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Proceedings of a Regional Advisory Process Meeting on the Level of Allowable Harm for Inner Bay of Fundy Atlantic Salmon in Support of Species at Risk

6 April 2004
Canadian Coast Guard Base
Dartmouth, NS

Robert O'Boyle
Meeting Chairperson

Maritime Provinces
Regional Advisory Process
Bedford Institute of Oceanography
1 Challenger Drive, P.O. Box 1006
Dartmouth, Nova Scotia
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Compte rendu d'une réunion du Processus consultatif régional au sujet des dommages acceptables au saumon atlantique de l'arrière-baie de Fundy en tant qu'espèce en péril

Le 6 avril 2004
Base de la Garde côtière canadienne
Dartmouth (N.-É.)

Robert O'Boyle
Président de la réunion

Processus consultatif régional des provinces Maritimes
Institut océanographique de Bedford
1, promenade Challenger, C.P. 1006
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August 2004 / août 2004

Foreword

The purpose of these proceedings is to archive the activities and discussions of the meeting, including research recommendations, uncertainties, and to provide a place to formally archive official minority opinions. As such, interpretations and opinions presented in this report may be factually incorrect or mis-leading, but are included to record as faithfully as possible what transpired at the meeting. No statements are to be taken as reflecting the consensus of the meeting unless they are clearly identified as such. Moreover, additional information and further review may result in a change of decision where tentative agreement had been reached.

Avant-propos

Le présent compte rendu fait état des activités et des discussions qui ont eu lieu à la réunion, notamment en ce qui concerne les recommandations de recherche et les incertitudes; il sert aussi à consigner en bonne et due forme les opinions minoritaires officielles. Les interprétations et opinions qui y sont présentées peuvent être incorrectes sur le plan des faits ou trompeuses, mais elles sont intégrées au document pour que celui-ci reflète le plus fidèlement possible ce qui s’est dit à la réunion. Aucune déclaration ne doit être considérée comme une expression du consensus des participants, sauf s’il est clairement indiqué qu’elle l’est effectivement. En outre, des renseignements supplémentaires et un plus ample examen peuvent avoir pour effet de modifier une décision qui avait fait l'objet d'un accord préliminaire.

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ABSTRACT

The inner Bay of Fundy Atlantic salmon population (*Salmo salar*) is designated as “endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is listed on Schedule 1 of the Species at Risk Act (SARA).

The prohibitions associated with SARA are scheduled to come into force on June 1 2004 and subsequently SARA will provide legal protection to this population. SARA provides that the Minister of Fisheries and Oceans may issue a permit to allow for incidental harm to a listed species if a number of conditions are met. The analysis provided herein will allow the Minister of Fisheries and Oceans to determine the basis under which permits are to be issued in Atlantic Canadian waters. In the context of these proceedings, “harm” refers to all prohibitions as defined in SARA. The severely depressed state and productivity of Inner Bay of Fundy salmon implies that any level of human-induced harm could jeopardize its survival or recovery. Recovery activities, including understanding the processes acting on the population, are essential to the survival and recovery of the population. All efforts are encouraged to minimize the impact of human activities on this population.

RÉSUMÉ

La population de saumon atlantique de l'arrière-baie de Fundy a été désignée par le Comité sur la situation des espèces en péril au Canada (COSEPAC) comme étant « en voie de disparition » et elle est inscrite sur la liste de l'annexe 1 de la Loi sur les espèces en péril (LEP).

Les interdictions prévues dans la LEP doivent entrer en vigueur le 1er juin 2004 et cette population de saumon tombera subséquemment sous la protection de cette loi. La LEP porte que le ministre des Pêches et des Océans peut délivrer un permis pour dommage fortuit à l'égard d'une espèce figurant sur la liste de la LEP si certaines conditions sont remplies. L'analyse présentée ici permettra au ministère des Pêches et des Océans d'établir la base sur laquelle des permis pourront être délivrés dans les eaux canadiennes de l'Atlantique. Dans le présent rapport, « dommage » s'entend de toutes les interdictions définies dans la LEP. Le grave appauvrissement de la population et de la productivité du saumon de l'arrière-baie de Fundy laisse croire qu'un dommage anthropique de quelque importance que ce soit pourrait nuire à sa survie et à son rétablissement. Les activités de rétablissement, y compris celles qui visent la compréhension des processus agissant sur la population, sont essentielles à la survie et au rétablissement de cette dernière. On encourage toutes les initiatives ayant pour but de réduire l'effet des activités anthropiques sur cette population.

INTRODUCTION

The chair, R. O'Boyle, opened the meeting by greeting the participants (Appendix 1) and inviting them to introduce themselves. The letter of invitation and agenda are presented in Appendices 2 and 3 respectively.

The objective of the meeting was to review the level of harm that would not jeopardize survival or recovery of inner Bay of Fundy (iBoF) Atlantic salmon and identify the potential sources of human-induced harm. The meeting used the guidelines for this evaluation that were produced at a DFO National Science meeting during 8 – 10 March 2004 (Rice, 2004). In support of this objective, a working paper addressing these issued was considered: Amiro, P. 2004. Review of Allowable Harm Permits for inner Bay of Fundy Atlantic salmon. RAP Working Paper 2004/24.

The products of the meeting are these proceedings, which provide details of the discussion generated in review of the working paper, and a Fisheries Status Report providing the conclusions of the review.

The Chair described the structure of the meeting. The rapporteur was identified as A. McPherson. The author of the working paper (P. Amiro) presented the results of the analyses, during which questions of clarification were addressed. This was done on sections to address the various aspects of the agenda. Participants were then given the opportunity to comment on the content of the document. The Fisheries Status Report and these Proceedings were drafted after the meeting based on the discussions and circulated to the participants for comment.

REVIEW OF SPECIES STATUS

Presentation Highlights

The inner Bay of Fundy (iBoF) Atlantic salmon is a distinct genetic component of the anadromous species, *Salmo salar*. Inner Bay of Fundy Atlantic salmon were known to spawn in 32 rivers northeast of (but excluding) the Saint John River in New Brunswick and the Annapolis River in Nova Scotia. The population has been in decline since 1990 and has varied from a peak of 40,000 mature fish in the 1970s to less than 200 wild adult salmon in 2003. Index river assessments show a declining trend (90% probability of 99.8% and 94.7% decline of five-year mean population size for Stewiacke and Big Salmon Rivers, respectively) and juvenile population monitoring indicate wide spread extirpations. Return rates from smolt to adult, an indicator of survival in the marine phase, has declined to extremely low levels relative to the 1970s and 1980s. Persistence of the population is currently maintained through the Live Gene Bank (LGB) program (a pedigree-supported spawning and rearing program designed to minimize the effects of hatchery programs on fish populations) currently utilizing 11 rivers. The iBoF Recovery Team set the recovery

target as the population distribution and abundance observed prior to the collapse in 1990; however no time horizon for recovery has been estimated.

Discussion

It was acknowledged that the focus of the working paper was on commercial fishing activities and their potential impact. Although other activities were discussed, no specific investigation of the impact of SARA prohibitions on Aboriginal fisheries or habitat was undertaken.

Natural recruitment was discussed. The author clarified that, based on his analyses, there was no equilibrium point above zero based on the stock - recruitment curve. Natural recruitment is thought to be possible but recovery of this population will depend on recruitment survival. Smolts can be generated from eggs but marine survival remains very low. The Live Gene Bank (LGB) was described as being essential for recovery of this population. LGB support in iBoF rivers will maintain the population until the cause for the decline can be identified and ameliorated.

A participant questioned the health of iBoF salmon freshwater habitat. The presence and maintenance of juveniles attests to the fact that habitat is in fact acceptable for salmon. Smolts are produced and smolt migrations have been observed. Anadromous and freshwater fish species have been monitored to see if there is a pervasive habitat effect. However, no differences in species composition have been observed over time. In terms of the estuaries, fish passage is an issue, although the author did not believe that fish passage has deteriorated during the timeframe of salmon decline. To evaluate the impact of any one activity (e.g. obstructions), the probability of catch, harm associated with catch and release, and the impact on of this harm on the populations would need to be considered.

When the recovery team articulated a recovery target, they did have information on the stock - recruitment curve. The recovery team thought they should reassess the status of iBoF salmon and recovery feasibility in 10 years time.

REVIEW OF SCOPE FOR HUMAN-INDUCED HARM

Presentation Highlights

At present, the iBoF salmon population is not recovering and is not viable without LGB support. As a result, some instances of human-induced harm could jeopardize survival, and depending on the state of the population, recovery of this genetically distinct population of salmon. Affecting the recovery of this population requires scientific activity. Hence, some level of human interaction with these salmon is required.

Discussion

Although there was discussion on the relative impact of harming adults vs smolts and their potential contributions to recovery, participants agreed that iBoF salmon are not recovering and thus, any harm may jeopardize survival or recovery of the population. Therefore, according to the national guidelines (Rice, 2004), there was no need to consider sources of mortality, alternate activities and mitigation measures for the impacting activities. Notwithstanding this, the meeting did review these activities and their potential impacts (next section) to provide information to the fisheries managers.

One participant suggested that the remaining adults may be extremely important to survival as they may pose some type of fitness advantage over the salmon that have been extirpated.

The chair was asked to describe the responsibilities of the competent minister with respect to monitoring the level of harm to salmon. The chair clarified that monitoring the status of the resource is within the mandate of the Department of Fisheries and Oceans.

The potential implications of the “no harm” determination were discussed. Participants from Resource Management (DFO) advised that they will be dealing with the implementation of this scientific advice.

REVIEW OF SOURCES OF MORTALITY/HARM

Presentation Highlights

Potential sources of human-induced harm were discussed. Information on specific fishery-interactions was drawn from Loch et al. 2004 and supplemented by the author of the working paper. The following summarizes activities that were considered in the discussions of the meeting and indicates which activities may affect iBoF salmon populations.

Activities considered:

- Since 1985, there have been no directed salmon fisheries in New Brunswick, Nova Scotia, and Newfoundland, areas where catches of iBoF Atlantic salmon have been recorded.
- Since 1983, there have been no directed salmon fisheries in the eastern United States.
- Salmon by-catch in non-salmon gear has been prohibited in Canada and in the US since 1983.
- There are commercial fisheries for known prey of Atlantic salmon. Fisheries for juvenile herring occur in the Bay of Fundy using high head weirs, which are

pursed for juvenile herring capture. By-catches of salmon are known to occur in these high head weirs. One high head weir in the iBoF caught and live released seven salmon in 2003; five were sampled before live release. These samples have not yet been tested to determine origin (i.e. whether or not they are members of the Inner Bay of Fundy salmon population).

- The potential exists for mortality of Atlantic salmon in the by-catch of gill nets, seines and mid-water trawlers targeting shad, mackerel, gaspereau, and herring. These fisheries are associated with many nets. In addition, holders of lobster licenses automatically receive a bait licence which entitles them to 3 gillnets for herring and mackerel. No documented catches are known for the gill net fisheries in the Bay of Fundy. According to Fishery Officer reports, encounters are rare. However, there are only 2-5 fishery officers working in the Bay of Fundy. Therefore the rarity of an encounter may be related to the low level of monitoring effort. There is no evidence for capture of salmon in purse seines targeting herring, despite efforts to collect this information. There is no information on the impact of mid-water trawls. Legislation currently requires mandatory release of captured fish.
- Commercial fishing activities for gaspereau in freshwater could be a source of indirect fishing mortality on juvenile salmon. Square net traps in the Gaspereau River require in-stream work. It is unlikely that that there would be an iBoF redd in this area.
- There are no known commercial fishing activities licensed in the marine habitat area utilized by iBoF salmon that would physically disrupt the marine habitat of mature salmon at sea.
- Direct mortality of seaward migrating Atlantic salmon, particularly maturing smolts, is known to occur at hydro powered electrical power generating stations in the Gaspereau River, Nova Scotia. Based on recent data provided by Nova Scotia Power, the mortality is likely in the order of 1.2% of the migrating population of smolts. There are five power plants on this system.
- Water management permits issued under provincial legislation, but cleared through DFO as Fisheries Act authorizations, are in place in many iBoF rivers. These activities include water management for power generation, irrigation, flood control, commercial and domestic water supply. The principal salmon rivers affected are; Cornwallis, Halfway, Avon, Gaspereau, St. Croix, Chiganois, Great Village, Parrsboro, Shepody, Petiticodiac and tributaries of Petiticodiac River. There are no estimates of mortality associated with these activities. However, there are more water-withdraw permits in place than water available in some cases. Cumulative impact of water withdraw was not assessed by DFO when permits were authorized. Therefore, the currently held provincial licenses may impact on iBoF salmon. There are no river specific salmon impact models for water removal.
- By-catch in marine recreational fisheries (angling and hand-lining) in the Bay of Fundy is unlicensed. Information from Fishery Officers indicates no recorded by-catch of iBoF salmon in these fisheries.
- There is the possibility for by-catch of salmon in freshwater recreational fisheries. Seasons are regulated to minimise the interaction with downstream and up-

stream migrating salmon and retention is prohibited under the Maritime Provinces' Fishing Regulations and the National Park Fishing Regulation.

- There is the possibility for harm to maturing and mature salmon associated with noise, shock waves, dredging and drilling in the Bay of Fundy. A mandatory review of applications to kill fish by means other than fishing or alter fish habitat is currently in place under the Fisheries Act. SARA would require consideration of "harassment and harm" to a species at risk. For many activities, construction times and methods can be varied to mitigate harm to iBoF salmon.
- At present, there are no EA proposals in review for seismic activities in the Bay of Fundy. There are seismic activities occurring on the Scotia Shelf of Nova Scotia. Seismic activities may have an effect on finfish. However, due to the concentration of iBoF salmon in the marine environment, interaction is thought to be minimal. The potential for salmon "harassment" would need to be considered.
- There are land-based oil and gas leases around the inner Bay of Fundy rivers. However, there is a low incidence of lethal spills and therefore, a minimal probability of such an incident jeopardising survival or recovery of iBoF salmon.
- There are no known mortalities of salmon associated with marine transportation.
- There are extensive salmon farming activities in the western Bay of Fundy that could affect the iBoF salmon. There are many possible biological mechanisms for salmon farming to negatively impact iBoF salmon. Impacts may include occupation of habitat, increased incidence of ecto-parasites and disease, genetic introgression of non-native genes and increased presence of predators of salmon associated with farm operations. Measures are being taken to address a number of these potential effects. Offshore aquaculture sites may also have direct impacts on iBoF salmon; however, no exhaustive assessment of potential impacts has been undertaken.
- The licensing of the transfer of salmonids between sites and introductions from other areas (importations) has the potential to affect iBoF salmon via indirect consequences: e.g. disease and genetic introgression. Escapees and the establishment of non-native fish in the iBoF salmon may lead to the weakening of specific adaptations (in iBoF) or competition with native salmon. The impact of this type of introgression with native iBoF is estimated as high. The status of iBoF salmon is known to the Nova Scotia and New Brunswick Introductions and Transfers Committees.
- There is the possibility for harm of iBoF Atlantic salmon associated with scientific research in the iBoF salmon habitat (both marine and freshwater). Scientific Research activities require a permit and all data must contribute to the recovery of iBoF Atlantic salmon. Non-lethal sampling is used wherever possible.
- Sonar activities undertaken by the military may impact iBoF salmon. There is currently no permitting mechanism in place for these activities.

Discussion

Although the cumulative impact of activities described above and mitigation measures were not discussed, the author provided an evaluation framework for consideration by fisheries managers as a guide to the management of these

activities. The focus was on those activities that might have some potential impact on Inner Bay of Fundy Salmon. This is provided in Appendix IV.

CONCLUDING REMARKS

The chair thanked the participants for their valuable participation and contribution. As stated at the start of the meeting, the main conclusions of the discussion are to be drafted as a Maritimes Fisheries Status Report. This is an interim solution until a national decision has been made on the placement of these SARA related reports. The discussion of the meeting will be drafted as a proceedings. Both documents will be circulated to the participants for their comment.

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Appendix I: List of Participants

Participant	Affiliation/Address	Telephone	E-mail
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Appendix II: Letter of Invitation

Fisheries and Oceans Pêches et Océans

29 March 2004

Re: Regional Advisory Process review on the level of allowable mortality of inner Bay of Fundy Atlantic salmon

The prohibitions associated with the Species at Risk Act (SARA) are scheduled to come into force on June 1 2004; subsequently, inner Bay of Fundy Atlantic salmon will become legally protected from activities that contravene these prohibitions. SARA provides that the Minister of Fisheries and Oceans may issue a permit to allow for incidental harm to a listed species if a number of conditions are met (SARA Section 73 (2, 3)). In support of this evaluation, Fisheries Management Branch has requested scientific advice on whether or not incidental harm (carried out by commercial fishing activities) would jeopardise survival or recovery of inner Bay of Fundy Atlantic salmon. This analysis will allow the Minister of Fisheries and Oceans to determine the basis under which permits are to be issued in the commercial fisheries in Atlantic Canadian waters.

Due to the timeline required and the nature of the existing data, a Regional Advisory Process (RAP) has been scheduled for **Tuesday April 6 2004** to review the advice generated by Fisheries and Oceans science staff. The draft for review is attached. We invite your participation in this review which is scheduled to **begin at 9:00 AM and conclude at 12:00 PM** in the Dartmouth Canadian Coast Guard Base Boardroom (3rd floor) on Parker Street.

The background documents for this meeting are available in PDF format at the following website. The documents are password protected with the same password for all " sarasalmon "

http://www.mar.dfo-mpo.gc.ca/science/rap/internet/workingpapers2004.htm

Thank you for your consideration of this request. I would appreciate confirmation of your participation (either in person or via telephone) in this process to Lynn Cullen @ 902-426-4164.

Yours sincerely,

Robert O'Boyle
Associate Director of Science; RAP Co-ordinator

BACKGROUND

SARA authorizes competent ministers (the Minister of the Environment and the Minister of Fisheries and Oceans) to enter into an agreement or issue a permit authorizing otherwise prohibited activities affecting a listed wildlife species, any part of its critical habitat, or the residences of its individuals. Sections 73-78 of the Act set out the conditions under which an agreement may be entered into or a permit issued, as well as the nature of the terms and conditions that may be included in such permits and agreements.

The competent ministers will be prepared to issue permits or enter into agreements in accordance with sections 73-75 of SARA on June 1, 2004 when the prohibitions sections of the Act come into force.

What activities may be authorized?

Under section 73(2) of SARA, authorizations may only be issued for one or more of the following purposes:

(a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
(b) the activity benefits the species or is required to enhance its chance of survival in the wild; or
(c) affecting the species is incidental to the carrying out of the activity

Under what circumstances are activities authorized?

Section 73(3) establishes that authorizations may be issued only if the competent minister is of the opinion that all three of the following pre-conditions are met:

(a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;
(b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and
(c) the activity will not jeopardize the survival or recovery of the species.

Appendix III: Agenda

Regional Advisory Process
Allowable Mortality of iBoF Atlantic Salmon in Support of the Species at Risk Act
Coast Guard Base Boardroom
06 April 2004

9:00 Welcome and introductions (Chair)

9:10 Presentation on allowable mortality for iBoF Atlantic salmon (P. Amiro)

9:40 Questions of clarification

10:10 Focused discussion on:

- Present species trajectory (and level of uncertainty)
- Present species status (and level of uncertainty)
- Recovery target and timeframe for reaching this target
- Whether human-induced morality can be permitted without jeopardizing survival or recovery of the species
- The maximum level of human induced mortality the species can sustain and not jeopardize survival of recovery of the species
- Major potential sources of mortality/harm and the level associated with each activity

11:30 Next steps:

1. If required, a summary species at risk status report for the CSAS website

Suggested headings include:
Summary
Species Status
Scope for Human-induced Mortality/Harm
Sources of Mortality/Harm
Rationale for Permitting

2. Proceedings of the meeting.

12:00 Adjournment

Appendix IV. Evaluation Framework for Potentially Impacting Activities

The following Table summarises the information associated with permits affecting mortality of iBoF salmon and attempts to assess actions directed to reduce or eliminate the activity. Associated with these actions are expected decreases in catch ability "q" or mortality "M", collateral effects that would result e.g. closed fishery, and what the likely benefits per cost would arise. This table is only provided as suggested qualitative risk assessment tool to assess alternative actions and is incomplete. Uncertain numbers are followed by (?).

Activity with potential for impact	Number licenses / nets	Effort (days per season)	Relative Probability of Capture (Catchability or q)	Probability of live release	Possible Alternative Management Actions	Probable reduction in "q" or increase in "M"	Collateral Impact	Benefit/Cost ($CND)
High head weirs	Unknown	60d	Low	High	Do not licence general non-directed catch weirs, Reduce to low head	High High	Nil Nil	Low/-10k/weir Low/-8k/weir
Gaspereau and herring gill nets	255 / 25,507	unknown	Low	Low	Restrict to fished tight Restrict to smaller mesh Delay opening of season in rivers to >14C	Moderate Moderate High	Nil Nil Nil	Low/Low Low/Low Low/Low
Gaspereau trap nets	32 / 164	30d/trap	Low	High	None required			
Power plants	1 / 1	360d	.15	.8	Increase bypass efficiency Reduce turbine mortality Cease operation during kelt and smolt migration	Moderate Moderate High	Nil Nil Moderate +	10K per %?? Not possible 20k/d*30d
Dams	11(?) / 11	360d	Not applicable	Not applicable	None required	Nil	Moderate -	Low/High
Recreational fisheries	Unknown But maybe approx 10,000 licences	180d	Low	High	Further restrict angling in rivers during the presence of migrating smolts and returning adults	Low	Nil	Low/High 30$/rod day lost???

Activity with potential for impact	Number licenses / nets	Effort (days per season)	Relative Probability of Capture (Catchability or q)	Probability of live release	Possible Alternative Management Actions	Probable reduction in "q" or increase in "M"	Collateral Impact	Benefit/Cost ($CND)
Scotia Shelf Seismic	1-6 surveys annually	Unknown	Low	Low	Ramp up sound generation (Already done in some areas) No activity during thermal preference temperature (4-10C)	Nil Nil	Nil Nil	Low/Low Low/High
Lethal spills Scotian Shelf drilling	Unknown	N/A	Low	Unknown	Do not permit drilling	Nil	Nil	Low/High
Herring fisheries (Juveniles)	Unknown	Unknown	Low	High	Do not permit high head weirs	Low	Low +	Low/High
Salmon farming	Unknown	360d	Nil	Not Applicable	Close farms Move to land based Enforce no escapement rules Enforce therapeutics laws	Unknown Unknown Unknown Unknown	Moderate + Unknown Moderate + Moderate +	Unknown/High Unknown/High Moderate/Moderate Moderate/Unknown
Scientific research	3 / 5	30d per device	Unknown to .10	Low to .003 (BSR)	Do not issue permits that have a high probability of incurring mortality.	Low	Nil	Low/Low