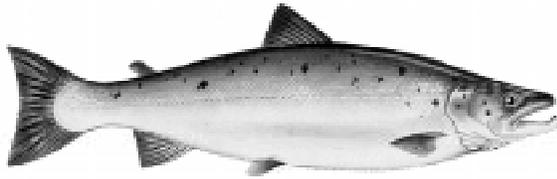




Maritimes Region

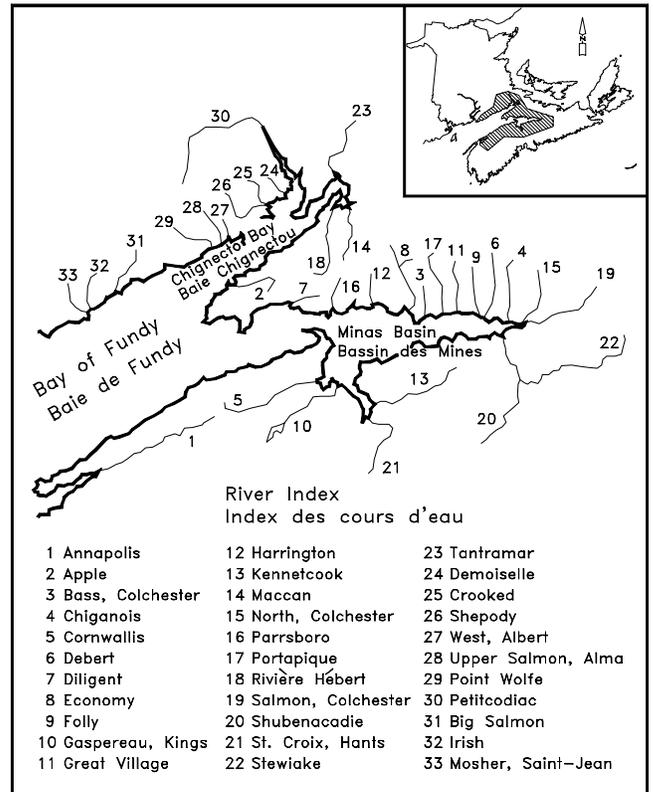


**Atlantic Salmon**  
**Inner Bay of Fundy**  
**SFA 22 & part of SFA 23**

**Background**

Atlantic salmon (*Salmo salar*) utilize both freshwater and the ocean for their life cycle. Salmon spawn in freshwater, grow to smolts in two to three years, migrate to the sea, mature and return to their natal river to complete the cycle. Variations in duration spent at these stages occur among stocks and generations. Salmon of Inner Bay of Fundy usually enter rivers in the fall of the year, have a high proportion that return to spawn after one winter at sea, are not generally known to migrate to the North Atlantic Ocean, and have high survival between consecutive spawnings. Inner Bay of Fundy rivers share similarities in geography, biology and probably marine distribution. Inner Bay of Fundy stocks inhabit twenty-six rivers in Salmon Fishing Area (SFA) 22, Nova Scotia, and ten rivers in SFA 23, east of the Saint John River, New Brunswick. Two rivers, the Big Salmon River and the Stewiacke River account for more than half of the current production of salmon in inner Bay of Fundy rivers.

Two stocks, Annapolis and Gaspereau, are situated in SFA 22 but are different from the Inner Bay of Fundy stocks; they have a significant 2-sea-winter salmon component and migrate to the northwest Atlantic.



The Inner Bay of Fundy stocks have been in decline since 1986. Conservation requirements based on 2.4 eggs m<sup>-2</sup> have not been met in any inner Bay of Fundy river since 1989. These rivers have been closed to all fishing for salmon since 1990.

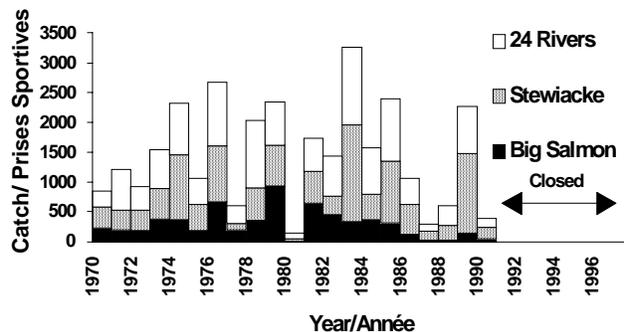
**Summary**

- All salmon fisheries have been closed since 1990.
- Juvenile salmon abundance has remained low since 1991.
- At least four years of recovery are needed before a fishery can be considered.

**The Fishery**

Inner Bay of Fundy rivers historically supported commercial and recreational salmon fisheries. Annual landings by commercial fisheries in the inner Bay of Fundy averaged 1,061 salmon during 1970-1984. The fishery was closed in 1985 and all licenses have since been retired.

Average annual recreational catches for 25 of 33 Inner Bay of Fundy rivers were 1,462 small salmon (< 63.0 cm) and 597 large salmon (≥ 63.0 cm) for 1970-1990. There have been no recreational or aboriginal fisheries since 1990, with the exception of the Gaspereau River which was opened to a catch-and-release angling fishery in 1997. Both the Gaspereau and the Annapolis are situated in SFA 22 but neither river has a stock typical of Inner Bay of Fundy stocks.



**Resource Status**

**Inner Bay of Fundy Stocks**

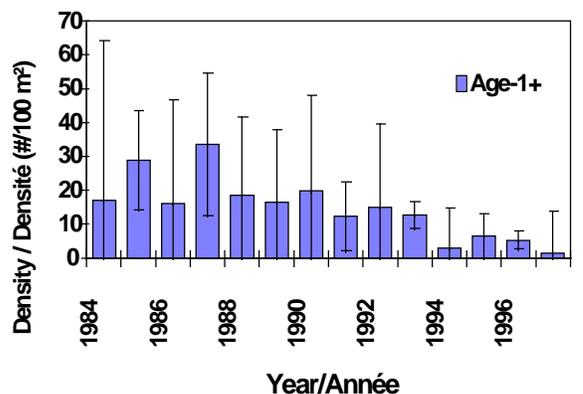
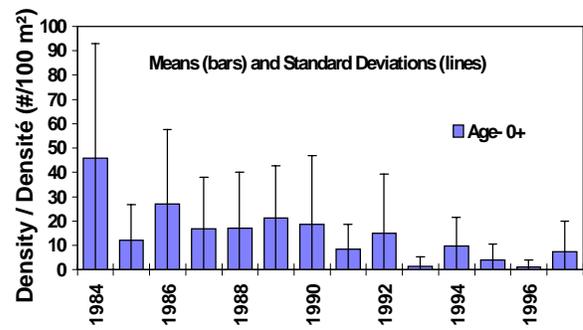
In general, conservation requirements have not been met since 1989 in any Inner Bay of Fundy river and current stock levels are very low. Rivers of Inner Bay of Fundy remain closed for conservation reasons until at least four years of good juvenile densities are measured. The status of the Inner Bay of Fundy salmon stocks is largely assessed on the basis of the performance of the

Stewiacke and Big Salmon River stocks. This year's assessment is based on juvenile salmon abundances in the Stewiacke River and Big Salmon River.

*Stewiacke River:*

Densities of age-0<sup>+</sup> and age-1<sup>+</sup> salmon parr in the Stewiacke River have declined significantly since 1990 and are currently very low.

**Rivière Stewiacke/Stewiacke River**



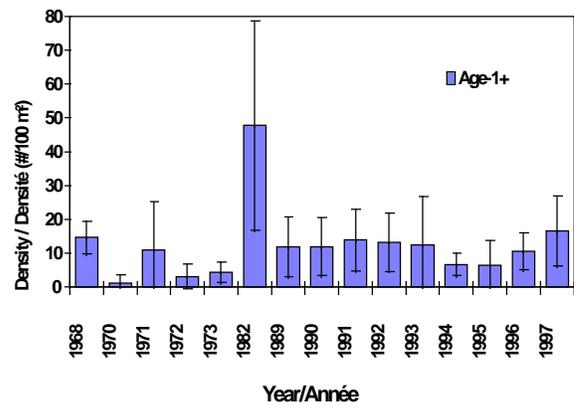
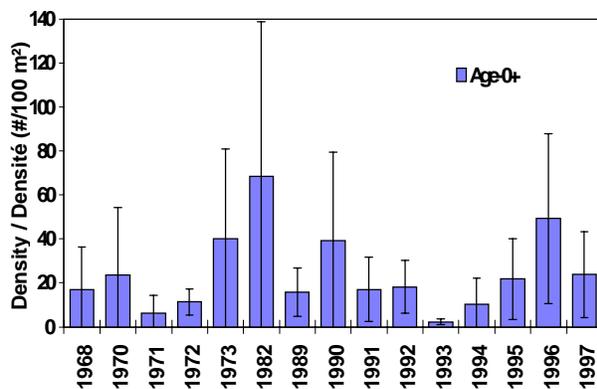
The stocking of hatchery smolts has been ineffective for enhancing the Stewiacke salmon stock. Their failure to return in significant numbers is further evidence that the Inner Bay of Fundy stocks are experiencing low marine survival.

*Big Salmon River:* Approximately 50 small and large salmon were estimated from visual

counts to have returned to Big Salmon River in 1997 (New Brunswick Department of Natural Resources and Energy). This return corresponds to <10% of the conservation requirement of 700 salmon.

Juvenile densities in the Big Salmon River do not show the same dramatic decrease noted in the Stewiacke River. The most notable difference between the rivers is the higher density of age-0<sup>+</sup> parr in the Big Salmon River in 1995 and 1996. This is assumed to result from releases into the river of mature adult salmon of native stock origin grown in sea cages. More than 200 adult salmon were released in each of 1994 and 1995 by the Big Salmon River Association and the New Brunswick Department of Natural Resources and Energy. The spawning success of these cage-grown adults was confirmed by the presence of age-0<sup>+</sup> parr above a natural obstruction to passage where a small number of the cage grown adults were stocked in 1994.

**Rivière Big Salmon/Big Salmon River**



*Other Inner Bay of Fundy Rivers:* Electrofishing at nine sites in six other Inner Bay of Fundy rivers in 1997 confirmed that juvenile densities were low throughout the area. Densities of age-0<sup>+</sup> parr were low and densities of older parr were below historic values. Trends in densities in these six rivers follow the pattern observed in the Stewiacke River.

**Non-Inner Bay of Fundy Stocks**

Only the Annapolis and Gaspereau rivers stocks fall under this grouping. Information to assess these stocks are limited to data acquired during collections of broodstock for the hatchery program and counting of adult salmon in the fishway in the Gaspereau River.

*Annapolis River:* Seining operations carried out during the past several years to collect broodstock for the hatchery program indicate stock abundance is low.

*Gaspereau River:* Total returns of salmon through the fishway at White Rock were 98 fish in 1997. This return, comprising 35% hatchery fish, equaled 71% of the conservation requirement for the river.

## *Outlook*

Salmon returns to all Inner Bay of Fundy rivers are extremely low as a result of abnormally low sea survival by 9 of the last 11 smolt classes (the exceptions being the 1988 and 1990 smolt classes). Low parr abundances indicate that there is little chance for these stocks to recover within the next four years.

Neither the Gaspereau River nor the Annapolis River salmon stock are expected to meet conservation requirements in 1998 because of low marine survival that these and other distant migrating stocks are experiencing. Expectations of returns equal or greater than conservation requirements are low even with hatchery returns included. There is little chance that the Annapolis River stock returns will exceed conservation requirements within the next ten years. Fish passage constraints, river acidification and agricultural practices also affect this stock.

## *Management Considerations*

Marine survival continues to be low and there is no indication when conditions may change. As well, juvenile densities are low which will delay recovery if marine survival improves. No exploitation should be considered until stocks rebuild. Recovery is expected to take at least a generation (4-5 years) under conditions of improved marine survivals and escapements.

Inner Bay of Fundy stock levels are reduced to the point that action should be considered to hedge against their extirpation.

## *References*

Amiro, P.G. and E. M. Jefferson. MS 1998. Status of Atlantic salmon in Salmon Fishing Areas 22 and 23 for 1997, with emphasis on inner Bay of Fundy stocks. DFO CSAS Res. Doc. 98/40.

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