



# PACIFIC SALMON COMMISSION

ESTABLISHED BY TREATY BETWEEN CANADA  
AND THE UNITED STATES OF AMERICA  
MARCH 18, 1985

600 - 1155 ROBSON STREET  
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Our File: 7100-1

Your File:

May 5, 2003

## MEMORANDUM

TO: Pacific Salmon Commissioners  
National Correspondents

FROM: Don Kowal, Executive Secretary

Re: Fraser River Sockeye and Pink Spawning Enumeration Programs

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I am forwarding for action, as requested by the Fraser Panel, a copy of a letter I received from the Chair and Vice-Chair of the Fraser Panel as a result of a presentation made by PSC staff at a pre-season Fraser Panel meeting held on April 30 - May 1, 2003.

Specifically the Panel stated:

"We urge the Pacific Salmon Commission to identify the importance of these longstanding escapement assessment programs for Fraser sockeye and Fraser pink escapement, forecasting, and basic management as soon as possible. We further seek the Pacific Salmon Commission's assistance to ensure the continuation of these essential activities in 2003 and beyond."

The presentation was entitled "Importance of Spawning Ground Enumeration Programs" and a copy of the presentation is attached. In addition, PSC staff, in advance of the meeting, had circulated to Fraser Panel and Technical Committee members a more detailed document on the "Management Utility of Fraser River Sockeye and Pink Salmon Spawning Escapement Estimation Programs," also attached.

If you have any questions regarding the above, please contact me at your convenience.

Don Kowal  
Executive Secretary

c.c. Fraser Panel





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May 1, 2003

Mr. Don Kowal  
600 1155 Robson St.  
Vancouver B.C.  
V6E 1B5

### Re: 2003 Fraser River Sockeye and Pink Spawning Enumeration Programs

Dear Mr. Kowal:

The bilateral Fraser Panel would like to express our serious concern to the Pacific Salmon Commission of a Canadian problem for Fraser sockeye and pink escapement enumeration programs that, if not corrected, will destabilize much of the information base used to manage these valuable stocks.

Specifically, the Panel has been informed that current funding levels may result in:

- elimination of the upriver escapement assessment programs for summer run sockeye,
- elimination of the (Early summer run) Pitt River sockeye and (Late run) Birkenhead River sockeye escapement enumeration programs,
- elimination of the pink salmon escapement programs,
- elimination of the juvenile programs which assist in forecasting pink salmon run size, and
- reduction in the escapement assessment programs for Early summer run sockeye.

These actions would not only seriously impede the Panel's ability to manage Fraser sockeye and pink salmon, but if continued, would necessitate the complete restructuring of the way these fisheries are managed. In these times of early returning Late run sockeye, endangered species listings, and highly variable ocean survival, the Panel needs to move towards more effective management.

It is our belief that should the changes outlined above occur, Canada's ability to meet its obligations described in the 1985 Pacific Salmon Treaty would be seriously compromised.

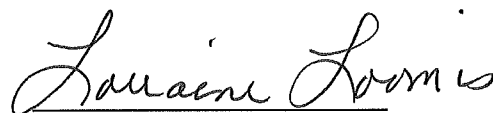
We refer you to the attached discussion document and Power Point presentation from Pacific Salmon Commission Staff for specific scientific and management consequences associated with the elimination and reduction of these programs.

Ultimately, these actions will increase in-season management uncertainty, potentially compromising the achievement of spawning escapement goals and reducing harvest opportunities in future years. We urge the Pacific Salmon Commission to identify the importance of these longstanding escapement assessment programs for Fraser sockeye and Fraser pink escapement, forecasting, and basic management as soon as possible. We further seek the Pacific Salmon Commission's assistance to ensure the continuation of these essential activities in 2003 and beyond.

Yours truly,


A handwritten signature in cursive script, reading "W. Saito", written over a horizontal line.

Wayne Saito  
Chair, Fraser River Panel

A handwritten signature in cursive script, reading "Lorraine Loomis", written over a horizontal line.

Lorraine Loomis,  
Vice-Chair, Fraser River Panel






## Spawning Ground Assessments

*Our understanding is that DFO staff were instructed to design 2003 Fraser River spawning ground assessment programs using year 2000 appropriation levels.*

*Problem: 2000 return year is a low abundance cycle line for sockeye, and there is no pink salmon return*

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## Issues for 2003

Large Summer and Late-run escapements will likely result from harvest constraints on Late-run sockeye.

- Will necessitate M/R programs on more stocks (25000 rule) than in 2000 (expensive)
- pink salmon enumeration required in 2003


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## Issues for 2003

Our understanding is that DFO has tentative plans to enumerate Early Stuart, most Early Summer and some Late-run stocks. However, few if any Summer-run stocks will be enumerated & Pink salmon may not be enumerated

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## International Obligation

Under the Diplomatic Note, August 13, 1985:

- Canada and the United States shall provide to the Commission:

5. Data on spawning escapements for all sockeye and pink stocks which migrate through the Area.


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## Prior DFO Commitments

DFO has committed to maintain, and where possible to improve, Fraser River sockeye spawning enumeration programs (Fraser River Sockeye Public Review Board Report recommendations (accepted by Minister of Fisheries) pertaining to the 1994 and 2002 management seasons

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## Importance of Spawning Ground Assessments to FRP Management

Development of spawner / recruit relationships

- used to develop in-season management strategies (eg. dominant and off-cycle line production relationships)
- used by Canada in pre-season run size forecasting
- used to develop spawning escapement goals (re: spawning initiatives)


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**Importance of Spawning Ground Assessments to FRP Management** 

Development of spawner / recruit relationships

- Trend to reduce catch and increase escapement, combined with less spawning ground data, will increase uncertainty in S/R relationships.


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**Importance of Spawning Ground Assessments to FRP Management** 

Conducting post-season production assessments by individual stock groups (permits a much finer resolution than data from Mission- critical for assessing minor stocks), e.g.,

- we estimate two or three Early Summer stock groups at Mission
- DFO enumerates up to 44 individual Early Summer stocks on the spawning grounds


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**Importance of Spawning Ground Assessments to FRP Management** 

Required for post-season estimates of total return

- important for assessing future run size model improvements


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**Importance of Spawning Ground Assessments to FRP Management** 

Provides key biological data (scale, sex & length), which permits population estimates by sex, egg deposition data, etc.

- enables estimates of freshwater and marine survival on stocks where juvenile data are also collected (Chilko, Quesnel and Late Shuswap)


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**Importance of Spawning Ground Assessments to FRP Management** 

Terminal area arrival data (index counts at Henry's Bridge and Likely & fence counts at Scotch Creek and Stellako)

- correct for possible stock ID bias in the tails of the stock distributions at Mission
- provides temporal run distributions

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**Importance of Spawning Ground Assessments to FRP Management** 

•Used to assess en route loss between Mission and the spawning grounds in years of extreme river temperature and discharge, and early Late-run migration

- required for EMA models
- would not have been alerted to Late-run early migration mortality issue w/o terminal data

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## Importance of Spawning Ground Assessments to FRP Management



May be future cost savings available with new technologies (DIDSON system)

In the view of PSC staff, it is critical to continue funding traditional programs until cheaper (but accurate) methods available

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## Summary of Panel Implications



The Fraser River Public Review Board report, and the recent Run Size Estimation Workshop, identified a strong need for greater accuracy of run size estimates.

New assessment fisheries are being planned to help in meeting this need.

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## Summary of Panel Implications



The absence of spawning ground enumeration programs will inhibit the ability of the PSC staff and the FRPTC to assess potential run size models based on new assessment fisheries, and on current and expanded Panel test fisheries.

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## Summary of Panel Implications



Other key impacts:

- Reduced capability of DFO to provide pre-season run-size forecasts (critical for pre-season planning)
- Elimination of capacity to assess en route mortality and update the EMA models

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## Summary of Panel Implications



Ultimately, this will increase in-season management uncertainty, potentially compromising the achievement of spawning escapement goals and reducing harvest opportunities in future years.

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## End of Talk



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May 2, 2003

## Assessment by PSC Staff on the Management Utility of Fraser River Sockeye and Pink Salmon Spawning Escapement Estimation Programs.

Spawning ground enumeration programs for Fraser River sockeye stocks have been conducted systematically on a subset of stocks beginning in 1938, and for the vast majority of all stocks since 1948. Spawning ground enumeration methods include visual surveys (small populations), mark-recapture estimates (larger populations), and in some cases counting weirs and fences are used. There are approximately 25 major, and a larger number of minor Fraser River sockeye stocks that are routinely enumerated on the spawning ground. These spawning ground population estimates are unique, providing one of the only consistent, long-term data sets of this duration in North America, and perhaps the world. In addition, spawning ground enumeration programs have been conducted on individual Fraser River pink salmon stocks since 1957. In more recent years a single estimate for the entire Fraser River pink salmon population has been generated.

In a general sense, spawning ground enumeration programs evaluate the success of salmon migration from the last estimation point (Mission), and the reproductive success of those fish that arrive on the spawning grounds. However, the utility of spawning ground estimates is more far-reaching. Long-term, stock specific, management objectives and annual escapement goals are developed using historical production data, with an essential component being spawning escapement estimates for individual stocks. In fact, DFO is in the process of developing a revised escapement policy for the future that relies at its core on spawner-recruit data on a stock-specific basis for the development of escapement targets, and subsequently on spawning abundances to monitor the achievement of such targets and to adaptively adjust them. Similarly, the capacity to evaluate DFO's wild salmon policy initiative, and potentially to respond to requirements under pending SARA legislation, will require that high quality spawning ground enumeration programs be maintained. Spawning ground escapement estimation programs provide essential data required in all facets of Fraser River sockeye salmon management, including pre-season management planning, establishing gross escapement targets by stock, and setting international TAC objectives. Continuation of these programs for both large and small spawning populations is vital to the future management of Fraser River sockeye and pink salmon.

Spawning population data for individual stocks are used in the following capacities:

- In the development of optimal production relationships (i.e., spawner-recruit) for each major stock, which are used in the development of in-season management strategies.
- Spawner / recruit relationships allow for further analyses of population structures and the stock specific dynamics of production (such as evaluations of dominant and off-cycle production relationships). It is important to recognize that recruitment per spawner and other production based relationships changes over time in response to a variety of factors, so monitoring such changes will be a key element of successful management in the future. For example, the increasing contribution of Mitchell River sockeye to the Quesnel stock group will affect the productive capacity of the entire group, but this important change in the structure of the Quesnel group would not have been recognized without spawning ground assessments.
- Individual spawning ground population estimates are used to complete a post-season analysis of annual sockeye returns, including the generation of production (catch, escapement and total returns by age) estimates for each spawning population. This represents a much finer resolution than is possible from the assessment of mixed stock catches in commercial, First Nations, recreational and test fisheries, and of estimates of escapement by stock group past Mission.
- Annual spawning ground enumeration programs for Fraser River sockeye provide key biological data from each spawning population, including population size by sex and matching scale, otolith, length and DNA data. These programs also provide estimates of the number of effective female spawners and egg deposition data, which are used to forecast future adult returns. These forecast data are critical to pre-season management planning conducted by the Fraser River Panel.





- Egg deposition data, in conjunction with programs that estimate freshwater juvenile sockeye abundance, allow for the separation of life history mortality into freshwater and marine phases. These data may provide critical insight in future years regarding the affects of environmental change, such as global warming, on Fraser sockeye populations.
- Where daily arrival data are available, we obtain information about time of arrival and the distribution of spawners in the natal watershed. Such estimates of arrival are obtained by daily index counts, such as at Henry's Bridge (Chilko stock) and Likely (Quesnel stock), and by fence counts, as on Early Stuart index streams, the Scotch Creek fence, the Stellako fence (potentially Nadina, and Stellako stocks) and the Sweltzer Creek fence (Cultus Lake). These data are used to evaluate the speed of travel between Mission and the spawning grounds, and to correct for possible stock identification bias in Mission escapement estimates (tendency for overestimation bias using stock ID methodologies, including DNA applications, in the distribution tails of the runs). This arrival timing information has also been an essential component in understanding the effects of extreme river discharge and temperature on the migration success and survival of sockeye exposed to such conditions in recent years.
- Spawning ground estimates are used in the development of Environmental Management Adjustment Models. These models are used by the Panel for in-season management to account for differences between Mission and upstream estimates that are due to a combination of environmentally induced mortality and estimation bias. Extreme migration conditions (high discharges and water temperatures) during the sockeye migration have become more common in recent years. Assessing the impacts of these extreme years on in-river salmon migrations requires the continuation of spawning assessment programs. It is important to recognize that the en route loss associated with early upstream migration behaviour of Late-run sockeye in recent years would not have been recognized without the spawning ground assessment programs conducted by DFO.
- The absence of spawning ground data will compromise attempts to develop improved run size models. This is contrary to Recommendation 10 of the 2003 Review Board report on the management of Fraser River sockeye salmon fisheries in 2002, which called for improvements to in-season run size estimation in order to more closely achieve management objectives. Without spawning assessment programs, management decisions will be made with less certain data, necessitating a more conservative management approach, and a reduction in the probability of achieving defined management objectives.
- In-river enumeration programs on Fraser River pink salmon have been conducted by DFO on both adult and juvenile Fraser River pink salmon populations since 1986. The in-river assessments are used by DFO to forecast future pink salmon returns, and the continuation of the programs is vital for Panel management of these stocks. In fact, if the in-river enumeration programs are discontinued, the Panel will lose its ability to track abundance changes in Fraser River pink salmon productivity and compromise the Panel's management capabilities.

Finally, in addition to being an obligation of Canada under the terms of the Pacific Salmon Treaty with the United States, the importance of maintaining consistent, high quality spawning ground enumeration programs was recognized by the Fraser River Sockeye Public Review Board. This Board was established by the Government of Canada, under the direction of the Honourable Brian Tobin, Minister of Fisheries and Oceans, to investigate the "apparent disappearance of several million sockeye salmon which normally would have migrated to spawning areas in the Fraser River watershed in 1994". The report published by the Review Board contained recommendations on a spectrum of issues, all of which were accepted by Minister Tobin<sup>1</sup>, as was the entire report. Included in the Board's report was the following commentary:

*"As part of an overall management strategy, a thorough plan for spawning escapement estimation is needed. Fundamental goals for accuracy and precision should be formulated at the stock and run timing group levels. Thorough quality control practices need to be formulated and enacted. The plan needs to be updated annually in light of new methodology, insight gained from unforeseen problems in the previous year, and changes in fish behaviour and their environment. .... Without such a plan, financial constraints may lead to a dangerously inadequate, ad hoc set of estimation procedures that would put genetically valuable stocks, and possibly major stocks, at risk."*

Most recently, 14 recommendations were put forward in a 2003 Review Board report on the management of Fraser River sockeye salmon fisheries in 2002. The Honourable Robert G. Thibault, Minister of Fisheries and Oceans, accepted all 14 of the recommendations. Of note is Recommendation 9:

*"It is recommended that monitoring and assessment studies be continued to improve understanding of the effects of high spawner density (e.g. Adams River) .... As well, external members of the Steering Committee advocate undertaking more extensive stock assessment studies on all Fraser River sockeye stocks."*





# PACIFIC SALMON COMMISSION

## FACSIMILE TRANSMISSION

DATE:

May 7, 2003

TO:

Members Committee on Scientific Cooperation

FROM:

Don Kowal

Pacific Salmon Commission

FAX: (604) 666-8707

OFFICE: (604) 684-8081

NUMBER OF PAGES FOLLOWING THIS PAGE:

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MESSAGE:

Attached for your information is  
correspondence related to the  
"Gwaii River sockeye and Pink spawning  
enumeration programs"

off faxed  
me

