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## **Status of the Flat Bay River stock of Atlantic salmon (Salmo salar L.) in 1994**

by

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<sup>1</sup>La présente série documente les bases scientifiques des évaluations des ressources halieutiques sur la côte atlantique du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

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### **Abstract**

Target egg deposition for Flat Bay River is established at 3,842,880 eggs to come from both large and small salmon. Biological characteristics collected from a limited sample of 42 fish reveal a presence of a 2 SW component within this stock. The spawning escapement for 1994 accounted for 20% of the required egg deposition. A total of 87,866 eggs were placed in incubators during the 1994 season. Final egg deposition rates for the Flat Bay River in 1994 will be available upon completion of stocking activities in the spring of 1995.

### **Résumé**

La ponte-cible dans la rivière Flat Bay est estimée à 3 842 880 oeufs, provenant à la fois des grands et des petits saumons. Les caractéristiques biologiques relevées dans un petit échantillon de 42 poissons révèlent la présence de saumons d'ibermarins dans ce stock. L'échappée de reproducteurs pour 1994 correspondait à 20 % de la ponte requise. En tout, 87 866 oeufs ont été placés dans des incubateurs au cours de la saison 1994. Les taux de ponte définitifs pour la rivière Flat Bay en 1994 seront connus au terme des activités de stockage, au printemps de 1995.

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## Introduction

Flat Bay River situated in Salmon Fishing Area (SFA) 13 encompasses a watershed area of 635 km<sup>2</sup>. Due to natural obstructions anadromous Atlantic salmon only have access to 89% of the riverine habitat and virtually no standing water habitat (Porter et. al., 1974). Porter et. al. (1974) record 16,012 (100m<sup>2</sup>) rearing units accessible to anadromous Atlantic salmon.

In 1994 a counting fence was operated on the Flat Bay River by the Barachois Development Association funded under Canada/Newfoundland Cooperative Agreement for Salmonid Enhancement /Conservation (CASEC) and Human Resources and Development. The intent of this project was to determine if the Flat Bay River stock was a candidate river for salmon enhancement activities.

The intent of this paper is to document the target egg deposition and determine to the extent possible the stock status of Flat Bay River for 1994.

## Background

Porter and Chadwick (1983) list the required number of spawners for Flat Bay River as 2,905 which is based on 92% and 8% grilse and large salmon respectively. The percentage large fish was based on recreational fishery statistics. Fecundity was assumed to be 1,540 eggs/kg. for all fish (Anon. 1978).

With respect to the recreational fishery the Flat Bay River has been under quota since 1986 (Table 1).

In 1992 a small hydro electric dam on Lookout Brook (Tributary 5 of Porter et. al. 1974) was breached causing siltation of the main stem downstream. There was no assessment of the impact on production if any. Porter et. al. (1974) noted excellent spawning habitat between the Trans Canada Highway and Three Brook (T4).

## Methods

Biological characteristics used in the present paper are those collected from the 1994 broodstock (Table 2). These broodstock were seined from the river in late September.

Target egg deposition is based on 2.4 eggs/m<sup>2</sup>.

A fish counting fence located just above the head of tide operated from June 16 - September 12. On June 11 and August 7 sufficient conduit pipe was removed from the fence to allow fish to pass uncounted for a 24 hour period. On September 12 the counting fence washed out and was not replaced. The fence count was adjusted upwards to account for missed fish as follows; (1) The daily counts were broken down into three time periods (0000hrs. - 0800hrs.; 0801hrs. - 1600 hrs.; and 1601 hrs. - 2359 hrs.) (ii) the average of the five previous and five post periods was applied to the period of the missed count.

### Results and Discussion

The fence enumerated a total of 470 adult salmon (403 small and 67 large) with the adjusted count totalling 490 adult salmon (this adjustment did not take into account the late installation of the fence). Based on the fence count 16.6% of the run was comprised of large salmon. The biological characteristic data collected did not reveal any repeat spawning grilse. Smolt ages as determined from the broodstock revealed that of the grilse 26% , 71% and 3% were of river age 4<sup>+</sup>, 3<sup>+</sup> and 2<sup>+</sup> respectively. Each of the two large salmon had a river age of 3<sup>+</sup>.

Table 1 displays the angling catches from 1986 - 1994. In 1994, 50% of the 128 grilse retained were angled below the counting fence (A. White pers. comm.) bringing total returns to the river to 554 and reducing the large component to 12.6% of total returns to the river. However it should be noted that 32 large salmon were hooked and released which is 48% of the large fish enumerated at the fence. Should hook and release mortality be significant then this act could be causing significant reductions in the number of 2 SW fish spawning in some watersheds. It is interesting to note that of the 32 large fish angled 28 of these were angled prior to July 31 thus suggesting that these early large fish are highly susceptible to angling, early in the season. Exploitation (retention) on grilse was 23% of the run.

The target egg deposition for Flat Bay River is estimated to be 3,842,880 eggs. At present the percentage of the required egg deposition that should come from large salmon cannot be determined due to lack of information on the production potential of the Flat Bay stock. Egg deposition in 1994 was calculated for both large and small salmon and then totalled.

Forty-three (40 small and 3 large) fish were seined in late September and used as broodstock for egg incubation.

Biological characteristics used in addition to those in Table 2 are as follows: female small salmon 72%; percent large salmon female 90% and 1540 eggs/kg. The

1540 eggs/kg. was used, even though the 46.3 kg. of females stripped yielded 87,866 eggs or 1898 eggs/kg , as some of the eggs stripped were of inferior quality (size) and did not fertilize. It is also interesting to note that these inferior eggs came from grilse.

Spawning escapement is estimated to be 383 fish (326 grilse and 67 large salmon) for a total of 751,325 eggs or 19.6% of target egg deposition. Final egg deposition figures will be forthcoming after the fry from the eggs of the 43 broodstock are distributed in June of 1995. If the 43 brood fish had not been removed then the egg deposition rate would have been 21.5% of target.

If the angling exploitation in 1994 is indicative of previous years then from 1986 - 1994 the watershed on average received 30% of the required egg deposition with a range from 19% - 41%. While this calculation does not take into account any changes that occurred within specific years it is obvious that this stock is receiving low egg deposition and that there has been no apparent increase in returns as a result of the 1992 moratorium or other management changes.

The authors recommend that action be taken immediately to reduce mortality on this stock.

#### References

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Table 1. Angling statistics Flat Bay River 1986 - 1994.

Year	Quota	Effort	Small Retained	Small Released	Large Released
1986	400	684	174	0	2
1987	300	815	219	0	0
1988	300	871	249	0	5
1989	250	612	130	0	1
1990	250	939	277	0	6
1991	250	977	251	0	2
1992	250	665	223	0	20
1993	250	678	173	0	17
1994	250	615	128	8	32

Table 2. Biological characteristics of salmon taken for broodstock Flat Bay River.

	Male Grilse (11)	Female grilse(28)	2 SW salmon(3)
Mean Weight(kg.)	1.46	1.27	3.22
Mean Length(cm)	55.43	51.46	67.17