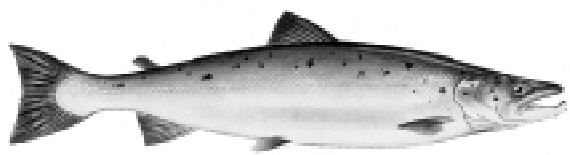
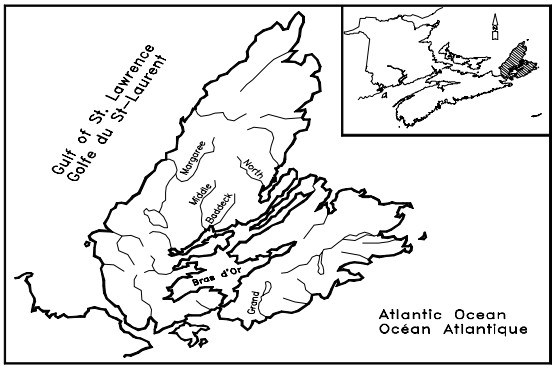


Atlantic Salmon
Cape Breton
SFA 18 [part] & SFA 19



Background

Cape Breton Island has at least 33 rivers which support Atlantic salmon. Rivers of Inverness and Victoria counties with headwaters in the Cape Breton Highlands have steep gradients and on a per unit area basis are the more productive for salmon (e.g., Margaree, Middle, Baddeck and North rivers). Rivers of Cape Breton and Richmond counties are of lower gradient and production potential (e.g., Grand River).

The Margaree has the largest of the Island's salmon resources with an estimated 2.8 million m^2 of juvenile production habitat. The next larger are the Middle and Baddeck each with 0.8 million m^2 of habitat; the remainder of the rivers are smaller. Stock composition varies from that of the Margaree with summer- (20-40%) and fall- (60-80%) running components each comprised of 70-80% large salmon (multi-sea-winter), to that of the Grand River which has predominantly (90-95%) a summer run of small salmon (one-sea-winter). The North River stock is primarily comprised of summer-run large fish; most stocks of other rivers tend to be large fish but of fall-run timing (Baddeck River) or occasionally with a small summer-run component (Middle River).

Conservation requirements are established for individual rivers based on 2.4 eggs per m^2 of river habit. The object, where possible, is to obtain the egg depositions from the large salmon component.

Stocking from the Cobequid hatchery in 1997 consisted of about 15,000, 6,000 and 4,000 smolts to the Grand, Indian (Qamsipuk) and Salmon rivers, respectively. Eggs of Margaree and Qamsipuk Brook stocks were collected in 1997. Hatchery-origin fish comprised significant large salmon returns in the North River and small salmon returns in Grand River.

Aquaculture of Atlantic salmon and rainbow trout/steelhead salmon occurs at several sites in Cape Breton (mostly within proximity to Bras d'Or). In 1997, total production was 373t; salmon are thought to have comprised three-quarters of the total. Atlantic salmon are of Saint John River, River Philip and LaHave River origins. No major escapes were known to have occurred in 1997; compared to 1995, sightings of salmon and rainbow trout escapees were few in the Middle and Baddeck rivers. A few rainbow trout are reported in the Margaree River. Black salmon, kelts or slinks are terms applied to small or large salmon in freshwater after spawning. Where sanctioned, exploitation of black salmon usually occurs in April/May as the fish return to sea.

Summary

- In 1997 the Margaree and North rivers exceeded conservation requirements; the Middle, Baddeck and Grand rivers did not meet requirements.
- Returns to Cape Breton rivers in 1998 may be fewer than in 1997; the Margaree and North rivers should again exceed conservation requirements.
- Juvenile densities in many rivers are near normal or above and should maintain stocks in the short term if recent reduced marine survival continues.

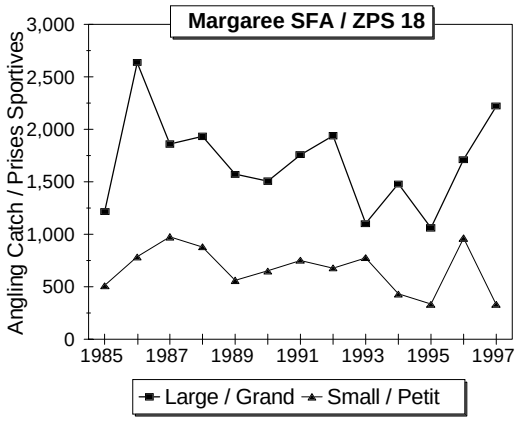
The Fishery

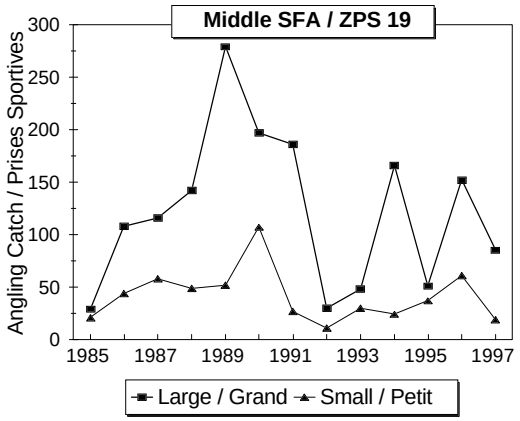
Allocations totaling 1,130 small, 700 large and 100 black salmon were made to the five First Nations of Cape Breton Island. Of the total, 130 small and 650 large fish were targeted from the Margaree River; 50 small and 50 large fish were specified from the North River. The remainder were to be taken from within Bras d'Or Lake. Reported harvests numbered 234 fish, up slightly from those of 1996. Known harvests were mostly from the Margaree River and Nyanza Bay. There was no catch by the Native Council of Nova Scotia whose 22^{+} individuals in Cape Breton could each tag 10 captured salmon.

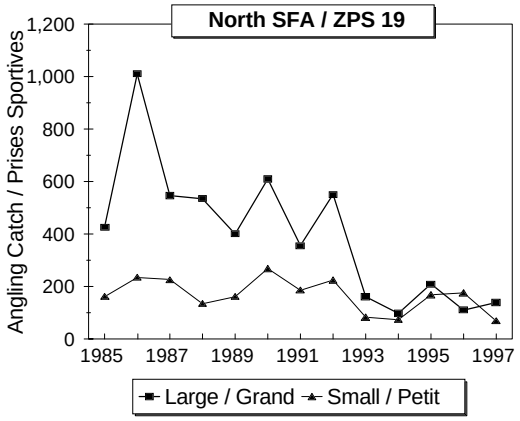
As in previous years, commercial fisheries were closed (two fishers remain eligible for re-entry) and by-catch in non-salmon commercial gear was prohibited. The recreational fishery for salmon on Cape Breton in 1997 was, with the exception of the Margaree, Mabou and Judique rivers, restricted to hook-and-release. The Margaree was open to the retention of small salmon (<63cm) Jun 1-Oct 31; Mabou and Judique rivers were open to retention of small salmon Sep 1-Oct 31. Most rivers, excepting those of Cape Breton Highlands National Park (CBHNP), were open Jun 1-Oct 31.

The estimated angling catch for Cape Breton (NS Salmon License stub returns; NS License not required in CBHNP) was 504 small and 2,609 large salmon; only 214 small fish were estimated to have been retained. Catches of small salmon were only 30% of the number caught in 1996; catches of large salmon were about the same as those of 1996.

The Margaree River attracted 88% of the Island's recreational fishing effort for salmon (exclusive of CBHNP) - up from 1996 but the same as in 1995. The Middle, Baddeck, North and Grand rivers drew an additional 8% of the Island's effort. Total effort was down 14% from 1996 and 41% from the mean effort, 1992-1996. The decline in effort coincides with hook-and-release regulations for small salmon that were instituted in 1994. Catch-per-rod day ranged from 0.265 on the Grand River (Margaree at 0.29) to 0.62 on the North River. With the exception of Margaree and North large salmon, catches of small and large salmon were down from those of 1996.



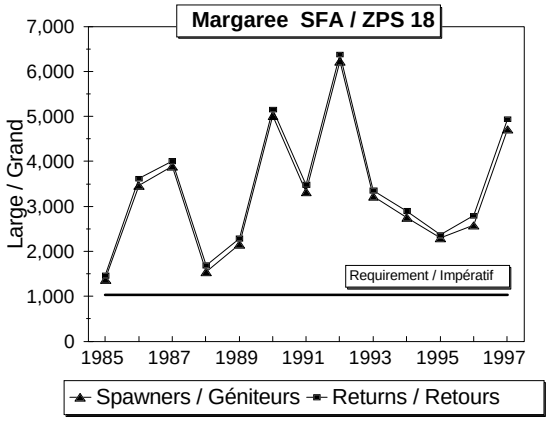


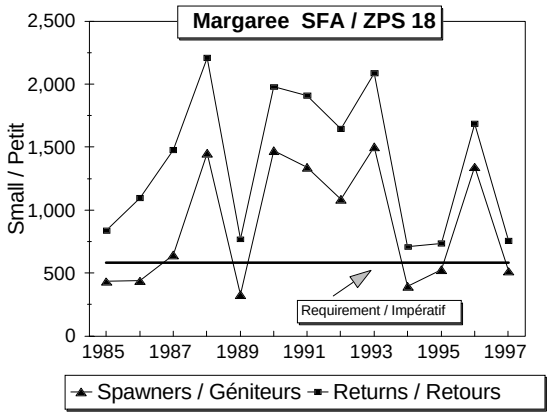


Resource Status

Estimated returns/escapements to the Middle, Baddeck and North rivers were based on mark-and-recapture techniques. marks were applied 1, 2 or 3 days previous to late-October snorkel counts to count tagged and untagged salmon. Margaree estimates were based on relationships between mark-recapture estimates of total returns, 1991-1996, and recreational catch estimated from NS Salmon Licence stub returns. Returns to the Grand River were based on partial counts of salmon trapped in the fishway at Grand Falls.

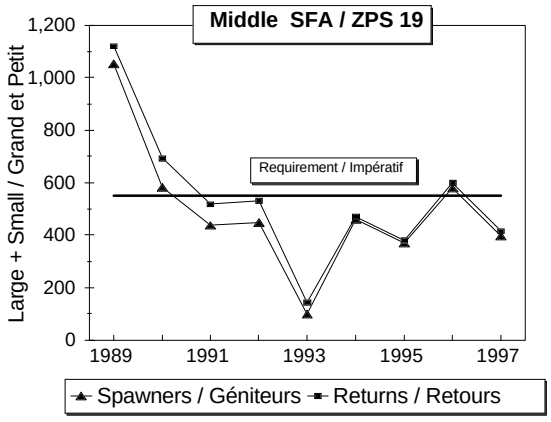
Margaree River: Estimated returns to the Margaree River were 4,938 large (90% CI 3,461-5,756) and 756 (90% CI 0-1,670) small salmon. Large salmon spawning escapements exceeded the 1,036 fish conservation requirements by 355%. The requirement for large fish has been exceeded each year since 1985. Small salmon have not met requirement in 6 of the last 13 years.





Juvenile densities at three tributary sites on the Margaree averaged 143 age 0^+ and 70 age 1^+, 2^+ parr per 100 m^2; similar to those of a large mainstem site. High densities are consistent with past egg depositions in excess of conservation requirements.

Middle River: The estimated spawning escapement to the Middle River was 396 (90% CI 276-791) fish comprised of 333 large and 63 small salmon. Escapement of large salmon was 71% of conservation requirement. Total small and large escapement was 72% of requirement. Egg requirements have not been met in 6 of the last 7 years.

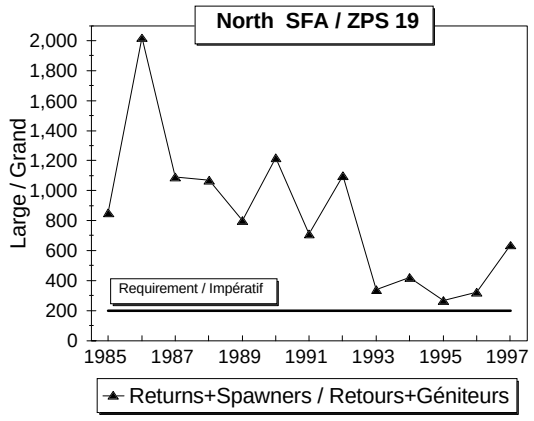


Densities of 36 age 0^+ and 46 age 1^+, 2^+ parr per 100 m^2 at two mainstem electrofishing sites on the Middle River exceeded an index of normal abundance (29 age 0^+ and 38 age

1^+, 2^+ parr) and are similar to densities in the 1950s, 1960s, 1970s and 1994-1997.

Baddeck River: Spawning escapement to the Baddeck River was estimated at 233 fish (90% CI 176-367) and was comprised of 174 large and 59 small salmon. Escapement was only 44% of the 530 fish conservation requirement. Large salmon were 39% of the 450 fish requirement, down 33% from that of 1996. Escapements have not been greater than 60% of requirements since assessment of returns began in 1994. Densities of 113 age 0^+ and 39 age 1^+, 2^+ parr per 100 m^2 are above the index of normal abundance and exceed and equal those of 1996.

North River: Late-October estimates of returns to the North River in 1997 were 758 (90% CI 526-1,516) fish comprised of 636 large and 122 small salmon. Several of the large fish observed were of hatchery origin. Escapements exceeded the conservation requirements of 230 fish (including 200 large) by 230%. Based on run reconstruction (angling catch raised by a 50% catch rate, 1985-1993) and swim-thru estimates of large salmon returns in 1994-1997. Large fish requirements were exceeded in each of the last 14 years.



Juvenile densities at each of two lower and upper river mainstem sites approximated normal abundance but were slightly fewer than those of the Middle and Baddeck rivers.

Grand River: A count of 32 fish (30% hatchery origin) in the fishway, an estimate of 40 fish below the fishway at the time of trap closure in early September and the application of a 0.4 by-pass rate suggested that 125 fish (53%) of requirement may have ascended the falls.

Juvenile densities both above and below the falls were low (30 age 0^+ and 6.4 age 1^+, 2^+) compared to densities of other rivers assessed in Cape Breton, but were double those of 1996.

Environmental Considerations

Rivers of Cape Breton are resistant to the effects of acid precipitation. River discharges measured at Margaree were below the long-term monthly mean for June to October. Water temperatures were cooler than in previous years. Daily average water temperatures on the Northeast Margaree did not exceed 20°C. On the basis of reports and data from anglers on the Margaree, conditions appeared to be good for river entry and angling over most of the season. Low discharges on the Middle, Baddeck, North and Grand rivers may have delayed entry of some fish to those rivers.

Returns of both 1SW (small) and MSW (large) salmon to many of Atlantic Canada's rivers, including 1SW fish to the Margaree and possibly Grand River and MSW fish to the Middle and Baddeck rivers, decreased in 1997 despite predictions of increasing marine survival in association with increasing winter habitat in 1995 and 1996. Recently reviewed factors which have the potential to impact on survival include decadal changes in marine fish communities, forage and predators such as large sea birds and seals.

Outlook

Short term

Margaree River: Quantitative forecasts of large salmon returning to the Margaree in 1998 are 3,265-4,643 fish or 3.2 to 4.5 times the conservation requirement. Forecasts do not reflect the concern that the 1996 smolt class of many stocks in Atlantic Canada (small salmon returns in 1997 and large salmon returns in 1998) may have suffered a 30-40% greater than expected mortality in the winter of 1997. Nevertheless, conservation requirements of large fish are likely to be exceeded in 1998. Small salmon returns, 1993-1997, have averaged 1,195 fish or twice the conservation requirements. However, it is uncertain that events affecting reduced returns in 1997 will continue in the winter of 1998.

Middle and Baddeck rivers: Adult returns to the Middle and Baddeck rivers from 1993-1997 averaged 400 and 298 fish or 73% and 56% of conservation requirements. Middle and Baddeck River returns were down 30% and 24% in 1997 from those of 1996. The decline in 1997 and long-term trend in declines in 1SW and MSW returns to many rivers of Atlantic coast Nova Scotia and Bay of Fundy rivers and decline in 1SW stocks on the Margaree is significant. This suggests that average returns to Middle and Baddeck rivers may be optimistic.

North River: Returns to the North River, 1993-1997, have averaged about 400 large fish or twice the conservation requirement. Thirty or 40% reductions in marine survival of MSW returns destined for the North River in 1998 are unlikely to reduce returns below conservation requirements. Small salmon returns have averaged more than the 30 small salmon conservation requirement.

Grand River: Returns to Grand River above the fishway in 1993-1997 have averaged 218 fish or 93% of conservation requirements. Returns in 1997 were uncertain but seemed to indicate continued low recruitment. Hatchery fish have comprised an average 35% of returns. Marine survival in 1998 may be similar to 1997. This suggests that conservation requirements are unlikely to be met on the Grand River in 1998. Juvenile densities have been low and wild adult returns have been decreasing.

Long term

Juvenile densities have been increasing in most rivers. This increases the possibility of greater future returns if current reductions in marine survival are short lived. However, the long-term outlook is unknown because downward trends in both juveniles and adults have been noted in many Maritime stocks.

Management Considerations

Margaree and North rivers have exceeded egg conservation requirements for over a decade and are forecast to exceed requirements in 1998. Small salmon may not meet requirements in 1998. Adults returns to the Middle and Baddeck rivers have rarely met conservation requirements in recent years. Low marine survival may insure that returns in 1998 do not meet requirements. Salmon returns to the Grand River have been low and trending downwards despite hatchery stocking.

Juvenile densities on the Margaree, Middle Baddeck, North and several other rivers are normal or above. These populations will maintain stocks in the short term. Juvenile densities are increasing on the Grand River but are lower than required to compensate for recent declines in marine survival.

Reduced marine survival in most of Atlantic Canada's salmon stocks has been confirmed. This evidence does not support an increase in exploitation of Cape Breton stocks.

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References

Anon. MS 1997. Report of the Working Group on North Atlantic salmon. ICES C.M. 1997/Assess: 10 Ref.:M 239p.

Anon. MS 1998. Atlantic salmon abundance overview for 1997. DFO Stock Status Report CSAS D0-02

Elson, P.F. 1967. Effects on wild young salmon of spraying DDT over New Brunswick Forests. J. Fish. Res. Bd. Canada. 24(4): 731-677.

Marshall, T.L., P. LeBlanc, K. Rutherford and R. Jones. MS 1998. Status of Atlantic salmon stocks in selected rivers of Cape Breton Island, 1997. DFO CSAS Res. Doc. 98/31.

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