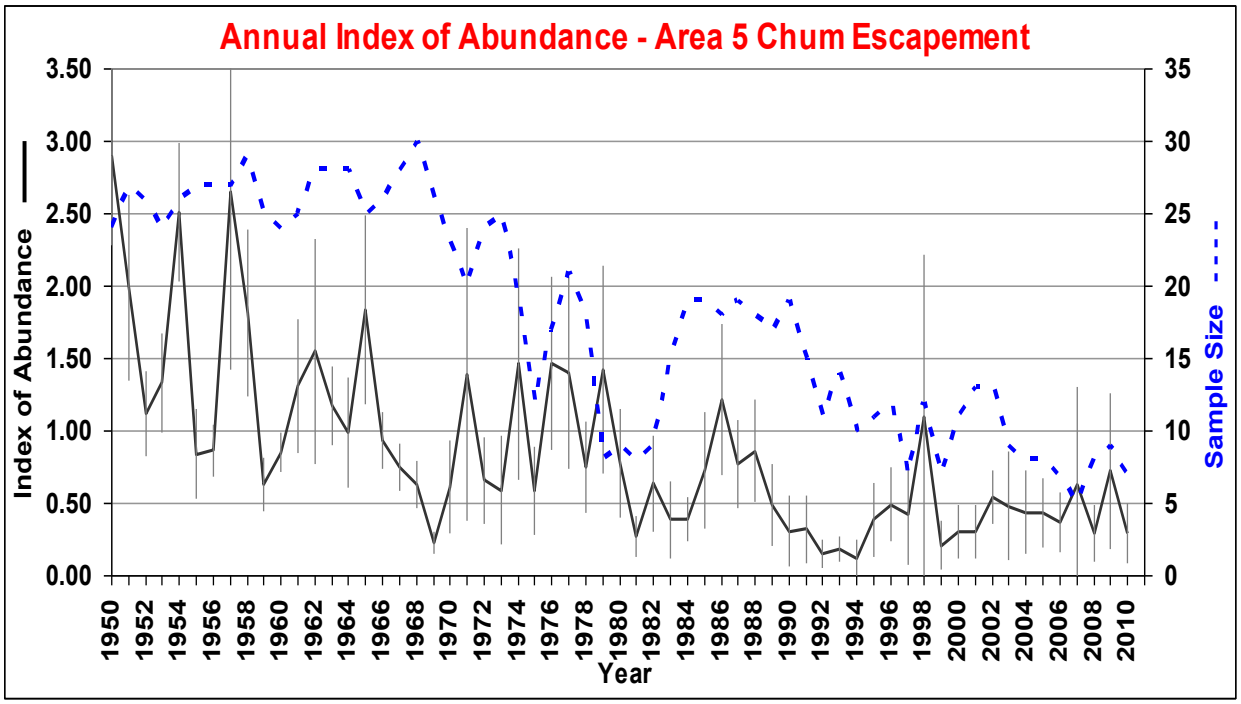
“*The very low escapement of recent years for many streams is a significant concern. While the overall chum escapements have not shown a pattern of decline over last four decades, there are a number of stocks that have declined to very low levels, and in some cases may be extirpated. Nass chum are currently depressed but the freshwater productive capacity is likely still there for stocks to rebuild given favorable ocean conditions and low harvest rates. Area 3-Nass chum abundance is expected to increase under the conditions of reduced harvest impacts and an environment of higher return rates. However, even major changes in harvest impacts do not ensure a “recovery”. Even with significantly reduced harvest rates we would not expect an increase if return rates are very poor. Recent management changes that have reduced harvest rates on Area 3 – Nass chum stocks appear to have slowed but not halted the recent decline of some stocks”. (CSAS Working Paper 2010/p58)*.

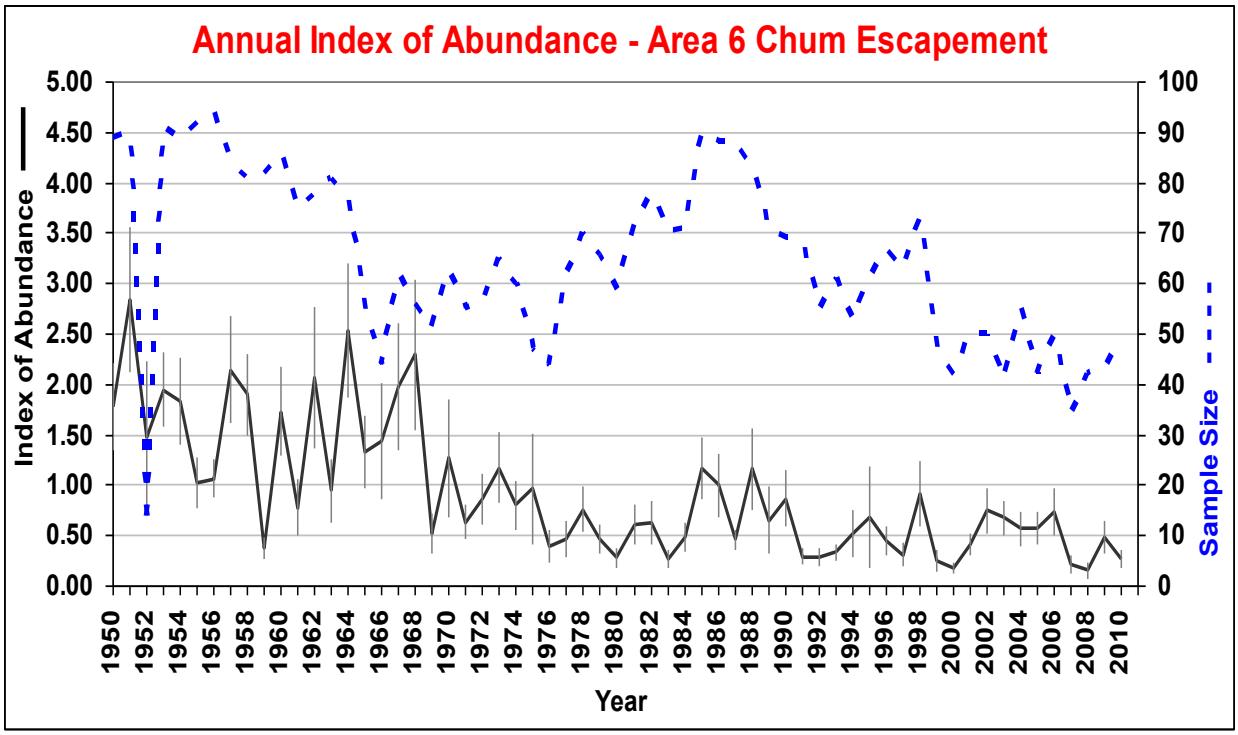
The assumption that north coast chum abundance may increase under conditions of reduced harvest rates and more favorable ocean conditions is likely overly optimistic. North Coast unenhanced chum salmon are harvested as bycatch in north coast commercial pink and sockeye fisheries. Improved marine conditions will likely benefit the target species, leading to more intense commercial fisheries on these target stocks. The bycatch and discarding of chums is therefore likely to increase in the event of more favourable marine conditions under the management strategies described in the Client’s submission.

The following graphs prepared by DFO (Brian Spilsted, Stock Assessment, DFO Prince Rupert) indicates the declining trend in chum abundance in Areas 3, 4, 5 and 6.


Annual Index of Abundance - Area 3 Chum Escapement
Index of Abundance
Sample Size
Year
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
20
18
16
14
12
10
8
6
4
2
0
1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010

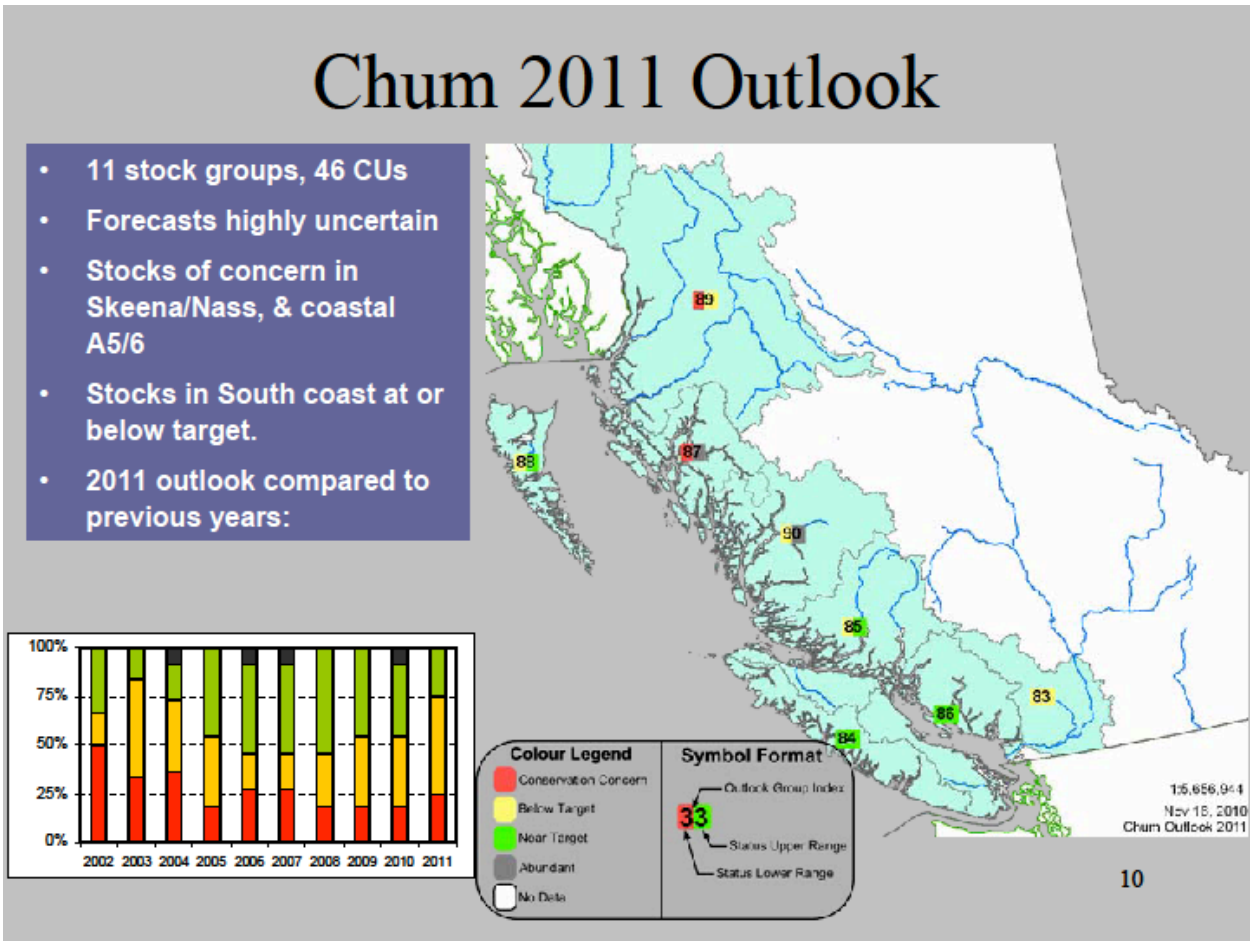

Annual Index of Abundance - Area 4 Chum Escapement
Index of Abundance
Sample Size
Year
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
25
20
15
10
5
0
1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010





Graphs supplied by Brian Spilsted, DFO Stock Assessment, Prince Rupert

In the November 2009 and 2010 IHPC meetings DFO classified several stocks in each of the above areas as “Stocks of Concern”. DFO defines Stocks of Concern as populations that are less than 25% of target and declining rapidly



(http://www.gulftrollers.com/news/IHPC/2011%20Outlook%20Nov%2024%202010%20(IHPC).pdf)

The bycatch of chum constitutes a significant proportion of the total chum stock in northern areas. In 2009, the estimated Area 3 chum bycatch was 72,679 of which 26,252 were released compared to a final chum escapement of 20,615 (pers. comm. Dave Einarson, DFO Area Manager). In Area 6 the total bycatch of chum salmon was 72,788 compared to a total chum escapement of 40,515 (2009 DFO Post-season report). Similar proportions of chum bycatch to target pink catch have occurred in previous seasons, as the AT should know.

Misreporting and underreporting of bycatch

A scientifically defensible estimate of chum bycatch in commercial fisheries in areas 3 and 6 is unavailable as there are no independent measures of either catch or mortality. Although fishermen are required to both phone in daily catch and release information and record species caught and released in a logbook, fishermen do not necessarily accurately report or record the number of non-target species caught and released. In their recent document, *"Steelhead Bycatch and Mortalities in the Commercial Skeena Net Fisheries of British Columbia from Observer Data: 1989 to 2009*, J.O. Thomas and Associates describe wide variations in catch data provided by fishermen through hails, logbooks and phone-ins compared to what was provided by independent observers. The report states that "*non-retention, non-possession regulations for steelhead for gillnet and seines led to an almost complete reduction of reported catches of steelhead for the remainder of the 1990's through to the present time*"(J.O.Thomas, 2010, p.5). In yet another example, 2010 observer data for chums released in the Area 3 seine fishery was more than double the reported catch (J.O.Thomas, 2010, p.6).

The problem of misreporting or underreporting is not a recent one, or confined to northern fisheries. Discrepancies between observed catches and the catch reported by fishermen ranged up to 51% for non-target species in southern fisheries (*Bijterveld et al "Comparison of Catch Reporting Systems for Commercial Salmon Fisheries in British Columbia", Canadian manuscript Report of Fisheries and Aquatic Sciences 2626, 2002*). Velez-Espino et al. (2010) also detail persistent underreporting of bycatch in BC troll fisheries: "*Statistical analyses of data reported by observer and logbook programs in West Coast Vancouver Island (WCVI) troll fishery for the period 1998-2008 demonstrated that there is a consistent underreporting of released Chinook in retention periods in logbooks when trollers are allowed to keep only legal size fish.*"

DFO has also published Observer Reports from 1998 to 2003 on its website: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/fisheries-peches/stats-donnees-eng.htm. Failure to closely scrutinize available observer data and summary reports is a major shortcoming in the PCDR.

The difference between the expanded observer data and the expanded fishermen's logbook data for the species subject to non-retention, non-possession conditions in Area B (southern seine) fisheries is as follows:

Species	1998	2000	2001	2002	2003	Average
Coho	-20%	-18%	-38%	-47%	-20%	-29%
Chinook	-52%	-37%	-50%	-45%	-58%	-48%
Steelhead	-50%	-22%	-35%	-10%	-40%	-31%

But the problem of under reporting or misreporting bycatch is not limited to salmon fisheries or to BC. In the 1990's DFO was unable to obtain accurate bycatch information from groundfish and halibut fishermen. In each of these fisheries, fishermen knew that the accurate reporting of bycatch and bycatch mortality would likely limit their access to the target species. There was little upside and an enormous downside to accurate reporting. Hence, there was rampant misreporting of bycatch and discards in both fisheries. DFO responded with a three-step approach: logbooks, 100% at-sea monitoring and dockside validation (Grafton et al, 2005).

AREA 3 SEINES 2010 OBSERVER MONITORING SUMMARY

Activity Summary

Date	FOS Effort	Ves Part	Obs Days	Sets Obs	Sets/ Day	Sets Monitored Est.
Jul-12	9	9	4	33	11	33.3%
Jul-13	9	7	4	27	11	27.3%
Total	18	16	8	60	11	30.3%

Sockeye_Kept

Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	12.58	414	1245	655
Jul-13	10.56	285	1045	379
Total	11.67	699	2290	1034

Chum_Rel

Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	40.67	1342	4026	2631
Jul-13	53.81	1453	5328	1944
Total	46.58	2795	9354	4575

Coho Rel

Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	0.94	31	93	71
Jul-13	0.93	25	92	63
Total	0.93	56	185	134

Chinook Rel

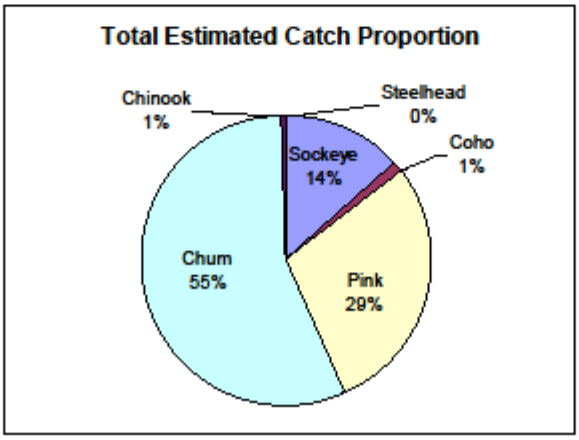
Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	0.58	19	57	13
Jul-13	0.37	10	37	10
Total	0.48	29	94	23

Pink_Kept

Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	24.58	811	2433	2216
Jul-13	23.56	636	2332	1633
Total	24.12	1447	4765	3849

Steelhead_Rel

Date	Set Avg	Ttl Catc Obs	Est. Catch	FOS Catch
Jul-12	0.12	4	12	0
Jul-13	0.04	1	4	0
Total	0.08	5	16	0



(DFO, Area 3 Seine Observer Summary, 2010)

Poor compliance with Conditions of License and insufficient monitoring

The other serious problem in addressing bycatch and discard issues in BC's pink salmon fisheries is compliance with DFO's Conditions of License. Compliance with bycatch reduction measures is a recognized problem in all north coast fisheries. The J.O.Thomas report mentioned above records concerns about compliance with revival boxes by gillnets. DFO has officially reprimanded the fleet several times for non-compliance and has threatened to close fisheries. DFO enforcement has expressed concerns about "release techniques of prohibited species" (pers. comm. Dennis Burnip, Conservation and Protection, DFO, 2009). Seine fishermen in public meetings have often complained about their colleagues "ramping" and the absence of enforcement. DFO's Conservation and Protection Branch has said in post-season reports that it does not have the capacity to monitor and enforce selectivity rules in north coast fisheries. They have also said that compliance with selective measures is at times very poor (2007, 2008, and 2009 North Coast Post Season Reports).

But even when fishermen comply with their Conditions of License; they often avoid abiding by the spirit of the Conditions. In seine fisheries, some fishermen have responded to the Condition of License requiring all sets to be brailed by employing very large brailers. The reason ramping up over the stern of the seine vessel was outlawed, and seines forced to brail their catch aboard, was so fish could be brought aboard alive in limited quantities, quickly sorted, and the bycatch species released back into the water with the "least possible harm" (DFO – Conditions of License). The use of very large brailers (allowing fishermen to get their catch aboard faster and therefore return to fishing sooner) has a similar impact as ramping the fish over the stern.

The other way fishermen have adapted to the Conditions of License is to allow the bycatch species to remain on deck until the fish have stopped moving. They are then returned to the water. The reason for this is that it is difficult and time consuming to release very active large bycatch species such as steelhead and chum salmon. It is much easier to sort them from the target pink or sockeye, push the target species down the hold, and deal with the bycatch while travelling to, or waiting for, the next set. DFO Managers and Charter Patrolmen have also related many stories of bycatch species being flung overboard by the tail (which will kill a salmon by dislocating its vertebrae), or even kicking them overboard. (The SkeenaWild Conservation Trust is prepared to produce evidence and affidavits to the above. We would encourage the Assessment Team to discuss these issues in private with Area Managers, Conservation and Protection people, fisheries observers and charter patrolmen). None of the above is a

unique response by fishermen in BC salmon fisheries (Vestergaard, 1996; Branch, Hilborn, et al, 2006, FAO, 1996; Grafton etal, 2006).

These responses by fishermen are rational as there are few disincentives to comply with the Conditions of License in terms of effective monitoring, enforcement or financial risk (fines are often relatively low and infrequent, and considered a cost of doing business) when compared to the significant incentives not to comply as reduced compliance leads to increased catch of the target species in a open access fishery. Again, these responses are not unique to BC net fishermen. (Pascoe, S. Bycatch management and the economics of discarding, *1997*; *Gjertson et al*, Incentives to Address Bycatch Issues, *2010*). A study of the discrepancy between observer and logbook data in Velez-Espino, 2010 states that, "underreporting of encounters and releases of non-target and sublegal fish is consistent with fisher awareness of the implications non-target-and sublegal mortality on their total allowable catches and possibly on the public opinion"

Indefensible estimates of chum bycatch mortality

Scientifically defensible estimates of chum catch and release mortality are not available. DFO must estimate that they are very high as they have allowed seines to retain depressed chum when DFO Managers and charter patrolmen felt the chums would be dead upon release in any event (DFO Post season report, 2005). It is evident from observations, anecdotal reports, DFO Conservation and Protection reports and the J.O. Thomas paper that chum survival upon release may be very low. In DFO's CSAS Working Paper 2010/059, DFO concedes that they have no independent measure of chum survival but use a 50% mortality rate "as a placeholder". There are few studies describing a relationship between salmon that escape or are released and subsequent spawning success. The most recent study (Baker and Schindler, 2009) conservatively suggests that 50% of the sockeye salmon that inadvertently escape from gillnets (as opposed to being caught and released as mandated in many BC fisheries) do not successfully spawn due to injuries. Underwood et al, 2004 describe how chum salmon suffer significant mortality rates after being released from fish wheels and that evidence of mortality increases from the point of capture. The few studies that are available would suggest that DFO's assumption of a 50% mortality rate is overly optimistic.

The evidence on chum bycatch and discards in commercial net pink fisheries on the north coast is that:

1) DFO has defined Area 3, 4,5 and 6 chums as being of "special conservation concern".

2) Chum bycatch and discards in Areas 3 and 6 can be a significant proportion of the chums returning to these areas
3) Data on the number of chums caught and released in north coast fisheries is based on fishermen phone-in reports and logbook records. This information is not independently verified. There are no consistent independent at-sea observer reports that could supply independent reports on catch, compliance or mortality. The only dockside validation programs are for Area 4 sockeye quota fisheries. And there is evidence from both the salmon fishery and other BC fisheries that information from fishermen's phone-in reports and logbook records is suspect. In fact, there is an incentive not to accurately report regulatory discards, and very little disincentive to report discards accurately.
4) It is recognized by DFO managers, DFO's Conservation and Protection staff, independent observers, and fishermen themselves that compliance with selective fishing requirements can be low and often inconsistent.
5) There is no independent measure of post-release mortality on chums. However, reports by DFO would indicate that it is very high in intensive seine fisheries and gillnet fisheries

Summary

The high incidence of unmonitored bycatch and discarding in BC's salmon fisheries is inconsistent with best practices as described by FAO (FAO, 1997; *Best Practices for Fisheries Management, Baltic Sea 2020,* 2009*).* These are not insolvable issues as managers both in BC and around the world have found that they "*can be mitigated with the appropriate mix of incentives, monitoring and enforcement*". (Grafton et al, 2005). The problem is that DFO's salmon managers have been unwilling to directly deal with bycatch and discard accounting, compliance, and enforcement. And the PCDR, as currently written, would allow DFO to maintain their current management practices.

MSC Certification, as it stands, would not lead to BC salmon fisheries adopting global best practices for catch and discard reporting, reducing bycatch and discards, rebuilding stocks of concern caught or discarded as bycatch, and decreasing the mortality of stocks of conservation concern discarded during commercial fishing operations.

Analysis of the Public Draft Comment Report

This section deals only with those PIs where the authors of this paper determined that the Assessment Team had issued an incorrect score that made a material difference to the outcome of the certification, either by causing it to pass where failure was warranted (60 Scoring Guideposts), or by prescribing inadequate conditions (80 Scoring Guideposts).

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.

SG 60.2: There is a scientific basis for the indicator stocks used in the management of the fishery.
PARTIAL PASS

SG 80.1: 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.
PARTIAL PASS

Rationale

SG 60.2 NC/CC and ISC:

- Despite references to indicator stocks, index stocks, and target stocks, (i.e., English et al. 2006; NC/CC CUP and ISC CUP) there are no definitions for distinguishing between or defining these stocks. Further, identification of indicator and index streams are not provided within the cited references. Many stocks identified in the references represent higher productivity target stocks that have been the primary focus of DFO management as identified in Price et al (2008, *Can. J. Fish. Aquat. Sci. 65*: 2712-2718). Other than Areas 7-10, indicator runs or key streams are not identified in public documents.

SG 60.2 ISC:

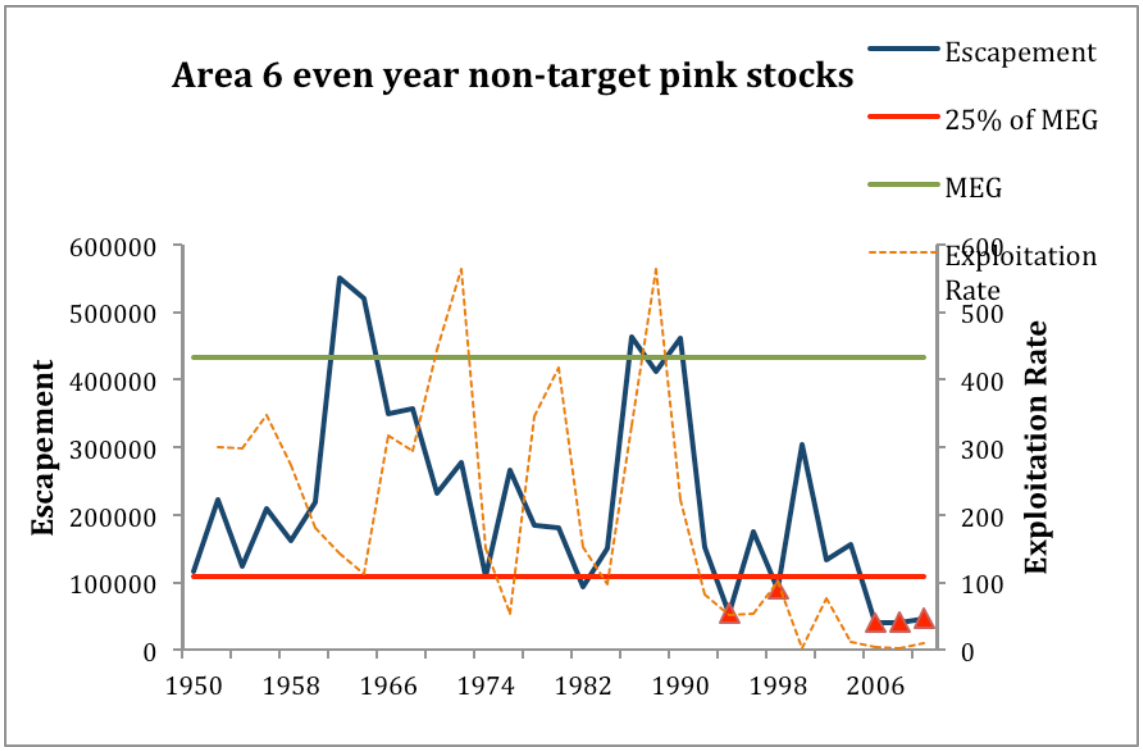
- The selection of indicator /index streams for Mid Vancouver Island in Area 14 are all enhanced except the Qualicum. One wild run is not an adequate as an indicator of the region's stock status.

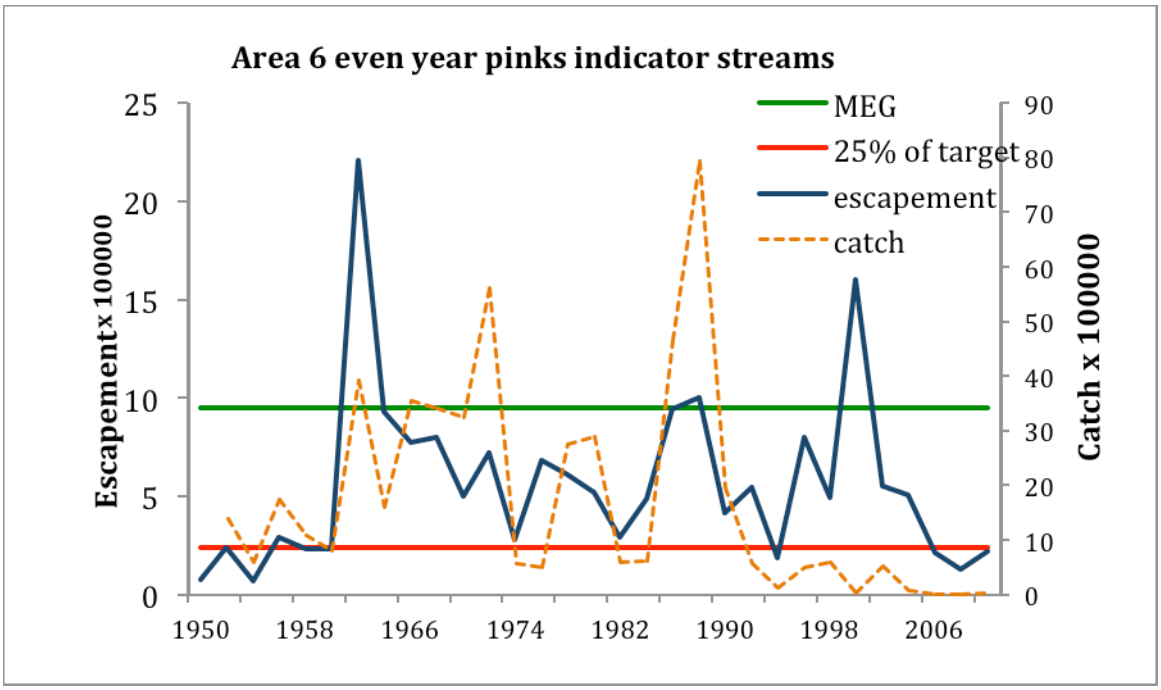
- Pinks in areas 15 and 16 lack sufficient indicator streams and monitoring. There are only 2 even year runs that have been counted more than 50% of the time in the last 5 years.

SG 80.1:

- Price et al (2008) showed that biases in stream selection caused by budget and staff cuts resulted in monitoring preferences for larger, healthier runs while smaller, depressed runs were dropped from enumeration. The consequence is an increasingly biased view of population health that can lead to harvest management that risks extirpation of small runs.

  This point is somewhat illustrated in the differences in status between Indicator and non-target streams in Area 6 (see figures below). The status of smaller non-target streams fall below the LRP more often than the indicator streams.





1.1.2.1 – Estimates exist of the removals for each stock unit

SG 60.1: Catch estimates for the majority of target stocks are available.
ISC FAIL

SG 60.2: Catch estimates are available for non-target stocks where the catch of the non-target stocks may represent a significant component of that stock.
FAIL

SG 80.2: 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.
FAIL

SG 60.3: Mechanisms exist to ensure accurate catch reporting and these mechanisms are evaluated at least once every 10 years.
FAIL

Rationale

There are no scientifically verifiable catch estimates for non-target stocks where the catch of the non-target stock may represent a significant component of the harvest of that stock. Evidence provided by DFO in Post-Season Summaries of Catch and

Escapement shows that the bycatch and discards of chum stocks in Areas 3 and 6 often exceed the escapement of these same stocks to the same area. The bycatch and discarding of chums constitutes a significant proportion of the total chum stock in northern areas. In 2009, the estimated Area 3 chum catch was 72,679 of which 26,252 were released compared to a final chum escapement of 20,615 (pers. comm. Dave Einarson, DFO Area Manager). In Area 6 the total catch was 72,788 compared to a total chum escapement of 40,515 (2009 DFO Post-season report).

It is important note that there is a significant discrepancy in the 2009 Area 6 discard data. The bycatch of chum hailed in to charter patrolmen was 71, 693, compared to the 61,713 fishermen phoned in or reported in their logbooks. A similar discrepancy exists for coho (see tables below) Both of these sets of data were not independently verified as there were no observers present. It is therefore impossible to know if either of them provides a reasonable estimate of chum bycatch and discards in Area 6.

Hailed Reports		
	Area 3	**Area 6**
Coho kept	Not Provided	15,914
Coho Released		65,175
Chum Kept		350
Chum Released		71,693

Phone-in Reports		
	Area 3	**Area 6**
Coho Kept	Not Provided	11,521
Coho Released		47,223
Chum Kept		350
Chum Released		61,713

Similar data should be available for previous seasons (e.g. 2007) through direct request to Dave Einarson, and the AT would be remiss in failing to request these data.

JOT and DFO reports show that the catch estimates collected by DFO through hails, logbooks, and fishermen phone-ins may not accurately reflect the level of bycatch and discards in fisheries. It is also incorrect to assume that all commercial harvesters hail-in their catches after the fishery closes as per their condition of License. Failure to hail-in catches is an ongoing enforcement problem in BC's commercial salmon fisheries.

Page 13 of this document describes the discrepancy between the bycatch calculated from observer data in an experimental program in Area 3 compared to what was reported by fishermen. Fishermen reported less than half the chum discards than what

the observers estimated to have been caught. Fishermen reported 0 steelhead caught compared to the 16 estimated to have been discarded from observer reports.

The contention in the Client's submission that commercial hail-in data are occasionally verified is, at best, misleading. There has been no consistent, scientifically defensible, independent measure of non-target bycatch, discard, and compliance for most open access commercial net fisheries in the north coast. There was, at one time, dock-side monitoring of north coast open access fisheries. But this has been discontinued. Enforcement is limited due to capacity constraints. There are no consistent observer programs that meet international standards and compliance patrols are limited due to lack of resources. A reading of DFO's North Coast Post-Season reviews over the past few years does not describe any scientifically defensible, consistent, fishery independent monitoring that would lead one to conclude that the inaccuracy of catch and discard data concerns identified in the J.O.Thomas and DFO reports is not continuing.

Furthermore, the AT's acceptance of the status quo means that the issues are unlikely to be addressed and that MSC would be certifying a fishery that does not meet international standards for the monitoring, control, and surveillance (MCS) of bycatch and discards (FAO, 2000).

It is unclear what the PCDR means when it says regulatory discards are "occasionally" verified. It is not clear what value this would be, even if it were true. But, the fact is, contrary to what is reported in the PCDR, there is no ongoing on-grounds verification program. Nor is there any current dockside validation of open access fisheries. The AT's acceptance of the Client's submission on this point would mean that MSC would be certifying a fishery that does not meet global best practices, or even for that matter, practices embraced by other BC fisheries such as groundfish and halibut.

The PCDR also points to CUP 4 as evidence that there are accurate catch estimates for bycatch and discards. Unfortunately, CUP 4.2.3.1 makes four key misstatements:

Daily inspections by enforcement patrol staff surveying harvest information and monitoring compliance to all fishery restrictions and management guidelines (e.g. use of revival boxes when mandatory). This data is recorded in the fishery managers Record of Management Strategies (RMS).

Post season reports produced by DFO Enforcement Staff make it clear that this is not done, nor do they have the resources should they want to (North Coast Post- season: 2007, 2008, 2009, 2010). For example, DFO Conservation and Protection staff state

that they have only checked between 3.0% and 7% of the total commercial effort between 2006 -2009, and much of this was directed at the commercial sockeye fishery. (DFO Post-Season Reports 2007- 2009).

Commercial hail-in data are verified occasionally by on-water inspections of catch by Fishery Officers, dock-side monitoring and auditing of sales slip data. Nearly all commercial harvesters submit catch information to DFO.

There is no evidence that there is a useful amount of on-water inspections by Fishery Officers: they spend relatively little time in the field during commercial fishing openings.

Catch monitoring programs also track by-catch and monitor compliance with conservation restrictions to assess impacts of fishing on non-target species for use in determining conservation measures on stocks of concern. For example, post–season estimates of steelhead by-catch are derived from in-season monitoring by charter patrol boats, weekly call-in by individual harvesters, log book data, and sale slip data.

Evidence has already been provided that most fishery dependent data is not independently verified. And there is no evidence that there is a systematic on grounds program to monitor compliance. Furthermore, J.O.Thomas 2010 shows that DFO is not able to produce scientifically defensible estimates of steelhead discards.

Comparisons between logbook and expanded observer estimates for south coast salmon fisheries from 1998-2003 are available at the following DFO website: http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/fisheries-peches/stats-donnees-eng.htm. These reports show clear and consistent discrepancies between observed, logbook, and managers data. Specifically, they show consistent underreporting of bycatch species.

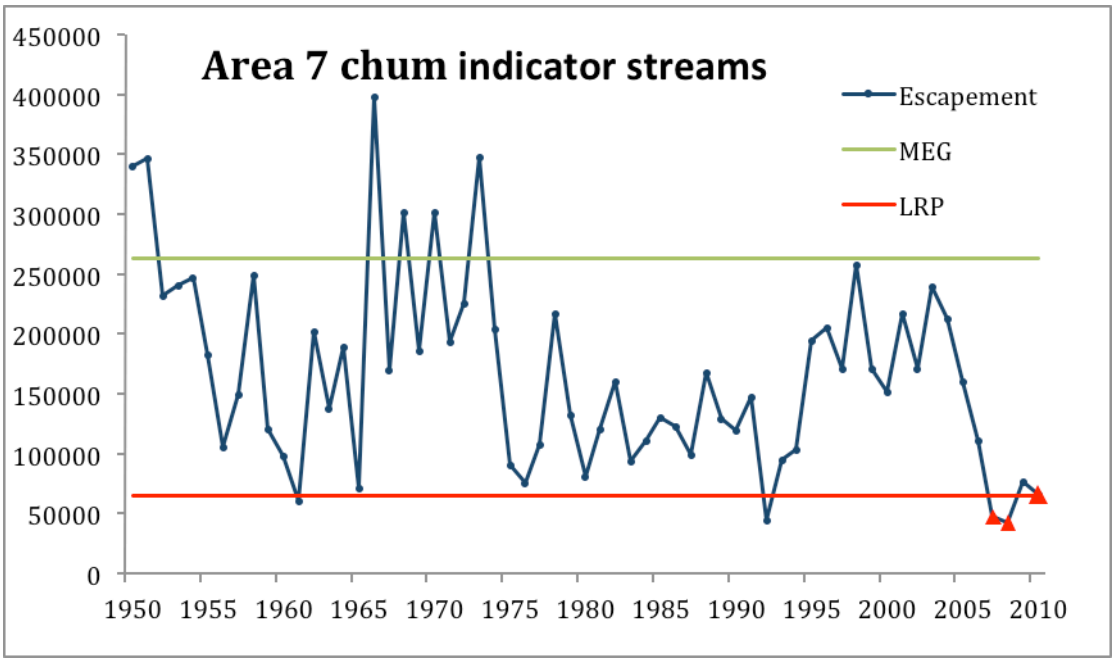
An analysis of the variances between logbook and observer data in the south coast troll fishery that is available for the years 1998-2008 shows that logbook data consistently underreports discards. It concludes that, “an independent source of catch and release data such as the one provided by the observer program seems to be irreplaceable to monitor fishing dynamics and potential changes in reporting biases” (Velez-Espino, 2010).

DFO is developing a Draft Strategic Framework for Catch Monitoring and Catch Reporting. Currently, it is nothing more than a plan for future discussions with stakeholders. It does not provide any certainty that DFO intends to meet international best practices for monitoring and compliance within the proposed certification term.

FAO has stated (Proceedings from International Conference on Integrated Fisheries Monitoring, 1999 http://www.fao.org/docrep/x3900e/x3900e00.htm#topofpage) that collecting data directly from fishermen is only feasible when:

1. *Data collection is within the competence of the fishers;*
2. *The activity is accepted as a priority component of operational procedures;*
3. *There is no incentive to cheat or falsify records, and*
4. *Where the data are validated.*

Further to the above rationale for failure of this PI, SG 60.2 is not met for ISC because there is very limited data on catch impacts to target stocks of odd year pinks returning to areas 11-14. SG 60.2 is also not met for NC/CC because catch estimates of non-target central coast chum stocks caught in Area 3 mixed stock fishery are not available (Nass chum CSAS 2010). There are significant conservation concerns for chum stocks returning to the central coast (DFO Stocks of concern, 2010) and as evidenced by the



status of indicator streams which have been falling below their LRP.

Figure:Area 7 non-target chum stocks. There are conservation concerns for chum stocks returning to the central coast (DFO Stocks of concern, 2010) and as evidenced by the status of indicator streams, which have been below the LRP in 3 of the recent 5 years.

In addition the above rationale, SG 80.2 is not met for ISC pinks because there are inadequate data on catch impacts of odd year pinks to Areas 11-14 and inadequate

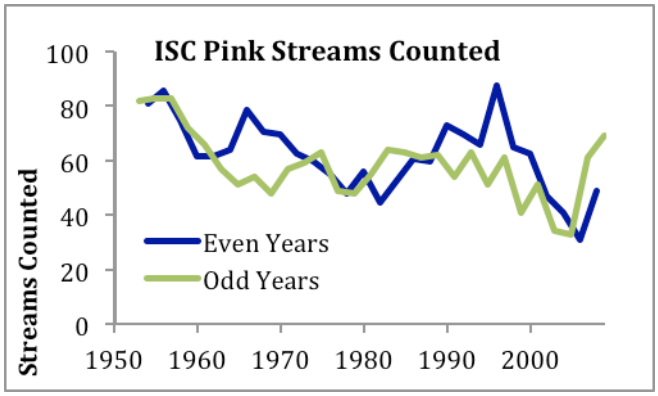
catch estimates for non-target stocks of mainland pinks caught in the Johnstone Straight fishery targeting Fraser pinks.

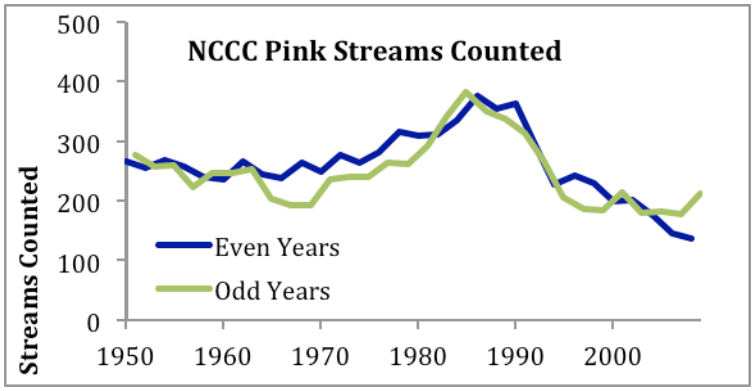
1.1.2.2 – Estimates exist of the spawning escapement for each stock unit.

SG 60.2: Escapement estimates for target stocks are available, where escapement estimates are necessary to protect the target stock from overexploitation.
PARTIAL PASS at best

Rationale

Escapement estimates and the salmon enumeration program have been severely eroded over the last two decades (figures below). While this was acknowledged in the CDR, the loss of information on salmon escapement from important target and non-target streams has meant a reduced ability to accurately and precisely assess trends and provide the quality of data needed to conserve salmon populations under heavy fishing pressure.





Figures above show trends in enumeration of pink streams in Areas 11-16 on the Inner South Coast and Areas 3-10 on the Central/North Coast. Recent increased enumeration in the ISC has been focused heavily on the Broughton (Area 12) in response to concern over sea lice impacts from salmon farms.

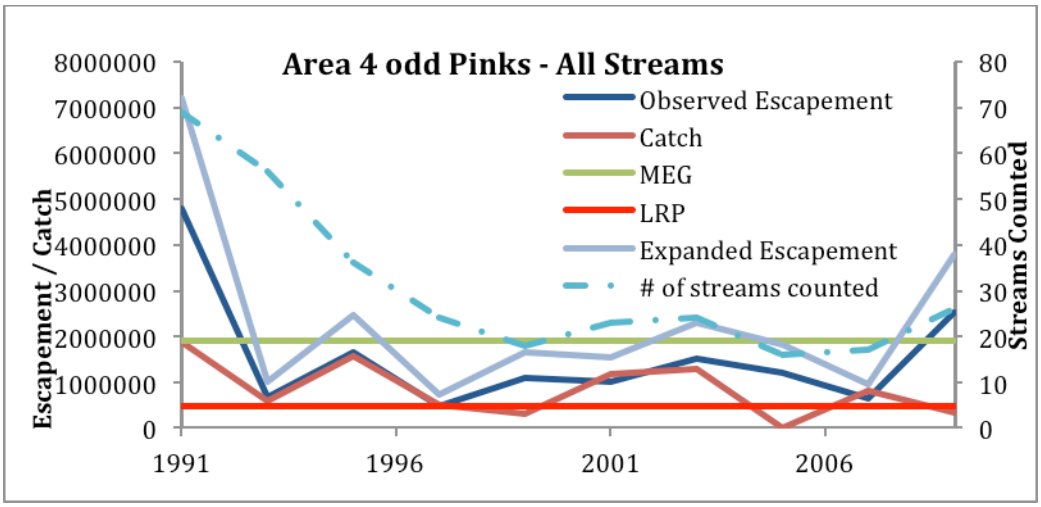
Recommendations to DFO were made by English et al. (2006) who identify a minimum of 152 pink index stream (even year) and 128 (odd year) to be enumerated annually on the North and Central Coast. Currently DFO is monitoring a little more than half of these streams, (optimistically 52% even years, 66% odd). The recommended increase would provide enumeration for 28% of the 766 odd year pink runs and 18% of the even year pink runs on the NC/CC.

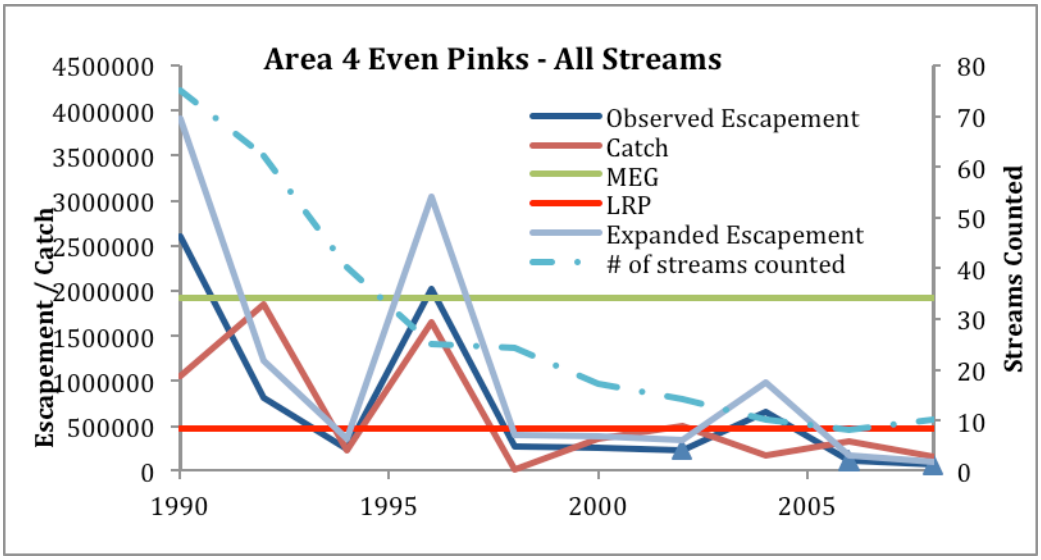
A comparison with the existing level of monitoring in Areas 11-16 on the ISC shows a lower percentage of streams monitored on the south coast.

- 60.1: As indicated by Condition 1-2, escapement estimates are not adequate for the ISC. Applying the same scale of improvement to monitoring as recommended for the NC/CC, monitoring of 17 (unenhanced) even-year streams would need to be increased to 56, and 15 (unenhanced) odd-year streams would have to be increased to 47. Given the spotty catch and escapement information, the critical status of some ISC stocks and the intense anthropogenic pressures in this region, this should be a considered the minimum

- 60.1: Escapement estimates for even-year target stocks of Skeena bound pinks caught in the Area 4 fishery have experienced severe declines and show significant gaps in the monitoring, especially when applied to the Middle Upper Skeena, Lower Skeena and Skeena Estuary Pink Conservation Units. Enumeration has declined to only 10 even-year pink streams in the Skeena drainage. At the same time, stock status of even-year pinks is now below their limit reference point in more than 3 of the last 5 years (Figure 3).

The following figures show trends in monitoring and status of Skeena even and odd year pinks. Even-year monitoring has declined drastically in 20 years from 75 in 1990 to 10 in 2008 with a low of 8 in 2006. Odd-year declined from 69 in 1991 to 26 in 2009 with a low of 16 counted in 2005. Substantial increases to monitoring and stock health need to occur if fisheries harvests are to be continued.


Area 4 odd Pinks - All Streams
Observed Escapement
Catch
MEG
LRP
Expanded Escapement
# of streams counted
Escapement / Catch
Streams Counted
8000000
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
80
70
60
50
40
30
20
10
0
1991
1996
2001
2006


Area 4 Even Pinks - All Streams
Observed Escapement
Catch
MEG
LRP
Expanded Escapement
# of streams counted
Escapement / Catch
Streams Counted
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
80
70
60
50
40
30
20
10
0
1990
1995
2000
2005

The following table is based on English et al. (2006). For ISC runs, the recommended to be counted annually was extrapolated from the NCCC recommendations since no such data exists for the ISC areas.

	NC/CC EVEN	NC/CC ODD	ISC EVEN	ISC ODD
Total Systems	766 NC /CC		282 ISC	
Maximum Streams Counted	377 (1986)	384 (1985)	88 (1996)	83 (1957)
Minimum Streams Counted	137 (2008)	177 (2007)	31 (2006)	33 (2006)
Recommended no of inidcators[1]	152	128	56	47
Counted annually over the last 5 Cycles (excluding enhanced runs)	80	85	17	15
Current level of monitoring compared to goal	**53 %**	**66%**	**30%**	**32%**

The authors of this paper agree with the AT that for Fraser pinks SG 80.3 is partially met, at most, because reliable estimates of escapement are not available.

In the case of Fraser River pink salmon, escapement has not been directly and accurately estimated since 2001. Currently, the only estimate of escapement is based on an indirect approach using the purse seine test fishery. Abundance is estimated based on the relationship between CPUE in the test fishery and historical estimates of escapement. Escapement is estimated by subtracting the catch from the total abundance. Unfortunately, because catchability and diversion rates through Juan de Fuca/Johnstone straight are confounded and have changed over the years, these estimates are biased and inaccurate (Cave and Michelson, 2010, *A blueprint for in-season estimation using test fishery data with a Bayesian cumulative normal model.* Paper presented at the 24th Northeast Pacific Pink & Chum Salmon Workshop, Nanaimo, BC, March 3, 2010). Also, estimates do not account for any en route mortality, as the “management adjustment” does for sockeye salmon, or for non-retention mortality by fisheries. Therefore, there are no reliable estimates of escapement for the Fraser aggregate, and no estimates at all for smaller stock units (e.g. run-timing aggregates, geographical groupings, etc).

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.

SG 80.2: 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.
FAIL

SG 80.3: The harvest limitations for target stocks take into consideration the impacts on non-target stocks and the uncertainty of the productivity for these stocks.
FAIL

Rationale

As shown for PI 1.1.2.1, DFO does not have accurate catch data on regulatory discards. There is little in the way of independent verification of bycatch and discards in catch and release fisheries. Furthermore, DFO and the Client seem to assume, for convenience, that most discards survive to spawn, therefore deflating the actual harvest rate impacts on the non-target stocks.

It is not clear what the post-release mortality rate for chums is, but the literature suggests that it may be relatively high. DFO clearly agrees because they allowed seines to retain chums in Area 6 in 2005 because the survival rate of the discarded chums in the intense pink fisheries at the time was so low (Fishery Notice FN0549). DFO has also expressed concerns in their Fishery Notices to industry about the lack of compliance in both data reporting and the selective fishing provisions of harvester's Conditions of License.

It is difficult to understand how "there is adequate information to estimate the relative productivity of non-target stocks" when

- There is no scientifically defensible estimate of bycatch and discards
- Compliance with selective fishing rules has been shown to be poor
- There is no scientifically defensible estimate of post-release mortality or spawning success of released fish

Harvest limitations for target pink stocks are not the first strategy DFO uses when it "*take[s] into consideration the impacts on non-target stocks and the uncertainty of the productivity of these stocks"*. DFO response on the North Coast has not been to limit access to abundant pink stocks, but instead to put in place selective fishing measures through Conditions of License (*Client Submissions: Certification Unit Profile and*

Management Summary for BC Pink and Chum Fisheries). But as has been shown above, there has been no systematic independent effort to access the accuracy of catch or discards, fishermen compliance, or post-release mortality. The most DFO has done is to issue fishery notices urging the fleet to comply with their Conditions of License. (example: Fishery Notice FN 0551). DFO Conservation and Protection (C&P) has raised concerns with Managers as reported in the 2008 and 2009 Post-Season review. For instance, in the 2008 Review C&P states that, "*We encountered several problems with seine vessels ramping their catch, contrary to license conditions. This practice saves them time (doubling their fishing effort) and money, however, it isn't very selective. I attended several industry meetings to address the issue. I have raised concerns with Steve Groves, FM [North Coast Fisheries Management]*"

In the Assessment Team's Scoring Rational they argue that "Where non-target stocks are captured exploitation rates are kept low to reduce impact". There is no indication that this strategy is pursued in North Coast pink salmon fisheries. Unless, that is, the AT is suggesting that catch and release fisheries decrease exploitation rates on the stocks of concern. But this would mean that most discards would have to survive capture. There is no evidence to support this contention. Even DFO says that they have no idea what the post-release mortality is (CSAS, 2010/059). If, on the other hand, DFO is suggesting that the exploitation rates of the target species – pink salmon – are kept low, there is little evidence of this. Abundant pink salmon returns trigger aggressive commercial fishing by seines in Areas 3, 4 and 6 as shown in the table below. And this has not changed as concerns over chum salmon stocks have increased as there has been little appreciable change in pink harvests once chum non-retention was put into place. The following table compares the ratio of the commercial pink catch by gillnet and seine fisheries in Areas 3 – 6 with the total catch and escapement in these areas.

Year	Ratio of Catch to Escapement	Catch Plus Escapement	Chum Catch
1996	1.08	6,552,598	378,038
1997	0.97	2,021,005	167,385
1999	0.79	2,073,036	657,134
2001	1.45	9,862,440	Non-Retention
2003	1.55	11,680,449	Non-Retention
2005	1.86	11,192,981	Non-Retention
2007	2.19	9,091,255	Non-Retention
2009	1.36	14,222,828	Non-Retention

(from DFO's North Coat Post-Season Reviews: 1996, 1997, 1999, 2001, 2003, 3005, 2007, 2009:
(See Appendix 1)

Taking into account the significant (but likely understated) chum discard estimates described earlier, this is not a fishery where exploitation rates are kept low to protect "stocks of special conservation concern".

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

SG 80.1: 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.
FAIL

Rationale

We can find no evidence that this guidepost has been met. The current MEGs focus on pink targets and do not include non-target stocks. Nor is there any assurance or evidence that non-target stocks will be considered in the development of LRPs. While the WSP calls for the LRP to include a "buffer"; it does not address the issue of whether bycatch issues should be considered in setting the buffer.

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.

SG 60.1: In the event of severe depletion, recovery plans are developed and implemented to facilitate the recovery of the depleted stocks within 5 reproductive cycles.
FAIL

SG 60.2: Stocks are allowed to recover to more than 125% of the LRP for abundance before any fisheries are permitted that target these stocks.
FAIL

Rationale

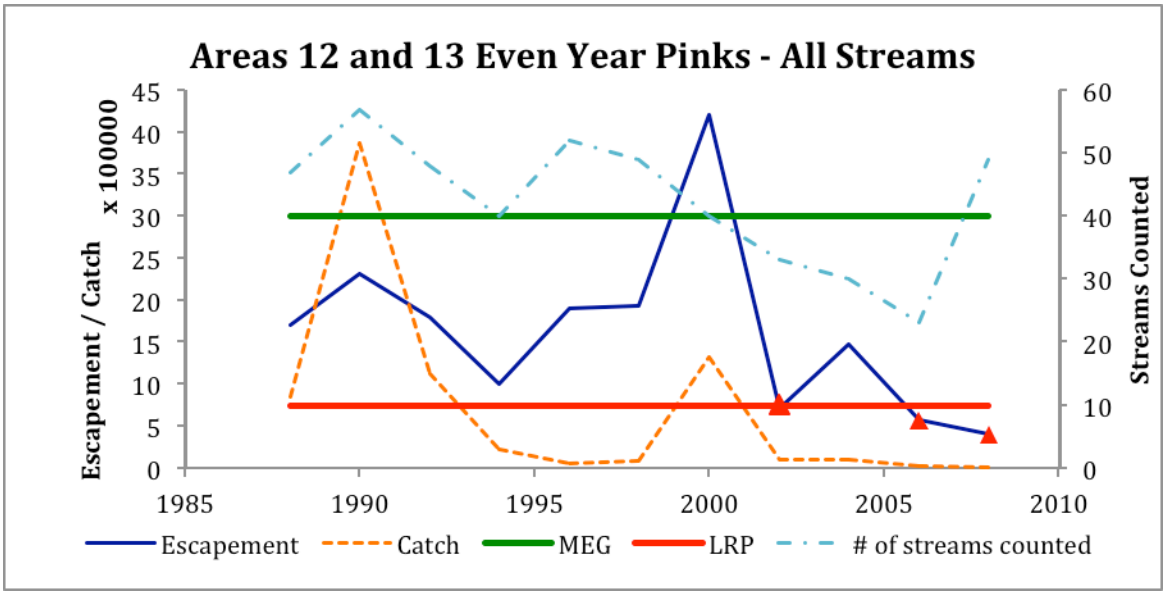
Despite departmental objectives to achieve MEGs, these management targets are consistently not being met. Often, fishing pressure continues until target escapements approach their Limit Reference Points (25% of the MEG). As such, the TRP has become a ceiling and the LRP is the new target to aim for.

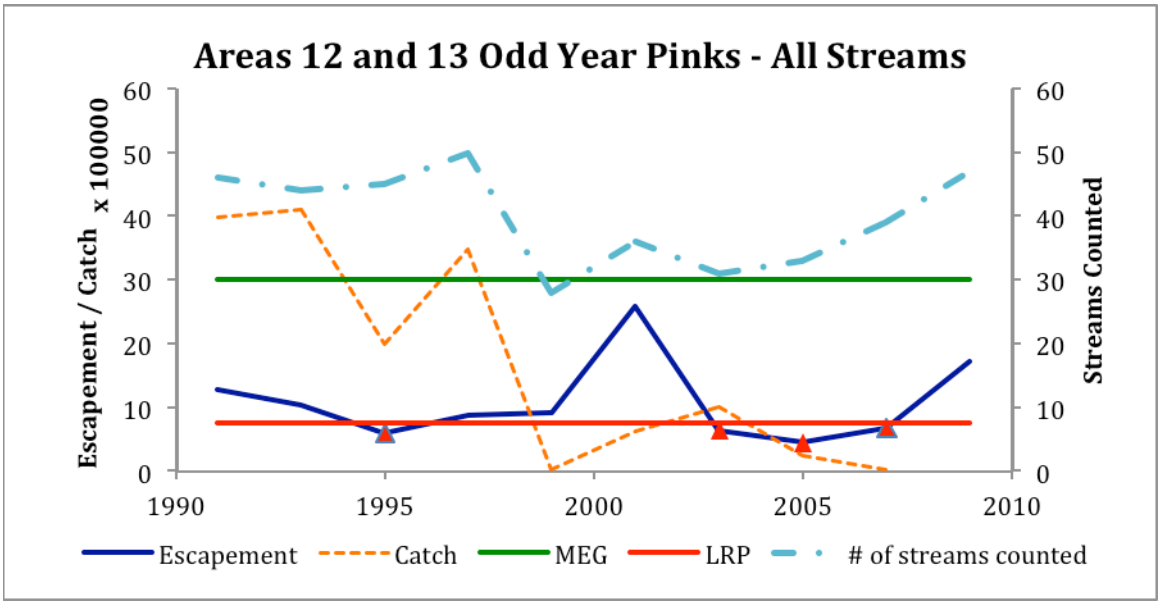
There is growing concern on the north, central and south coasts for declining abundance of even year pink stocks. Several areas impacted by mixed stock fisheries (Areas 4, 6, 7 and 12) have even year pink returns falling below their LRPs. While this has curtailed some terminal fisheries, most of these stocks are still being fished and no recovery plans have been identified. In most cases these stocks are not even formally identified as stocks of concern

Analysis by Price et al. (2008, *Can. J. Fish. Aquat. Sci. 65*: 2712-2718) shows that north and central coast runs that did not meet their MEGs in the previous decade were those most likely to be dropped from further monitoring efforts when budget and other resource constraints were imposed. The consequence is an increasingly biased view of population health.

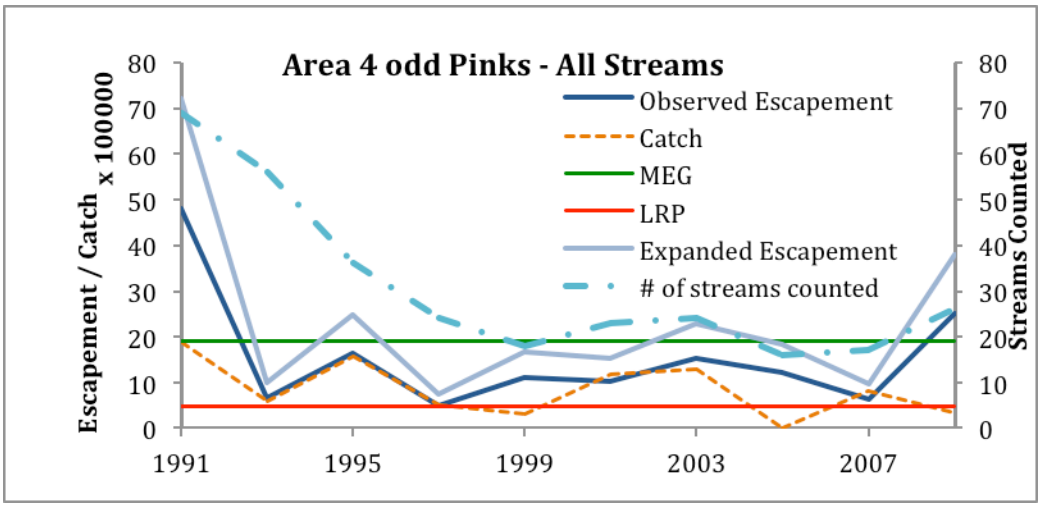
Given the decline in monitoring that has occurred in the last 20 years, and the bias toward dropping streams near their LRP, it is likely we have a much rosier picture of the region's health than is likely the case. This can be likened to a 'shifting baseline' syndrome (Pauly 1995) in the context of enumeration efforts.

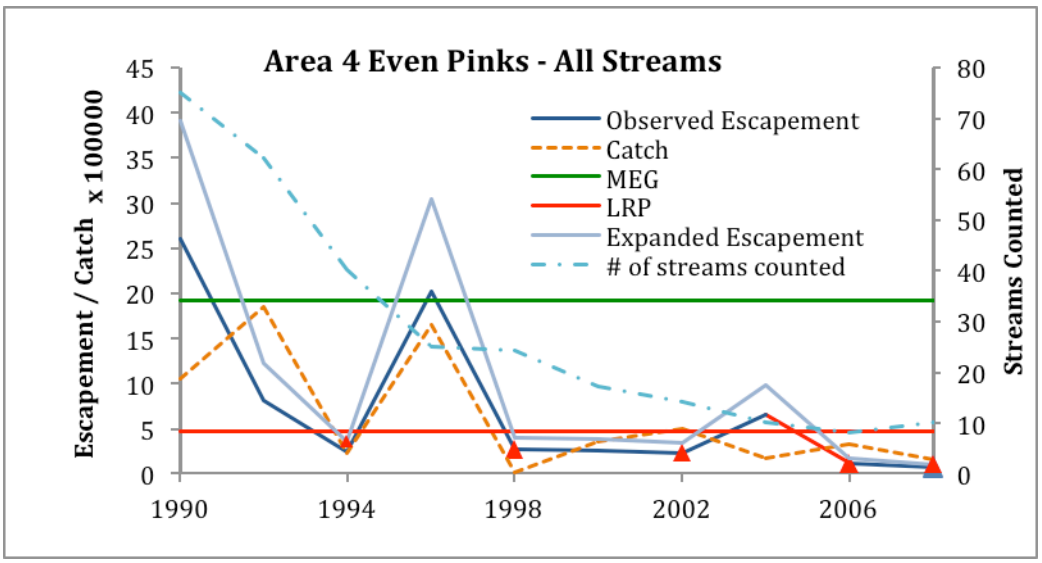
SG 60.3: In the ISC, low abundance and depletion of pink stocks in the Broughton and mainland inlets has curtailed terminal fisheries, however actual recovery plans have not been developed and many stocks are still under pressure from intense high density net pens and mixed stock fisheries.



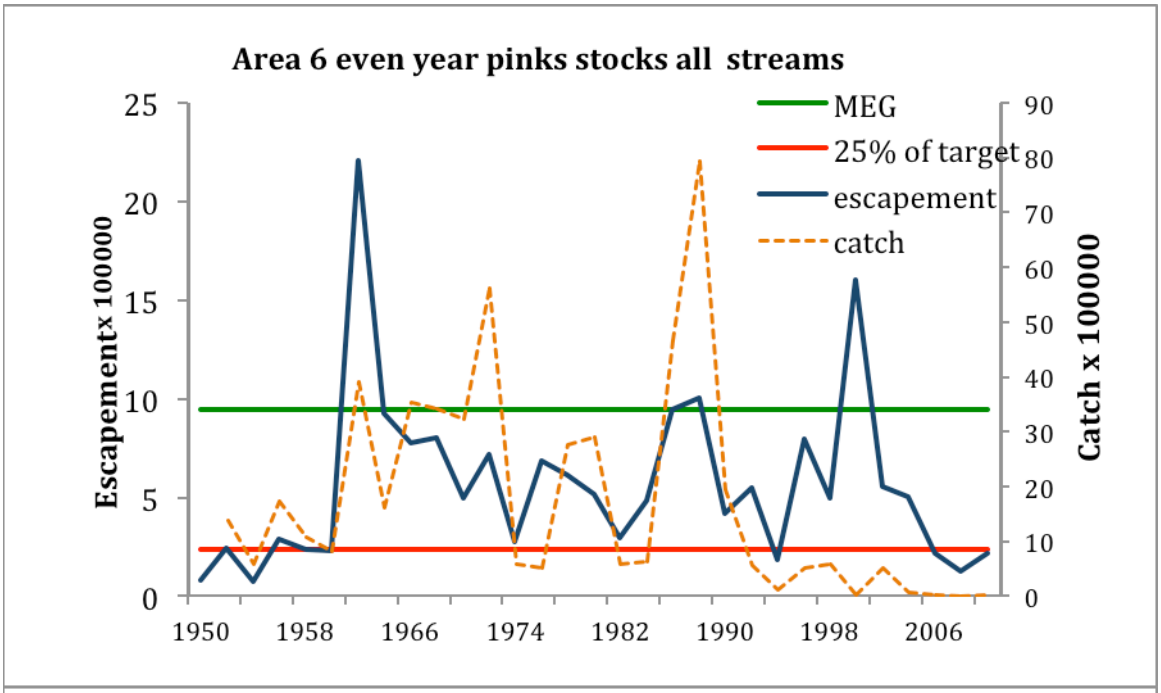


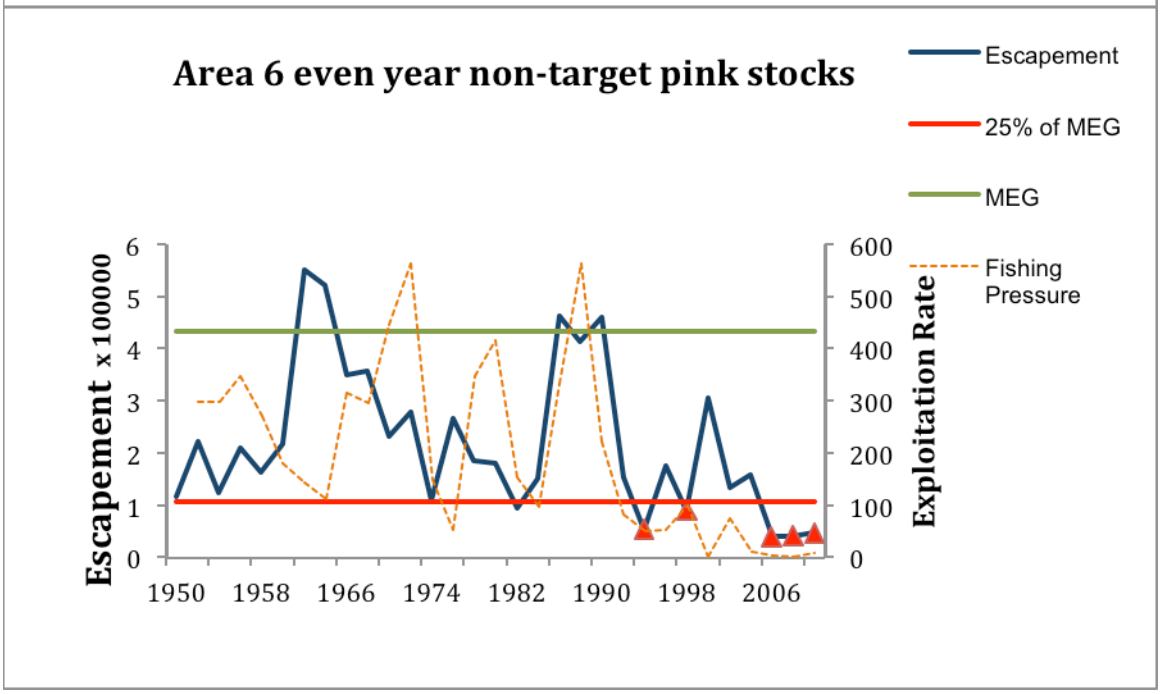
Figures above show odd and even pink stocks in Areas 12 and 13 of the ISC. Both stocks have been below their LRPs in 3 of the last 5 cycles with odd years very depressed back to the mid 1990s. While directed fisheries on these stocks have not occurred since 2001, this does not appear to have assisted in recovery. Boundary modifications to the Johnstone Strait fishery may be inadequate to protect many of the non-indicator runs that return to the Broughton with peak runs timing in September. Additionally, fish farm production in the Broughton has only increased during the time that the 'management plan' has been in place. As such, necessary actions these stocks clearly need for recovery are still pending and measures to this point appear somewhat superficial.





Figures above show trends in status of Skeena even and odd year pinks. Both the raw and the expanded escapement (as per English et al 2006) of even year pink show returns have been below their Limit Reference Point in three of the last five cycles, yet fishery pressure is still occurring. The status of even year returns warrants more stringent harvest restrictions and a management plan that recognizes a conservation concern for even year pinks. Currently this fishery does not pass the 60.1 and 60.2 SG. If poor escapement estimates due to dramatically reduced monitoring are a factor in the over exploitation of weak even year runs, this fishery would fail the 60.1 SG in 1.1.2.2 as well.





The above figures show even year pink status in Area 6. The status of even year pink stocks in Area 6 supports other lines of evidence suggesting broader conservation concern for even year runs. The slightly more depressed state of the less productive, non-target steams have failed to meet the LRP in 5 of the last 9 cycles and would suggest that fishing pressure is a factor.

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.

SG 60.1: Data on bycatch in the majority of the fisheries are available to determine impacts on non-target species.
FAIL

SG 80.2: In known problem areas of high bycatch, there is an ongoing monitoring program.
FAIL

Rationale

There is an extensive description of DFO policy and intentions in the Client's submission, but little of it addresses either the criterion contained in the 60 and 80 guideposts. The 60 guidepost asks for "Data on bycatch in the majority of the fisheries are available to determine impacts on non-target species". It has been demonstrated that there are no independently verifiable data on bycatch and discards, nor has the PCDR provided any research detailing post-release chum mortalities. Therefore, it is difficult to see how the PCDR concludes that the impacts on non-target species have been determined.

The PCDR seems to recognize the problem by passing the 60, but placing a condition on SG 80.1. But it is difficult to determine why the AT has said steelhead, which DFO has said is not a significant conservation concern, warrants special mention in a condition, when chum stocks, which DFO have said are stocks of "special conservation concern", are ignored.

Regarding SG 80.2, there is no ongoing monitoring program in place in open access fisheries other than the unverifiable logbook and phone-in data. Fisheries literature suggests that accurate bycatch and discard data requires fishery independent information (FAO 2010, Branch et al, 2006). And FAO defines Monitoring as:

- ***Monitoring*** the collection, measurement and analysis of fishing activity including, but not limited to: catch, species composition, fishing effort, bycatch, discards, area of operations, etc. This information is primary data that fisheries managers use to arrive at management decisions. If this information is unavailable, inaccurate or incomplete, managers will be handicapped in developing and implementing management measures.

FAO, 2000

The monitoring in place in most B.C. pink fisheries does not meet the above minimum standard.

The AT should provide reasoning for its conclusion SG 80.2 has been met because, "there are extensive monitoring programs and reporting requirements, by log books, for all of the fisheries". This definition of effective monitoring is, according to international standards, insufficient for effective monitoring of a fishery (Sampson, 2002, “Best Practices” for Fisheries Management, 2010).

There is little evidence that DFO employs a monitoring program for pink salmon fisheries that meets FAO's guidelines for Monitoring, Control and Surveillance (MCS) (FAO, 1997; FAO, 2010). The AT does say they reached their conclusion based on the client's submission. We would suggest that the AT verifies that the client's submission is accurate, and that it meets MSC's objectives, and FAO and international standards for best practices for the monitoring of bycatch and discards. Finally, it has been demonstrated already in this submission that the logbook program does not provide a “high confidence” that direct impacts on non-target species have been identified.

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.

SG 80.2: When new problems are identified, the management plans require a new monitoring program be instituted to determine the effectiveness of bycatch reduction measures.
FAIL

Rationale

In 2002 DFO published " *Bijsterveld, L., S. Di Novo, A. Fedorenko, and L. Hop Wo. 2002. Comparison of catch reporting systems for commercial salmon fisheries in British Columbia. Can. Manuscr. Rep. Fish. Aquat. Sci. 2626: 44p*", which describes serious problems with catch reporting and monitoring in BC salmon fisheries and provided a series of recommendations. DFO has not made any significant progress in addressing the problems identified or implementing the recommendations. It is therefore difficult to understand how the AT agreed this criterion has been successfully addressed. As stated previously DFO has produced a *Draft Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries* (http://www.gulftrollers.com/news/IHPC/IPHC%20presentation%20Nov%2025%202010.pdf), but it is

limited to being a plan to discuss the issue with stakeholders. It does not meet the test of the 80 Guidepost.

The AT has determined that a condition is required for steelhead in the area 4 pink fishery because, "there is no evidence of a successful monitoring program and associated bycatch control program." This submission has provided evidence that similar issues exist for stocks that DFO has described as being of "special conservation concern". It is therefore unclear why the AT has singled out steelhead when the same issues apply to other non-target species discarded in commercial pink net fisheries. Clear evidence that bycatch reporting is inaccurate, due primarily to a lack of observer coverage (Bijsterveld et al. 2002), is not adequately reflected in the condition prescribed for this performance indicator.

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.

SG 80.1: Management has some research to evaluate effects of major environmental impacts on natural salmon productivity and capacity, though quantitative estimates not always available.
ISC PARTIAL PASS

SG 80.2: Management has track record for attempting to minimize or mitigate impacts of human caused environmental impacts.
ISC PARTIAL PASS

SG 80.3: Results and conclusions from research are made available to stakeholders and there are on-going efforts to incorporate this information when developing harvest plans and escapement goals, if necessary.
ISC PARTIAL PASS

Rationale

The above 80 SGs are only partially met, particularly for the inner south coast unit of certification, due to DFO's inadequate research and management of pathogen transfer from salmon farms to juvenile pink salmon.

Pathogens are threats to wildlife (Macdonald and Laurenson et al. 2006; Thirgood 2009) and the spread of infectious pathogens frequently occurs when increased contact between infected domestic animals and wildlife is allowed (Dobson and Foufopoulos et

al 2001; Otterstatter et al 2008). As a result, epizootics can deplete wild populations, as shown by the transmission of rabies from domestic dogs to wild carnivores (Power et al 2004; Daszak et al 2000), *Pasteurella* from domestic to wild sheep (Jessup et al. 1991), and *Crithidia bombi* from commercial to wild bumble bees Otterstatter et al (2008). Salmon farming is no different and has resulted in sea lice epizootics which have negative effects on wild pink salmon populations (Krkosek et al. 2007). As aquaculture continues and expands, diseases will continue to emerge and affect wild fish adversely (Murray and Peeler 2005). Recently a new virus was identified in farmed Atlantic salmon in Norway and threatens wild fish (Palacios et al 2010).

Although work has been conducted in BC regarding sea lice epizootics in wild fish as a result of salmon farming, scant other research is available on the multitude of other parasitic and infectious diseases that occur on salmon farms in BC and how they affect pink salmon. It is also unknown and unclear based on the DFO Management Summary (MS) and the Certification Unit Profiles (CUP) whether research or monitoring has been conducted on pinks that pass by the approximately 120 farm sites in BC to assess the risk of disease transfer from farms to pink salmon.

The creation of an additional condition (see conclusions) is recommended.

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)

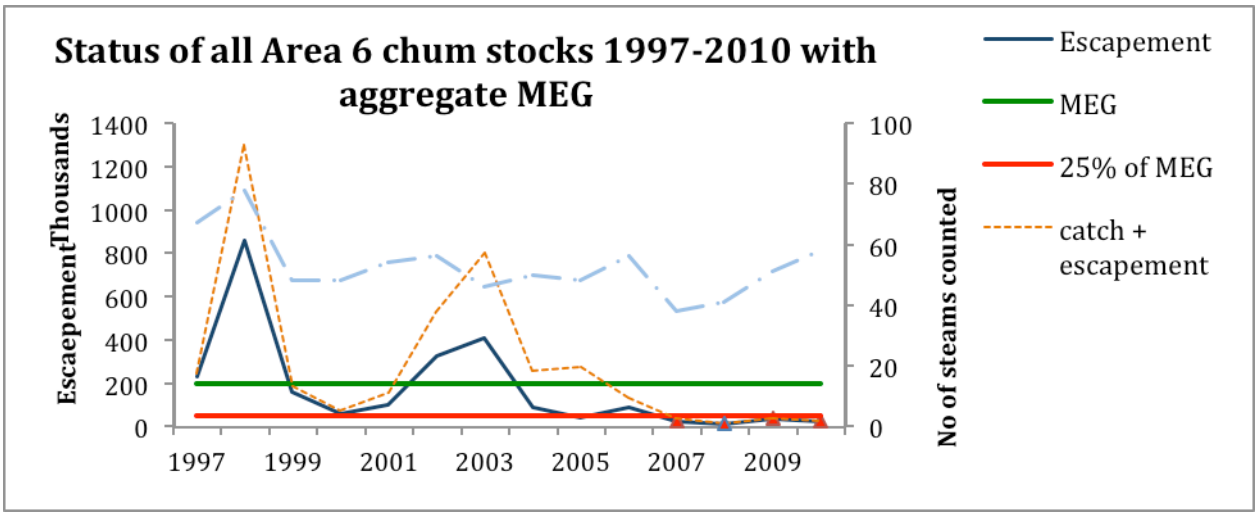
SG 60.1: The management system attempts to prevent extirpation of non-target stocks and does have rebuilding strategies for the majority of the stocks.
FAIL

SG 60.2: 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.
FAIL

Rationale

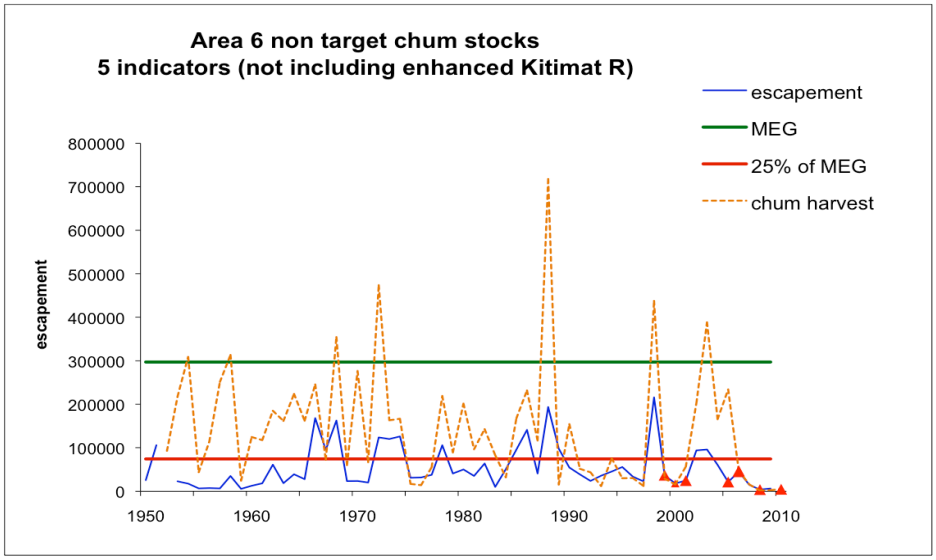
Meeting management escapement goals is directly related to exploitation levels. In 2006, English at el. found that 48% of salmon runs in Areas 3-10 were either highly exploited or of conservation concern. A quick assessment suggests that in 2011 the situation has not improved and has likely gotten worse. Skeena pink CUs, Non Babine sockeye CUs, Area 6 sockeye CU's Area 3 Nass chum CUs, Skeena chum CUs, Douglas Channel chum CU's and likely more, all suggest there are serious conservation concerns for salmon stocks on the North coast impacted by the Area 3, Area 4 and Area 6 pink fisheries.

- 60.3: As stated earlier, the management agency has historically placed its emphasis on fostering production over the conservation of less productive, smaller, and more diverse stocks. Further, despite its stated goals of striving to achieve MEGs, analysis by Darimont et al (2010) shows that over the course of six decades the Department has repeatedly not met its own targets, often pushing stocks below the TRP. As such, managers appear to have come to treat the MEG (a.k.a. TRP) as a ceiling rather than a target and non-target stocks of pink, chum, sockeye and steelhead have all slipped toward their LRP's and beyond. The figure below illustrates the depressed state of these non target stocks

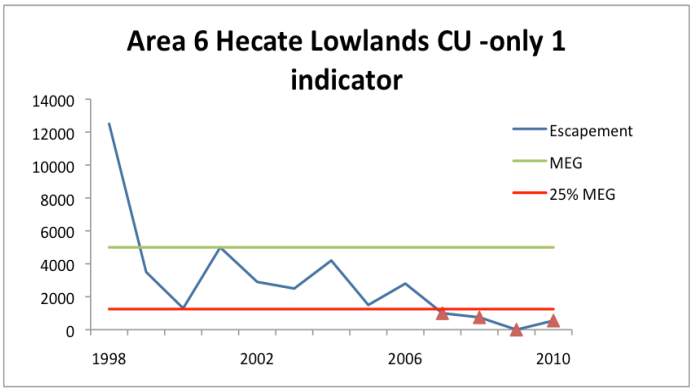


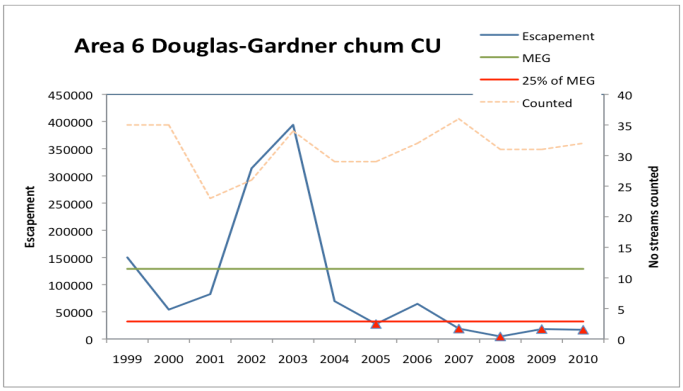
This figure shows the combined status of indicator, index, target and non-target streams over the last 10+ years and suggests that chum status in Area 6 is a serious conservation concern. High exploitation rates on non-target chum stocks did not decline until stocks were falling below their LRPs, demonstrating the fallacy of the MEG system to self regulate and 'assure stocks maintain potential productivity' (Public Draft Report). In 4 out of the last 5 years escapements have been below the LRP (25% of MEG). The MEG shown here is the Area 6 aggregate, which is lower than the sum of individual stream goals.

Note: While declining stock status is not a function of stream enumeration, poor escapement monitoring on the Kitimat River has contributed to and confounded low returns.

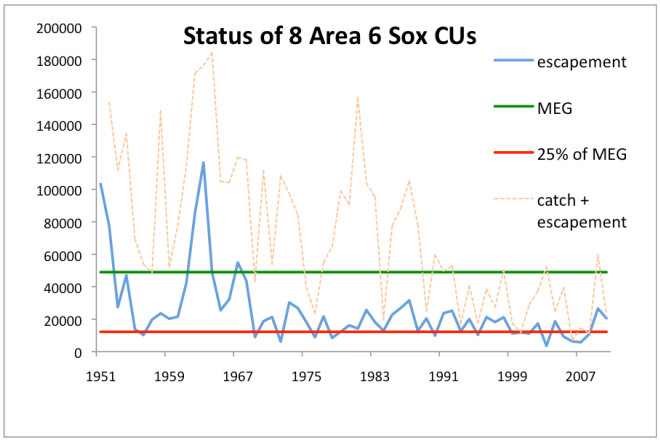


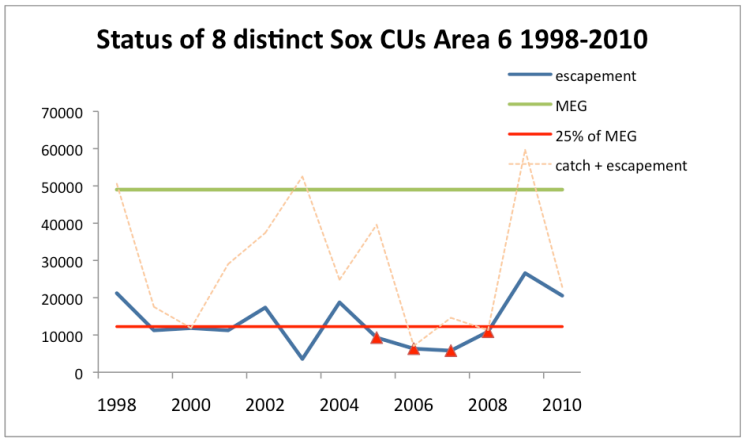
The above figure shows status of non-target chum stocks in Area 6 based on indicator streams. Serious conservation concerns are apparent with high exploitation rates on non-target stocks in the Gil Island/Area 6 pink fishery. The MEG is the sum of stream escapement goals for 5 indicator streams. The accepted management practice of maintaining high fishing pressure despite repeated failure to achieve the TRP has resulted in falling below the LRP in 7 of the last 9 years. Fishing pressure is not significantly reduced until stocks have fallen below the LRP.



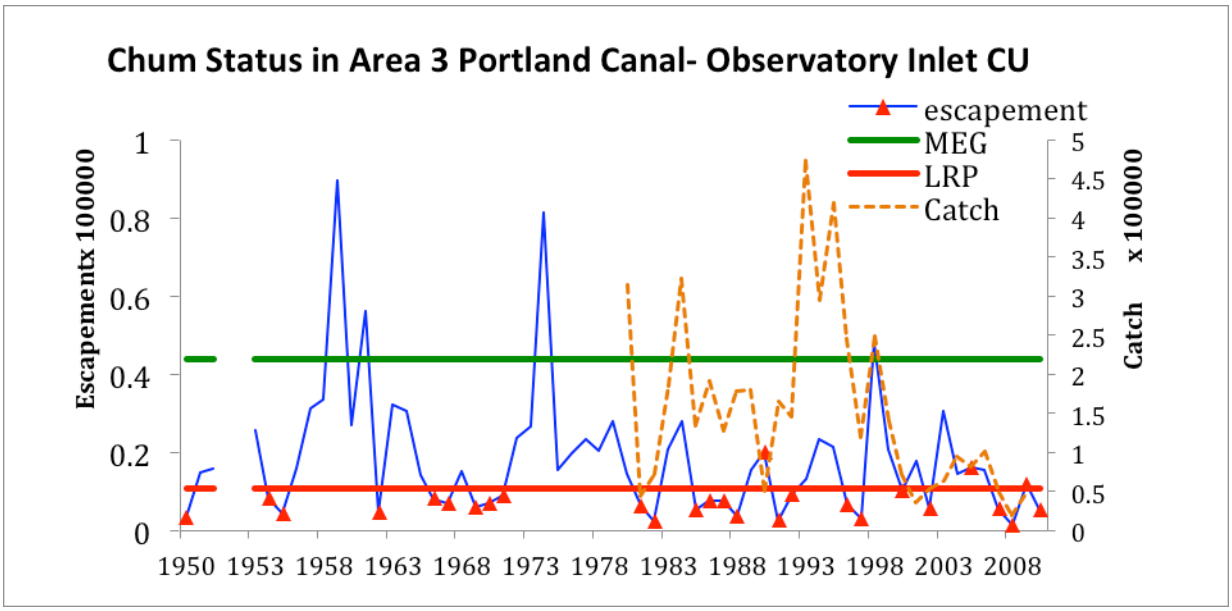


The two figures above show conservation unit status of Area 6 non-target chum stocks harvested in the Area 6 pink fishery. MEG is the sum of the individual stream targets: Douglas-Gardner Chum CU contains 5 indicator streams. The Hecate Lowland CU contains only 1. Both substantiate previous analysis that suggests chum stocks caught in the Area 6 pink fishery are a serious conservation concern as returns are below the LRP in more than 2 of the previous 5 years with a 10 year downward trend.

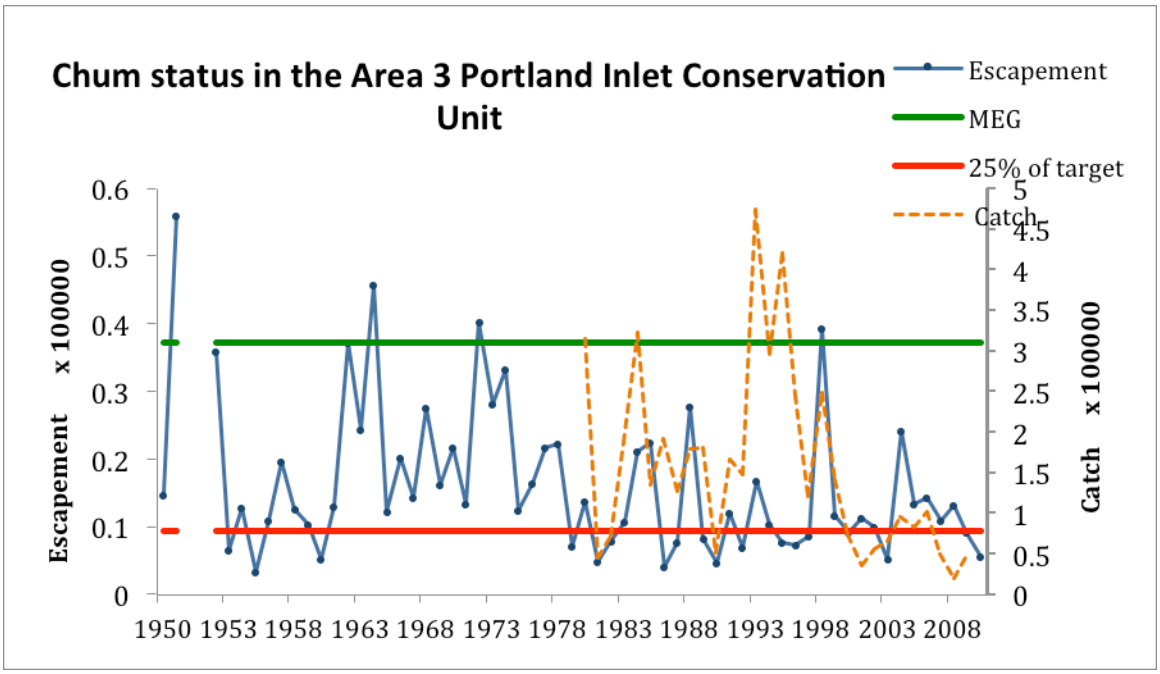




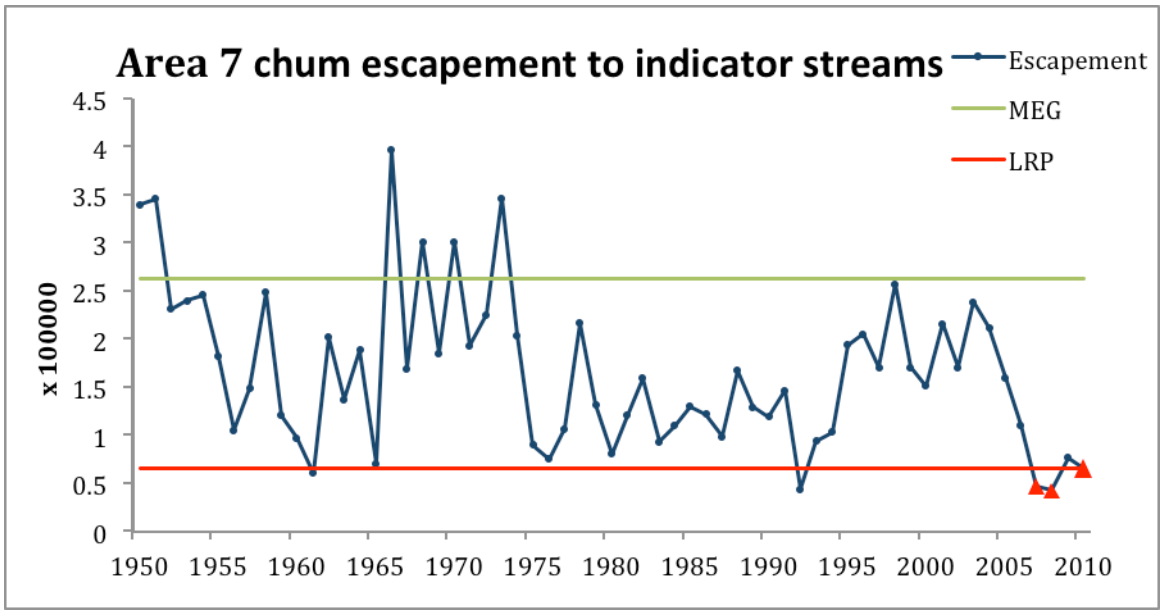
The above figures the long-term and recent status of 8 distinct sockeye Conservation Units in Area 6. The MEG is the sum of the 8 individual stream targets. Serious conservation concerns are apparent yet high exploitation rates continue under pressure of the Gil Island/Area 6 pink fishery. These trends underscore the accepted management practice of continued fishing pressure despite the depressed state and declines in non target stocks. Sockeye stocks/CUs in Area 6 have now failed to meet the LRP in 4 of the last 6 years. No rebuilding plan is in place nor is there any recognition of the stock status in DFO documents, non-retention of sockeye or further, closure of this fishery because of its impacts on so-called non-target stocks.



The above figure shows the extremely depressed state of non-target chums stocks in the Portland Canal- Observatory Inlet Conservation Unit. Despite management objectives to keep stocks above the LRP and meet the TRP, chum stocks have been consistently over-exploited in the Area 3 pink fishery for over 20 years with no rebuilding or recovery plan.



As with the Portland Canal –Observatory Inlet CU, the above figure shows the extremely depressed state of non-target chums stocks in the Portland Inlet Conservation Unit. Despite the purported existence of a management goal to stay above the LRP and meet the TRP, chum stocks have been consistently over-exploited in the Area 3 pink fishery for over 20 years with no rebuilding or recovery plan. In addition to critical stock status, there has been a declining trend in stream monitoring with Area 3 CUs having minimal coverage.



Despite the curtailment of directed fisheries on central coast chum, they are still caught in the Area 3 mixed stock fishery (Nass chum CSAS 2010). There are significant conservation concerns for chum stocks returning to the central coast (DFO Stocks of concern, 2010) as evidenced by the status of indicator streams which have recently been below their LRP (see above figure).

This paper has provided ample evidence that mixed stock pink fisheries are not "executed such that the recovery of depleted non-target stocks is likely to occur in a reasonable time period". The fishing induced mortality rates on these stocks remain too high. The AT specifically acknowledges this in their scoring rational for the 80 guidepost.

The PCDR provides no evidence that DFO plans to reduce intensive mixed stock pink fisheries in areas of high abundance of non-target species. The AT should note that QCI pink fisheries have not been mentioned in this paper. The reason is because they are managed as retention terminal fisheries that encounter relatively little bycatch.

There are four ways for DFO to effectively reduce the impact on non-target species while maintaining relatively high catches of the target species in mixed stock fisheries:

1. Move to selective fishing incorporating scientifically verifiable estimates of non-target encounter and mortality rates which would allow the agency to effectively monitor fishery impacts and take management action where necessary.
2. Reduce exploitation rates on the target species to what would allow non-target species to recover within a reasonable time
3. Move to terminal fisheries
4. Employ incentives or disincentives that would encourage fishermen to reduce bycatch such as establishing bycatch limits with transferable shares for non-

target species, moving to full retention fisheries with bycatch targets or video monitoring as employed in the BC halibut fishery.

The first option is very costly for industry. The second foregoes catch and therefore revenues; the third avoids some of the cost while maintaining revenues. The third encourages the participation of fishermen in addressing the issue by employing innovative incentives and disincentives.

The AT should, in its condition, prescribe that DFO look at reducing mixed stock fisheries in areas where the encounters of non-target stocks of "special conservation concern" are relatively high by employing alternative harvesting strategies.

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.

CONDITION INADEQUATE

Rationale

The Client's submission details four possible Reference Points to manage fisheries that impact non-target stocks, the first two of which are exploitation rate ceilings and fixed harvest rates. Pink fisheries are not managed to ensure escapement targets for other salmon species are met. Second, there is no clear evidence from Post-Season Reports that exploitation rates for the target species have been significantly curtailed in north coast mixed stock fisheries to rebuild depressed chum stocks. Evidence should be provided, or a condition is warranted.

The scoring rationale states that the fourth criterion for the 80 guidepost is not reached because "estimates of bycatch of Skeena steelhead" are lacking. This paper has provided evidence that reliable estimates of other non-target species are also lacking. What has made steelhead discard estimates particularly problematic is that fishers, as a response to the political and allocation issues surrounding steelhead catch, have all but quit reporting steelhead bycatch in their logbooks (J.O.Thomas, 2010). Observer reports (see page 13) indicate that the same response by fishers is evolving for chums. This phenomenon is not unique to the BC salmon fishery as it is an expected response by

fishermen to a regulation that is not being enforced and may limit their ability to fish (Mathieson, 2003)

It is therefore to be expected – based on fishermen behavior and experience with steelhead (and in other BC fisheries such as groundfish and halibut) – that the underreporting of discards in commercial net fisheries will increase. Therefore, the conditions should be expanded to include all non-target species. This is confirmed by the Velez-Espino (2010) when they conclude, “underreporting of encounters and releases of non-target and sublegal fish is consistent with fisher awareness of the implications non-target-and sublegal mortality on their total allowable catches and possibly on the public opinion”

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

SG 80.1: The management system includes mechanisms to identify and evaluate the impact of fishing on the ecosystem.
FAIL

SG 80.2: Control mechanisms are used to minimize impacts of fishing on the ecosystem.
FAIL

Rationale

The Client, in its scoring summary states that, "In general, the methods used by commercial fishers to harvest pink salmon in commercial fisheries generally have minimal impact on the ecosystem" and that, "The evidence of the application of control mechanism to minimize the impact of fishing on the ecosystem are adequate (e.g. short nets, short sets, recovery boxes, coloured floats)" in support of its contention that the second criterion of the 80 guideposts is surpassed. This paper has supplied evidence that the fishery has significant impacts on non-target stocks, and that the control mechanisms in use in open access mixed stock fisheries are both inadequate and unenforced. Furthermore, the absence of scientifically defensible estimates of the proportion of non-target species survive to spawn means that the impacts are not fully defined.

Pink salmon provide important nutrient inputs to coastal terrestrial and aquatic ecosystems (e.g., Wilkinson et al. 2005). The AT failed to identify this important

ecosystem contribution of pink salmon and the lack of both research and management (e.g., management objectives or decision rules related to pink salmon nutrient input) to ensure pink salmon continue to fulfill their integral role in these ecosystems.

Moreover, interception and retention of sockeye salmon in Area 6 in the so-called pink salmon fishery is often significant relative to the escapement of sockeye salmon to Area 6 systems where sockeye salmon provide proven freshwater ecosystem benefits (e.g. Kitlope Lake; Hill et al. 2009, *Can. J. Fish. Aquat. Sci. 66*: 1141-52). However, no efforts have been made by DFO to estimate the stock composition of the Area 6 sockeye bycatch to evaluate the impact of fishing on the ecosystem, despite the ability to readily do so using molecular tools (pers. comm. Dave Peacock, Area Chief, DFO North Coast stock assessment), and recommendations to do so by regional experts outside of the management agency (Hill et al. 2009; Hill et al. 2010, *Ecology and Society* 15(2): 20. [online] URL: http://www.ecologyandsociety.org/vol15/iss2/art20/)

Both of the 80 SGs have not been met and a condition should be added, or condition 3-6 strengthened to more explicitly identify the above considerations.

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

CONDITION INADEQAUTE

Rationale

There have been no significant responses to:

1. Steelhead Bycatch and Mortalities in the Commercial Skeena Net Fisheries of British Columbia from Observer Data: 1989 to 2009, J.OThomas, 2010
2. Area 3 Observer Reports (Page 13)
3. Comparison of Catch Reporting Systems for Commercial Salmon Fisheries in British Columbia, L. Bijsterveld, S. Di Novo, A. Fedorenko, and L. Hop Wo, Fisheries and Oceans, 2002, Canadian Manuscript Report of Fisheries and Aquatic Sciences 2626

Condition 3.4 should be expanded to include a reference to providing accurate catch reporting and monitoring.

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.

SG 80.2: 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.
FAIL

Rationale

Hatcheries are not required to and do not mark pink salmon that are released. Only the number of fry released is known. The abundance of wild Fraser pink salmon fry is estimated annually based on field sampling program at Mission, BC. However, because marine survival of hatchery versus wild pink salmon from the Fraser River has not been assessed, the proportion of hatchery fish cannot be estimated from fry abundance. Although enhancement currently contributes a small percentage of total Fraser pink production (<5%; CUP), there is no defensible method of estimating the contribution of hatchery fish to the catch and escapement. Because the majority of production is from wild populations, it could be argued that SG60.2 is met or partially met. SG80.2 is clearly not met.

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 species, and considers the impact of fishing on the ecosystem and socioeconomic factors affected by the management program.

SG 80.1: 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.
FAIL

SG 80.6: There is progress in understanding the impact of the fishery on target and non-target species.
FAIL

CONDITION INADEQUATE

Rationale

There is no ongoing or planned research into whether discarded non-target species survive to reproduce. Current research from Bristol Bay Alaska suggests the proportion of discards from competitive, mixed stock fisheries that fail to spawn may be relatively high (Baker and Schindler, 2009). Defensible estimates of the proportion of discards from North Coast pink fisheries that fail to spawn are a necessary component to understanding the impacts of pink harvests on the ecosystem.

Reference to the failure of the above guideposts to pass should be included in Condition 3.6.

3.4.2.1 – The management system includes compliance provisions.

SG 80.1: The management system includes compliance provisions that are effective for the fisheries.
FAIL

SG 80.2: Infractions, which result in adverse impacts on the status of the stocks or on the ecosystem, are rare.
FAIL

Rationale

Evidence has been provided that there is not sufficient compliance in catch reporting and monitoring.

DFO Management and Conservation and Enforcement personal have reported a lack of compliance with selective fishing regulations contained in fishermen's' Conditions of License (North Coast Post-Season Reports 2005 – 2009, C&P Reports http://www.cec.org/Storage/91/8878_09-5-ARSP-Annex_9_North_Coast_CP_2008.pdf, Notices to Industry, IHPC meetings). This is confirmed by the recent J.O.Thomas report (J.O.Thomas, 2010) and by the results of dockside validations from the years they were in effect for north coast seines (J.O.Thomas). Further descriptions of the lack of compliance are contained in a "*Submission to the Commission for Environmental Cooperation"*, 2009*, (http://www.cec.org/Storage/29/7744_09-5-SUB_en.pdf).*

In the 2008 Mid-year C&P Review it states that:

> We had a significant problem with gillnet vessels failing to have operational revival boxes operating during the salmon gillnet fishery. This practice was a focus of our enforcement efforts and resulted in several charges and in the future may curtail commercial gillnet openings. We attended all the commercial openings in Nisga'a territory with no violations noted. Barbed hooks in the recreational salmon fishery were an enforcement issue this year.

http://www.cec.org/Storage/91/8878_09-5-ARSP-Annex_9_North_Coast_CP_2008.pdf

C&P said in their 2009 mid-year review that compliance with revival box regulations improved. But this would be expected in that there was no Skeena River sockeye fishery in 2009 to monitor.

The 2010 C&P Mid-Year Review states that:

"*The current detachment strength is a 20-percent reduction from the previous 10 officer organization. The management of most of the Department's fisheries has become increasingly more complex in recent years. This has resulted in an inability to address many issues/fisheries, i.e. proper auditing and enforcement actions regarding logbook/fish slip compliance in salmon gillnet fisheries*."
(2010 Post-Season Review)

The following are a series of internal DFO comments on north coast compliance in 2006 accessed through the *Freedom of Information Act*:

On July 18, 2006, Steve Cox-Rogers, Head of DFO North Coast Stock Assessment wrote to the Area Director for the North Coast Area of DFO expressing his concerns over the lack of compliance with selective harvest methods by the gill net fleet.

"I now expect to see the old SWC guidelines exceeded…The Area 3/4 fishery this year has been quite aggressive and given the complete relaxation of selective fishing requirements this year (no short nets, no short sets, low effective compliance for attempting to revive fish, few weedlines etc) I doubt there will be anything technical I can provide that will show we (DFO) implemented any of the selective fishery objectives for steelhead as outlined section 3.1.6 of the 2006 IFMP."

On August 8, 2006, Cox-Rogers wrote the following in a memo to DFO North Coast Area Chief, Dave Einarson:

" When we do the post season estimates, however, several issues will affect the estimated harvest rates. The first is the apparent lack of compliance this year with regard to steelhead/coho catch and release requirements for the GN fleet. On a tour I did last Thursday to collect DNA/scales, none of the boats we sampled had functioning blue boxes on board…in fact, all of the fishermen I spoke to expressed little desire to participate in reviving steelhead or coho and were just throwing them back dead or alive as soon as they hit the boat. Ian Bergsma (our sample coordinator) tells me this has been the case all year in both Area 3 and 4. The proportion of boats using weedlines also seems very low to non-existent this year which probably reflects that scramble to attain and use smaller mesh nets in 2006. "

In a memo to DFO biologist, Dave Peacock, dated August 21, 2006 Cox-Rogers wrote:

"Dave. Some management philosophy, as optics now are important. The GN fleet has fished three days straight with little selectivity, and Dan is considering letting them go go [sic] for another five days…my view is fishing to ceiling guidelines is one thing, but it is how is done that will come back to haunt us."

On the same day, Cox-Rogers voices his concern to colleague, Dan Wagner, over the lack of compliance with selective guidelines and how that might affect the chances for the Skeena fishery to meet the criteria for certification by the Marine Stewardship Council.

Hi Dan, Some wording from the IFMP 3.11.5 that needs some thought for the post-season:

Skeena steelhead

***The objective for Skeena steelhead, as well as all north coast steelhead, is to release to the water with the least possible harm all steelhead caught incidentally in fisheries targeting other species**,*

-the intention of this statement is to minimize the capture experience suggesting we (DFO) are committed to using fishing techniques which do this. Simply fishing to a ceiling exploitation rate is independent of actually trying to achieve this objective

The application of selective fishing approaches in recent years has reduced steelhead impacts to below the harvest ceilings

-with zero percent impact, the fleet could fish 7 days a week. Seines are getting there, as is the inland fishery. By fishing to the ceiling this year without trying to be as selective as possible, it will be harder for the GN fleet to convince "outside" pressures that they meet the Marine Stewardship Council objectives for this fishery as we have stated they are doing…

Later in the same memo Cox-Rogers registers his disappointment at DFO's backtracking:

"…The real issue for me is that we said we would fish selectively to minimize harvest impacts on non-target species and we caved under pressure."

The client takes some effort in explaining the role of observers in ensuring compliance, including describing how observer deployment focuses on areas with high priority catch reduction regulations. The fact is, there has been almost no observer coverage in northern seine fisheries for pink salmon in the last ten years other than a brief experiment in 2010.

The Client describes that "if there is potential to have an impact on stocks of concern, the number of observers can increase to 6 to 10 per fishery (with 30 to 100 vessels operating in the fishery)". This is insufficient according to the literature which suggests a minimum of 20% to 50% observer coverage is necessary to provide an accurate estimate of bycatch (Babcock and Pikitch, 2004). However, this is to estimate bycatch, not to measure and monitor compliance. DFO felt it necessary to implement 100% coverage to ensure compliance in the BC halibut and groundfish fisheries.

FAO describes monitoring, control and surveillance as being a key component of the fisheries management process. Key tools are:

- an appropriate participatory management plan developed with stakeholder input;
- enforceable legislation and control mechanisms (licenses etc.);
- data collection systems - dockside monitoring, observers, sea and port inspections, etc.;
- supporting communications systems;
- patrol vessels capable of extended operating to remain at sea with the fishing fleets;
- aircraft available for rapid deployment to efficiently search large areas;
- use, where appropriate, of new technology (VMS, satellite, video, infra-red tracking, etc.);
- linked, land-based monitoring;
- support of the industry and fishers;

- bilateral, subregional and regional cooperation with other MCS components; and,
- professional staff.

(FAO, 2000: http://www.fao.org/fishery/topic/3021/en)

The current north coast commercial pink fisheries are lacking the above bullets one, three, and eight. It is therefore does not meet international best practices.

The management system states that its goal is to minimize impacts on non-target stocks. But as shown above, it does not have the monitoring and compliance capacity to do so. It therefore cannot meet SG 80.1. Monitoring, as described above, is very limited in scope. SG 80.2 is therefore also not met. A condition is therefore clearly warranted.

Also, as shown in the table and rationale on page 13 of this report, reporting of non-target stock and non-target species is inaccurate, particularly in south coast pink salmon fisheries. Observer coverage must reach at least 20% to bring the quality of reporting data to a level that provides reasonable estimates of catch.

3.4.2.2 – The management system includes monitoring provisions.

SG 60.1: The management system includes provisions for a monitoring program to evaluate the performance of the majority of the fisheries against its policies and objectives.
FAIL

SG 80.1: The management system incorporates an effective monitoring program, which evaluates the performance of the fishery relative to management goals and policies.
FAIL

SG 80.2: Monitoring is broad in scope, and results are available to the majority of the stakeholders.
FAIL

Rationale

The scoring rational for 3.4.2.2 states that the DFO submission provides sufficient evidence of monitoring systems to pass the 60 and 80 guidepost criteria. But the key failing of this conclusion is that the AT should be assessing the *performance* of the management system relative to the assigned criteria, not against the Client's descriptions of policy and management guidelines. It is the fishery that is being accessed, not the "back story". This requires examining whether the performance of the management system actually delivers what the Client describes. If there is evidence that the outcomes promised in the Client's submission are not being delivered upon, the AT should address this with a condition.

Evidence has been provided that monitoring is not broad in scope. In 2009 there were 3,572 boat days in Areas 3, 4, 5, and 6. DFO C&P checked 381 or around 10% of the net fishing effort. But the C&P effort was disproportionally spent monitoring the GN fleet. The seine fleet therefore had less than 10% of its effort monitored in 2009. (pers. Comm. Dave Einarson, DFO). It should be noted that vessel checks by C&P are quite different from monitoring the fishery. C&P vessel checks are like a road side check for vehicles. C&P officers do not stay with the boat and monitor its fishing operations. They check the operator's license, whether the vessel meets specific regulations, issues a citation if required, then leaves to check another vessel.

The following table describes the proportion of the total commercial fishing effort that was monitored by independent observers in the years 1998 to 2003 in southern fishing areas. In each of these years there were significant discrepancies between observer reports and logbook reports for various species. There is no information that would suggest that there were any observer programs from 2004 through to 2010. Again, this evidence would suggest that monitoring is not “broad in scope”.

Percentage of Southern Commercial Salmon Fishing Effort Monitored: 1999-2003
http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especes/salmon-saumon/fisheries-peches/stats-donnees-eng.htm

Year	Monitoring Coverage
1998	7.0%
1999	5.0%
2000	6.0%
2001	6.0%
2002	2.6%
2003	2.7%

It is noteworthy that DFO’s 2009 Post-Season Report states that 350 chum in area 6 and 0 chum in area 3 were caught by seines. The actual number of chum caught and released was over 71,000 in Area 3 and 61,000 in Area 6.

Therefore, the second criteria under the 80 guidepost should not have passed as monitoring is not broad in scope and results are unavailable to the majority of stakeholders.

For information purposes monitoring does not necessarily have to be by on-board observers. Video monitoring for seines is being developed that could be implemented in much the same way as it has been for the BC halibut fishery. See this website from Archipelago Marine:
http://www.archipelago.ca/highlight.aspx?ID=3bb5f344-f9cd-481a-b2e2-c3ff23b31862

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

SG 80.2: Taking into consideration natural variability in population abundance, there is evidence that the capture and discard of non-target species or undersized individuals of target species is trending downward, or is at a level of exploitation that has been determined by management to be acceptable.
FAIL

SG 80.3: 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.
FAIL

Rationale

The client provides a great deal of information describing DFO's intentions relative to the use of gear and fishing practices that minimize both the catch and mortality of non-target species. But the test in SG 80.2 is whether the capture and discard of non-target species is trending downward or is at a level of exploitation determined by management as acceptable.

Whether the discards are trending downward is unlikely as fishing practices, areas fished, and management actions in Area 3, 6, 7, and 8 pink fisheries have not significantly changed over the past decade. Furthermore, a decline would be undetectable as there is no independent assessment of discards. For instance, if fishery dependent data for steelhead was employed, it could be concluded that steelhead discards are trending downward, but it is difficult to tell because of the misreporting of steelhead catches.

DFO does not have a scientifically defensible estimate of chum mortality due to fishery impacts on the north coast. They therefore do not have a reliable estimate of current exploitation rates. The current depressed state of north coast chum stocks suggests that the current level of exploitation is too high to allow for stock rebuilding. The fishery therefore fails to meet SG 80.2 and a condition is called for.

SG 80.3 also fails. The scoring rational for 3.4.2.1 states that, "*there is evidence of compliance concerns with regarding (sic) to the reporting of steelhead catch in Area 3*

and 4 fisheries, ramping for seine vessels and the use of revival boxes. There is also evidence that harvest management rules for Area 3 and 4 pink fisheries have not been consistently applied and enforcement actions have not been effective in some years (e.g. 2006)". It is therefore difficult to see how the AT agreed with the third criteria under the 80 guidepost that "*fishers generally conduct their fishing activity in a manner that is consistent with the goal of reducing the catch of non-target species".*

The concerns expressed by the AT are confirmed by DFO C&P reports and by notices to industry detailing DFO's concerns over the fleet's compliance with their Conditions of License.

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.

CONDITION INADEQUATE

Rationale

Again, the scoring rationale only details problems with steelhead discards in saying that, "no *evidence of the quality and quantity of catch and discard data has been provided*". This paper has provided evidence that similar, if not more pronounced, issues exist for other non-target species.

The condition should therefore be expanded to include other species discarded in north coast pink salmon fisheries.

DFO Action Plan for meeting certification conditions

Many of DFO's timelines for key conditions are significantly different from what the conditions in the PCDR stipulate. In fact, some of DFO's timelines could conceivably mean that no significant changes in management performance might be expected until the final year of the certification, or even beyond. The table and notes below contrasts what the conditions prescribe and what DFO says they are prepared to do.

Condition	Deliverable	Certification Deadline for Condition (June 1st certification)	DFO Current Timeline	Season DFO Action may lead to Compliance with Condition
1.1 NCCC	Report to Certifier: Catch Monitoring Framework	June 1, 2013	July 2012	Unknown,does not commit to addressing condition
1.1 NCCC	PSARC Review of Steelhead Model	June 1, 2013	July 2013	likely 2014
1.1. ISC, Fraser	Report to Certifier: Catch Monitoring Framework	June 1, 2013	July 2012	Unknown,does not commit to addressing condition
1.4 all units	Report to Certifier defining Upper and Lower Benchmarks	June 1, 2013	July 2014	
1.5 all units	Report to Certifier defining Upper and Lower Benchmarks	June 1, 2013	July 2014	
1.6 all units	PSARC Paper: Stock Status and Rebuilding Plan Options	June 1, 2013	July 2015	2015 or even post-certification
1.7 all units	Report to Certifier defining Upper and Lower Benchmarks	June 1, 2013	July 2014	2014 or 2015
2.3 all units	PSARC Paper: Stock Status and Rebuilding Plan Options	June 1, 2013	July 2015	2015 or later
3.1 all units	same as response to 1.4 and 1.6	June 1, 2013	July 2014 and 2015	2015 or later

Notes on DFO Response

Condition 1.1 NCCC does not commit to producing accurate catch reporting for target and non-target stocks. It also does not commit to producing scientifically defensible catch estimates for steelhead. The current draft is nothing more than a template for further discussion with stakeholders. As work will not completed until mid-season 2013, it is unlikely any management action to comply with the condition will occur before 2014.

Condition 1.4 The timelines and commitments in DFO's Action Plan are different from what is in the PCDR and what is required by the Condition. DFO is only committing to produce a report by mid-season 2014.

Condition 1.5 Same as note on 1.4

Condition 1.6 DFO response will not address condition as it fails to commit to rebuilding depleted stocks to the MEG within 3 cycles. DFO timelines in the Action Plan differ from what is required by the Condition and what is reported on page 58/59 of the PCDR. The current timeline will not implement changes to the management plan in time for the last season of the certification (2015) (see table in DFO Action Plan).

Final note: DFO says in its Action Plan that its timelines could be extended if certification is delayed beyond February 1, 2010.

In addition to the facts that (1) the certification should be withheld at this time due to objective failure of several 60 scoring guideposts, and (2) many of the conditions in the PCDR are not sufficient and that the final the final PCDR should contain more and strengthened conditions, DFO's timelines in the Action Plan do not meet what is required by the current conditions in the PCDR.

Conclusions and Recommendations

In accessing the management performance of the BC commercial pink salmon fishery this paper has identified six critical failings:

1. The catch reporting mechanism for the bycatch and discards of non-target species fails to provide accurate catch and discard data.
2. The monitoring and compliance regime does not ensure that bycatch and discards are accurately reported or that fishermen abide by their Conditions of License governing selective fishing practices
3. There is no scientifically defensible estimate of the proportion of discards that survive to spawn
4. The incentives and disincentives incorporated in the management regime fail to encourage fishermen to either reduce or eliminate bycatch
5. Bycatch and discard levels for stocks of special concern are too high to permit the recovery and rebuilding of these stocks.
6. There is no direct link within the management system between knowledge of fishing impacts on non-target stocks and rebuilding and recovery plans for those stocks.
7. Research, monitoring and management objectives related to the contribution of pink salmon to coastal terrestrial and aquatic ecosystems is inadequate to ensure pink salmon and sockeye and chum caught as bycatch in pink salmon fisheries continue to fulfill their critical role in these ecosystems.

Addressing the first three failings are necessary to ensure that the pink salmon fishery meets MSC's Principles and Criteria for Sustainable Fishing and International Best practices. But it is failings 4 through 7 that speak to the identified problems with management performance in the BC pink salmon fishery.

This paper has provided objective evidence that either the 60 or 80 guideposts have not been met for several Performance Indicators. On page 47 of the PCDR it states that "*What is unique about the MSC certification process over the 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*". And that 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*". This paper has provided a wealth of objective evidence from the above sources that indicate that the Client has not met many of the scoring guideposts at the 60 and 80 levels. And therefore the PCDR does not meet the MSC standard.

It is worthwhile at this point to reread MSC's Principles and Criteria for Sustainable Fishing contained in the introduction of this paper and test them against the objective

evidence supplied. After considering the evidence provided it is clear that the PCDR will not lead to fisheries being "*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."*

Or, that they will ensure that DFO "*Account(s) for the non-target species captured and landed in association with, or as a consequence of, fishing for target species. "*

or that,

1. *appropriate procedures* are put into place to ensure *effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specific corrective actions be taken in the event that they are*
2. fishing operation(s) *make use of fishing gear and practices designed to avoid the capture of non-target species; minimize mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive*.
3. *And, that fishing operations should 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".*

Finally, the PCDR, in terms of data collection, monitoring, compliance, and enforcement, does not meet international "best practices" as expected by MSC. In "*Best Practices" for Fisheries Management, Baltic Sea, 2020*, 2010), prepared by eminent fisheries scientists including: *Carl-Chrisitian Schmidt, Anthony Cox, Emily Andrews-Chouicha, Quentin Grafton, Bonnie McCay, Ray Hilborn, and Matilda Thyresson.* Best Practices concludes that:

High quality data on catches are essential for reliable scientific fisheries advice but often such data are corrupted where management instruments (e.g. individual quotas) create incentives to misreport landings or to discard fish at sea. Thus reducing or measuring discards (e.g. through bans, disincentives, or observer or camera monitoring) and tackling unreported landings by effective landing controls can improve the quality of data. P.19

In discussing Norwegian fisheries it states that:

At all stages documents (e.g. logbooks, sales notes) are checked against actual observations (e.g. catch onboard, amount landed) to prevent loopholes where documents declare false information. P. 28

In the US experience:

US fisheries management plans have to include accountability measures for non-compliance, as well as plans for onboard observers. High observer coverage in many US fisheries increases the incentives for compliance and likelihood of detection in cases of non-compliance.

It speaks to the Issue of fishermen responsibility by stating:

Placing the burden of proof on users of a public resource and applying the precautionary approach is a way to put long-term sustainability and the public interest first. It allows the private sector to benefit from the use of public resources with sufficient evidence that the public interest is not unduly jeopardized and certifies that obligations are fulfilled.

o allow the PCDR to address the objective evidence provided, meet the MSC standard and embrace international best practices, BC's pink salmon fisheries should not be certified until all of the 60 scoring guideposts are fully met. Moreover, the following conditions should be in put into place or amended where the 80 guideposts have not been met and/or the AT's prescribed conditions are inadequate to ensure that the 80 guideposts are met within a reasonable length of time.

Condition 1-1 should be modified to include:

Bycatch and discard data must be independently verified in mixed stock fisheries where stocks of concern are encountered. Scientifically defensible catch and discard estimates for all non-target species caught in pink salmon fisheries need to be provided within 1 year.

New Condition for 1.1.2.4

Certification is conditional until DFO provides scientifically defensible information on harvesting impacts on stocks of concern, and how these impacts are incorporated into management strategies. Harvesting impacts must include defensible estimates of the proportion of discards that survive to spawn. DFO must also – beginning in 2011 – provide evidence of how pink fisheries are managed in a precautionary manner in regards to both reducing impacts on non-target stocks, and incorporating concerns over their productivity and rebuilding.

Condition 1-4 should be modified to include:

The LRP's must explicitly include reference on how concerns for co-migrating non-target stocks are incorporated into the LRPs for target stocks.

Condition 2-1 should be modified to include:

Certification of pink fisheries will be conditional until scientifically defensible estimates of bycatch and discards are obtained annually in all pink fisheries beginning in 2011. Certification of pink fisheries requires the successful introduction of a comprehensive, fleet wide bycatch and discard monitoring program that ensures that each participating fishermen's bycatch and discards are reported accurately, and that each fisherman complies with their License Conditions.

Condition 2-2 should be modified to include:

DFO must, beginning in 2011, address identified problems with the underreporting and misreporting of bycatch and discards, and ensure compliance by all participating fishermen with selective fishing measures.

Condition 2-3 should be modified to include:

DFO should, beginning in 2011, reduce harvest rates on target stocks in pink salmon fisheries with co-migrating non-target stocks identified as: (1) being below their LRP, (2) in need of protection, or (3) requiring reduced impacts as part of their recovery plan. Fishing plans, once LRP's are implemented for non-target stocks, must ensure that the recovery of stocks of concern is highly likely to occur within a reasonable time period.

The above would be in addition to what the AT has already proposed in this condition.

New condition for 2.1.5

Peer reviewed research must be conducted on the impacts of all infectious and parasitic diseases reported on salmon farms. Monitoring of pink salmon for salmon farm diseases must occur in all areas where they migrate in the vicinity of salmon farms and processing plants that discharge waste to the marine environment must have effluent tested. Any farms with pathogens present must fallow until it is demonstrated these diseases do not transfer and negatively impact wild pink salmon.

Conditions 3-2 and 3-3 should be modified to include:

Certification will be conditional until scientifically defensible estimates of bycatch, discards, and post-release mortalities are obtained annually for non-target species encountered in all pink salmon fisheries. And that evidence is supplied – within one year – of how escapement goals, harvest rates, or exploitation rate ceilings for the target stocks are modified to ensure the recovery and rebuilding of non-target stocks.

Condition 3–6 should be modified to include:

A research plan should be initiated to describe the proportion of non-target stocks that survive to spawn after being discarded in pink salmon fisheries. This research plan should be provided to the certification body within one year.

A socio-economic analysis should be provided that examines the social and economic incentives and disincentives inherent in the current management practices and how they either encourage or discourage fishers from meeting ecosystem objectives.

New Condition for 3.4.2.1

Certification is conditional until a comprehensive monitoring program is put into effect that ensures all fishermen participating in pink fisheries comply with their License Conditions. And that information gathered through monitoring is employed as an incentive for fishermen to comply with management objectives and License Conditions (e.g. the BC halibut fishery). This monitoring program should be in place in one year.

New Condition 3.4.2.2

Certification is conditional until a comprehensive monitoring program is put into place that monitors bycatch, discards, post-release mortalities of each fisher involved in pink salmon fisheries. The monitoring program should provide annual reports linked to the recovery and rebuilding objectives in place for non-target stocks. The monitoring plan will be in place within one year.

New Condition for 3.7.1

Certification is conditional until evidence is supplied that impacts on non-target stocks (as defined by the proportion of the non-target stocks encountered in pink fisheries that survive to spawn) meets rebuilding and recovery objectives for those stocks. And that managers work with fishers to reduce encounters with non-target stocks by avoiding fishing in times and areas with a relatively high abundance of non-target stocks.

Condition 3-8 and 3-9 should be modified to:

Certification will be conditional until scientifically defensible estimates of bycatch, discards and post-release mortalities are obtained annually for non-target species encountered in all pink salmon fisheries. And that evidence is supplied – within one year – of how escapement goals, harvest rates, or exploitation rate ceilings for the target stocks are modified to ensure the recovery and rebuilding of non-target stocks.

Management of the fishery should be modified to encourage - through effective incentives and disincentives – fishers to reduce their impact on non-target stocks.

Acknowledgements

This document was prepared by SkeenaWild Conservation Trust, Misty MacDuffee (Raincoast Conservation Foundation), Jeffery Young (David Suzuki Foundation), and Aaron Hill (Watershed Watch Salmon Society) with research assistance from David Roscoe (on behalf of WWSS), Andy Rosenberger (RCF), and Stan Proboscz (WWSS).

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Appendix 1

Pink Catch and Escapement for Areas 3, 4, 5, and 6 for the years 1996, 1997, 1999, 2001, 2003, 2005, 2007, 2009

		1996	
Area	**Catch**	**Escapement**	**Chum Catch**
3	1,232,215	304,560	195,421
4	1,164,174	2,003,161	137,339
5	330,011	273,100	20,077
6	673,409	571,968	25,201
Totals	**3,399,809**	**3,152,789**	**378,038**
Ratio of Catch to Escapement		**1.08**	

		1997	
Area	**Catch**	**Escapement**	**Chum Catch**
3	420,439	214,340	119,050
4	369,241	444,283	17,333
5	10,451	68,750	386
6	193,711	299,790	30,616
Totals	**993,842**	**1,027,163**	**167,385**
Ratio of Catch to Escapement		**0.97**	

		1999	
Area	**Catch**	**Escapement**	**Chum Catch**
3	356,905	163,600	243,316
4	17,223	271,731	12,263
5	1,470	148,170	1,630
6	541,969	571,968	399,925
Totals	**917,567**	**1,155,469**	**657,134**
Ratio of Catch to Escapement		**0.79**	

		2001	
Area	**Catch**	**Escapement**	**Chum Catch**
3	1,391,892	1,007,899	**Non-Retention**
4	1,198,087	1,017,612	
5	550,857	400,350	
6	2,688,658	1,607,085	
Totals	**5,829,494**	**4,032,946**	
Ratio of Catch to Escapement		**1.45**	

		2003	
Area	**Catch**	**Escapement**	**Chum Catch**
3	1,946,526	841,856	**Non-Retention**
4	908,483	1,493,266	
5	319,765	233,825	
6	3,930,208	2,006,520	
Totals	**7,104,982**	**4,575,467**	
Ratio of Catch to Escapement		**1.55**	

		2005	
Area	**Catch**	**Escapement**	**Chum Catch**
3	2,499,501	917,635	**Non-Retention**
4	0	1,191,722	
5	191,219	234,225	
6	4,589,404	1,569,275	
Totals	**7,280,124**	**3,912,857**	
Ratio of Catch to Escapement		**1.86**	

	2007		
Area	**Catch**	**Escapement**	**Chum Catch**
3	3,016,567	588,684	**Non-Retention**
4	802,378	627,423	
5	649,122	111,200	
6	1,769,491	1,526,390	
Totals	**6,237,558**	**2,853,697**	
Ratio of Catch to Escapement		**2.19**	

	2009		
Area	**Catch**	**Escapement**	**Chum Catch**
3	1,064,912	640,214	**Non-Retention**
4	341,403	2,367,670	
5	131,704	146,350	
6	6,655,835	2,874,740	
Totals	**8,193,854**	**6,028,974**	
Ratio of Catch to Escapement		**1.36**	

DFO North Coast Post-Season Reviews