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Proceedings of the PSARC Salmon Subcommittee Meeting

December 6-7, 2004
Nanaimo, BC

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Fisheries & Oceans Canada
Pacific Scientific Review Committee
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Nanaimo, British Columbia V9T 6N7

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PACIFIC SCIENTIFIC ADVICE REVIEW COMMITTEE (PSARC)
SALMON SUBCOMMITTEE MEETING

SUMMARY

Allowable Harm Assessment of Interior Fraser Coho.

Interior Fraser coho have been recommended for listing as 'endangered' under the Species at Risk Act (SARA) by the Committee on the Status of Endangered Wildlife (COSEWIC). This Working Paper was intended to provide a summary of stock status information and advice relating to recovery targets in compliance with the requirement for DFO to provide an Allowable Harm Assessment as part of the SARA permitting framework. The Subcommittee found the Working Paper incomplete and recommended a new paper be submitted to PSARC at a future meeting.

Status Review of "Inside" Sockeye Stocks – those adjacent to the Strait of Georgia, North-Eastern Vancouver Island and the Southern Mainland.

This Working Paper summarized available stock status information and examined potential limiting factors for sockeye stocks on the 'inside' of Vancouver Island. The paper was accepted subject to revisions. These populations are data-limited however the Subcommittee expressed concern regarding substantial declines in abundance observed in many of the stocks over the 50 year study period. Human-induced factors influencing stock status that were considered in the assessment included Johnstone St. fisheries and habitat degradation. Marine climate effects were also discussed. The Subcommittee recommended further stock assessment work be initiated to monitor the status of these sockeye stocks.

SOMMAIRE

Évaluation des dommages admissibles

Le Comité sur la situation des espèces en péril au Canada (COSEPAC) a recommandé que le saumon coho du Fraser intérieur soit désigné « en voie de disparition » en vertu de la *Loi sur les espèces en péril* (LEP). Ce document de travail résume les données sur l'état du stock et offre des conseils en matière d'objectifs de rétablissement conformément à l'obligation pour le MPO de présenter une évaluation des dommages admissibles dans le cadre de la délivrance de permis en vertu de la LEP. Le sous-comité juge que le document de travail est incomplet et recommande qu'un nouveau document soit présenté à une future réunion du CEESP.

Examen de l'étude des stocks « intérieurs » de saumon rouge, soit les stocks adjacents au détroit de Georgia et ceux du nord-est de l'île de Vancouver et du sud de la C.-B. continentale

Ce document de travail, qui résume les données disponibles sur l'état des stocks de saumon rouge à l'« intérieur » de l'île de Vancouver et examine de possibles facteurs limitants pour ces stocks, est accepté sous réserve de révisions. Mêmes si les données sur ces populations sont limitées, le sous-comité se dit inquiet des déclins substantiels des effectifs de bon nombre des stocks que l'on a observés durant la période d'étude de 50 ans. L'évaluation a abordé des facteurs anthropiques qui influent sur l'état des stocks, notamment les pêches dans le détroit de Johnstone et la dégradation de l'habitat, ainsi que des effets climatiques marins. Le sous-comité recommande que des travaux supplémentaires d'évaluation des stocks soient effectués pour surveiller l'état de ces stocks de saumon rouge.

INTRODUCTION

DETAILED COMMENTS FROM THE REVIEW

S2004-10 Allowable Harm Assessment of Interior Fraser Coho.

M. Folkes, B. Ionson

Subcommittee Discussion

The Working Paper was requested to provide scientific advice on incidental harm permitting for Interior Fraser River coho salmon (IFC). IFC were designated by COSEWIC as "endangered" in 2002. DFO Science in the Pacific Region was asked to undertake an *Allowable Harm Assessment* in advance of a decision to list or not list under the Species at Risk Act (SARA). The Working Paper was reviewed December 6 2005 in an *ad hoc* PSARC meeting to review the scientific basis for incidental harm permitting.

There is no well established framework for reviewing Allowable Harm Assessments to meet the requirements of SARA. The IFC Working Paper represents the first review of an Allowable Harm Assessment conducted by PSARC and the standards for scientific peer review, as identified in the PSARC Terms of Reference, were applied. An overview interpretation of the Act in the context of the requirement for science advice for incidental harm permitting was provided by Jake Rice, Director of the Canadian Science Advisory Secretariat for DFO in Ottawa. Some key points were: 1) in the absence of a SARA recovery and action plan, under Section 73 of SARA an incidental harm permit can be issued for a maximum of 24 months after Schedule I listing. Allowable Harm Assessments are interpreted to be valid for a maximum of 24 months from listing. There can be no directed harvest on a Schedule I Designated Unit (DU) until an approved recovery and action plan is in place.

A draft framework for DFO to address permitting conditions under Section 73 of SARA was developed by DFO Ottawa. The Terms of Reference were used by regional Science and Resource Management to develop the IFC request-for-working-paper specific to the IFC case. The principal questions addressed in the Working Paper as required under Section 73 of SARA are: 1) What is the present/recent species trajectory? 2) What is the present/recent species status? 3) What is the expected order of magnitude / target for recovery? 4) What is the general time frame for recovery to the target? and 5) What is the maximum human-induced mortality which the species can sustain and not jeopardize survival or recovery of the species?

Questions raised by reviewers and during Subcommittee discussion centred on the interpretation of what constitutes survival and recovery. One interpretation that guided Subcommittee discussion was the notion that the Allowable Harm Assessment should focus on assessing the probability of recovery at the end of the 2-year permitting

period given the best information presently available including uncertainty in survival over the 2-year projection. The simulations should indicate that the probability of recovery is greater given the permitted activity after the two-year period than when permitting was initiated. The Subcommittee agreed that extending the projections beyond the 2-year permitting period is also of interest to assess whether recovery will occur over ensuing generations given the full range of uncertainties in survival and recruitment projections that are probable given random and plausible climate effects.

Both reviewers and the Subcommittee concluded that the Working Paper was incomplete and required more clarification on current status and more work on simulations to assess recovery probabilities at increments of exploitation. The Subcommittee acknowledged that rejection of the paper meant that science advice for decision making is now delayed and impacts the Region's interest in a January deadline to meet time lines for a decision on listing in 2005.

One reviewer noted that although the Working Paper discounted habitat as a factor limiting productivity and capacity, there was no valid assessment of freshwater effects. The reviewer suggested that an assessment of freshwater effects should be undertaken to evaluate habitat limits. This could be done by dividing the adult recruits in each year by the corresponding marine survival rate to estimate (back-calculate) annual smolt abundance. The reviewer also suggested that uncertainty in marine survival needs to be integrated into simulations as a stochastic variable to assess the probability of recovery for an assumed distribution of marine survival rates and increments of exploitation. The present Working Paper simulated the effects of exploitation on recovery at increments of fixed marine survival over 50-year forward trajectories. The probability of falling below specified biological limits, as identified by the IFC Recovery Team, was calculated in the Working Paper by comparing the simulated running 3-yr geometric mean escapement (1 generation) to the biological reference point. The Subcommittee noted that smoothing the output using a 3-year mean may not adequately portray risk given the variation in year-class projections within each generation.

Overall, the Subcommittee agreed that considerable work is required to explore modeling results with respect to the assumptions, uncertainty in the data, and model structure before advice is offered. The Subcommittee was also concerned about changes made to IFC data sets and the lack of agreement of a standard data set for IFC. The Subcommittee discussed the ramifications of modeling the five populations identified in the Recovery Plan as a single Designated Unit (DU), as was done in the Working Paper, and the implications of harvest on survival and recovery of individual populations within the DU.

Subcommittee Conclusions

The Working Paper was not approved. The Subcommittee concluded that a new paper is required and should:

- Provide more clarification on current status.
- Simulate the probability of recovery at increments of exploitation over a projected 2-year permitting period by sampling from a marine survival probability distribution representative of recent survival rates estimated for Interior Fraser coho.
- Simulate the probability of recovery over several generations to assess recovery potential over a range of assumed survival trajectories that account for random and climate-driven events.
- Consider freshwater habitat limits in the evaluation of risk.
- Consider implications to populations within the DU.

Subcommittee Recommendation

The subcommittee recommended that a new paper be submitted that more fully explores modeling results with respect to the assumptions, uncertainty in the data, and model structure before advice is offered. Specifically, the analysis needs to simulate the effects of harvest on the probability of recovery over 2-year and longer trajectories to determine the level of acceptable exploitation given uncertainty in survival.

S2004-09 Status Review of "Inside" Sockeye Stocks – those adjacent to the Strait of Georgia, North-Eastern Vancouver Island and the Southern Mainland.

D. Dobson, C. Wood

Subcommittee Discussion

The Working Paper contained a synthesis of abundance and habitat information available for thirteen lake-type sockeye stocks on the east side of Vancouver Island and examined potential limiting factors affecting the populations. The Subcommittee and reviewers commended the authors on their efforts to consolidate and interpret a substantial body of information from numerous sources. One reviewer suggested the paper could be improved by re-ordering the information on a stock by stock basis. It was also noted that considerable assessment work has been carried out in the Nimpkish R. system that has not been considered in this Working Paper.

The authors noted that the quality and consistency of escapement data provided in the paper was generally poor and that there was insufficient data to estimate lake spawning capacity and assess stock status relative to benchmarks of capacity (i.e. S_{MSY}). However, one reviewer noted and the Subcommittee agreed that the

precipitous decline in spawning escapement indices identified for many stocks is compelling evidence of an abundance decline. The particularly poor status of the most southerly group of 'inside' sockeye populations assessed in the paper fits the pattern of poor status previously reported for the more extensively studied nearby Sakinaw Lake sockeye and designated by COSEWIC as "endangered". Of further concern is the critically low observed levels of abundance in some of the populations and the associated risk of extinction. The Subcommittee discussed the need and potential options for augmenting stock status information through directed escapement surveys and juvenile studies.

The Working Paper describes potential limiting factors to 'inside' sockeye stocks, in particular, fishery harvests in Johnstone St., habitat degradation by logging, and marine climate impacts on survival. The Subcommittee discussed the potential impact of marine mammals and agreed that predation by seals and sea lions could be an additional contributing factor limiting population recovery.

The authors concluded that fishing mortality is a major factor influencing stock status but that other risk factors such as poor marine survival could not be ruled out. Because run timing is thought to overlap with Fraser sockeye, the 'inside' stocks are likely intercepted in Johnstone St. fisheries. A previous run reconstruction estimated exploitation rates of some stocks to be in the range of 20-40% while a more recent analysis indicated Sakinaw Lake Sockeye are exploited at 20-60%. These estimates are highly uncertain because of the limited available run timing information, therefore the Subcommittee concluded that further analysis would not be productive.

The Subcommittee discussed the evidence for low survivals assumed for 'inside sockeye'. The authors related the study area sockeye to adjacent salmon stocks, however, one reviewer suggested that there is greater justification for considering information from Fraser R. sockeye populations.

The authors provided a plot in the Working Paper to illustrate the influence of two risk factors, fishing and forestry, on the viability of the sockeye stocks. The populations most vulnerable are those most southerly located in the study area, in part because these sockeye migrate through the entire gauntlet of Johnstone St. fisheries. The Subcommittee agreed this approach was informative and suggested it should be applied to other risk factors.

<u>Subcommittee Conclusions</u>

- The Working Paper was accepted, subject to the following revisions:
    - Inclusion of a series of appendices referred to in the text of the Working Paper which summarize abundance data, habitat information, and fishery management strategies relating to the study area.

- Completion of additional plots illustrating variation in stock status relative to risk factors for the major factors, other than fishing and forestry impacts given in Figure 23 of the Working Paper.

- The Subcommittee expressed concern regarding the long term declines in abundance of many of the 'inside' sockeye stocks. Of the thirteen populations examined, three show serious declines in escapement and are now critically low, and four are at low abundance and/or declining; while three appear to be stable, and three cannot be assessed because of inconsistent data. The three stocks demonstrating the most serious declines are the most southerly located and of particular concern.

Subcommittee Recommendations

1. The Subcommittee recommended that a new Working Paper be developed to review the status of the Nimpkish River sockeye stock and that incorporates the large body of information known to be available but that is not included in the current paper.
2. The Subcommittee noted the poor quality of abundance information currently available for 'inside' sockeye stocks. Given the critically low status of many of these stocks, it is recommended that further assessment effort be directed toward refining abundance trends for these populations.

APPENDIX 1: Working Paper Summaries

S2004-10 Allowable Harm Assessment of Interior Fraser Coho.

M. Folkes, B. Ionson

In 2002, COSEWIC designated Interior Fraser River Coho (IFC) as “endangered”. IFC could become legally listed in 2005 under the Species At Risk Act (SARA). This Working Paper was in response to a request to assess the potential for incidental harm permitting. Questions addressed in the Working Paper were: 1) What is the present/recent species trajectory? 2) What is the present/recent species status? 3) What is the expected order of magnitude / target for recovery? 4) What is the general time frame for recovery to the target? and 5) What is the maximum human-induced mortality which the species can sustain and not jeopardize survival or recovery of the species?

Recent revisions of the historical escapement time series suggests that the rates of decline (estimated by two methods), while still within the COSEWIC criteria for listing, are not as severe as was presented in the COSEWIC status report (COSEWIC, 2002). An immediate recovery goal (LRP) for the DU has been defined (three year running geometric mean =20,000 wild spawners) by the Interior Fraser Coho Recovery Team. The three year running geometric mean escapement (2001-2003: 34,000 spawners & 2002-2004: ~31,000 spawners) for the designated unit (DU) is above the LRP (20,000). Harvest impacts on long term escapement are assessed at varying levels of marine survival and exploitation rate. Potential sources of harm are discussed and their impact is quantified.

S2004-09 Status Review of "Inside" Sockeye Stocks – those adjacent to the Strait of Georgia, North-Eastern Vancouver Island and the Southern Mainland.

D. Dobson, C. Wood

This paper examines the status of coastal sockeye populations in watersheds adjacent to the Strait of Georgia, Johnstone Strait and the southern Mainland Inlets. We considered 13 lake-type populations associated with Sakinaw Lake and the Tzoonie River on the Sunshine Coast, Village Bay Lake on Quadra Island, the Nimpkish River (including Vernon, Woss and Nimpkish lakes) and Quatse and Nahwitti lakes on northeastern Vancouver Island, as well as Phillips, Heydon, Fulmore, Glendale, Klinaklini, Kakweiken and MacKenzie rivers in the southern mainland inlet area. To date, only the Sakinaw Lake population has been assessed with its status reviewed by PSARC and it was subsequently designated as Endangered by the Committee on the Status of Wildlife in Canada. Preliminary inspection of escapement data suggests that other inside sockeye populations may be vulnerable to the same threats as the Sakinaw Lake population. Like Sakinaw sockeye, the other inside sockeye populations have been managed "passively", meaning that abundance and harvest rate are not monitored during the fishing season, if at all

Of the thirteen populations examined in this study, three have shown serious declines in escapement and are now at critically low abundance (<100 spawners); four are at low abundance relative to historical levels and/or declining; three appear to be stable; and three cannot be assessed because of inconsistent data. Over a 50-year time period, all the populations have declined in abundance with the likely exception of Nahwitti, Phillips, Heydon and Klinaklini. It should be noted, however, that recent escapement estimates for Heydon and Klinaklini cannot be compared directly with historic estimates, and that escapements to the Phillips population have declined steadily in recent years.

Many factors have probably contributed to the long-term declines in abundance of the inside sockeye populations, including habitat degradation and loss and climatic factors. However, the three populations showing the most serious declines and critically low abundance spawn farthest to the south (Areas 13-16) and are thought to migrate through Johnstone Strait in mid summer. They are therefore the most vulnerable to incidental fishing mortality in the mixed stock fisheries in Johnstone Strait. Other populations are vulnerable too, depending on their migration timing and spawning location. The major freshwater habitat factors affecting these sockeye populations are damage related to past logging, climatic/habitat conditions leading to summer low flows and migratory problems; and urban and agricultural land use leading to problems associated with increased access. We cannot yet rule out unfavourable trends in marine habitat either.

APPENDIX 2: PSARC Salmon Subcommittee Meeting Agenda, December 6-7, 2004

PSARC Salmon Subcommittee Agenda
December 6-7, 2004
9:00-4:00
Coast Bastion Inn, Nanaimo BC

December 6:

9:00-12:00	Review of Working Paper*, Allowable Harm Assessment of Interior Fraser Coho*– Authors: M. Folkes, B. Ionson
12:00-1:00	Lunch
1:00-4:00	Formulation of subcommittee conclusions and recommendations

December 7:

9:00-12:00	Review of Working Paper*, Status review of 'inside' sockeye stocks - those adjacent to the Strait of Georgia, north-eastern Vancouver Island and the southern mainland inlets* – Author: D. Dobson
12:00-1:00	Lunch
1:00-4:00	Formulation of subcommittee conclusions and recommendations

APPENDIX 3: List of Attendees

Subcommittee Chair: Greg Thomas
PSARC Chair: Al Cass

NAME **EXTERNAL PARTICIPANTS**	**December 6**	**December 7**
Dave Blackbourn	✓	✓
Paul Rickard	✓	
Ken Wilson	✓	✓
Mike Galesloot	✓	
Alvin Sewid	✓	
Mary-Sue Atkinson	✓	✓
Wayne Harling	✓	✓
Lloyd Webb		✓
Marcel Shepert		✓
DFO MEMBERS		
Greg Thomas	✓	✓
Al Cass	✓	✓
Melanie Sullivan	✓	✓
Dave Meerburg	✓	✓
Richard Bailey	✓	
Bert Ionson	✓	
Jake Rice	✓	
Kent Simpson	✓	✓
Diana Dobson	✓	✓
Pieter Van Will	✓	✓
Arlene Tompkins	✓	✓
Brian Riddell	✓	
Carole Eros	✓	
Cindy Yockey	✓	✓
Chris Wood	✓	✓
Joel Sawada	✓	✓
Steve Baillie		✓

Reviewers for the PSARC papers presented at this meeting are listed below. Their assistance is invaluable in making the PSARC process work.

Kent Simpson	DFO
Mike Bradford	DFO
Neil Schubert	DFO
Steve Cox-Rogers	DFO