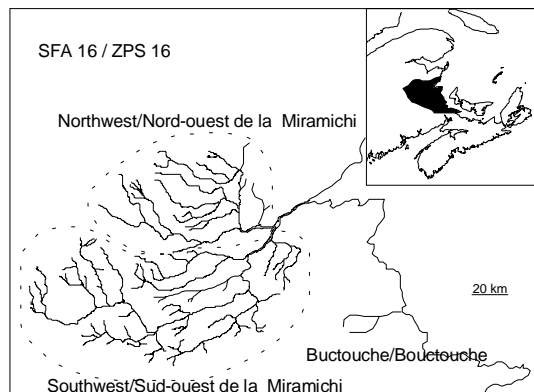


Atlantic Salmon Miramichi & Buctouche Rivers SFA 16



Background

The management area known as Salmon Fishing Area (SFA) 16 contains 41 rivers with Atlantic salmon runs. The Miramichi River is the largest river representing 90% of the salmon producing habitat in SFA 16. Most juveniles spend two to three years in the river before migrating to the ocean in spring. Spawning populations consist of varying proportions of small salmon (fork length < 63 cm) and large salmon (fork length ≥63 cm). The small salmon are predominantly maiden fish (never spawned before) which have spent one year at sea before returning to spawn (one-sea-winter salmon). These small salmon, are generally > 80% male. The large salmon component contains a mixture of maiden fish which have spent two and occasionally three years at sea before spawning and previous spawners which are returning for a second or more spawning. The majority (>80%) of the large salmon are female. The relative proportions of the size groups in the returns vary geographically. In the Miramichi, the ratio is two to five small salmon for every large salmon. In the smaller rivers, large salmon tend to be more abundant. The large salmon undertake extensive marine migrations to Labrador, Greenland and the Faroe Islands. The small salmon undertake less extensive migrations to Labrador, Newfoundland and the Grand Banks. The highly refined homing abilities of Atlantic salmon result in discrete stocks in individual rivers; the Miramichi River contains several stocks. Most salmon return to the smaller rivers in September and October but the Miramichi River has an important component which returns during May to August.

Conservation requirements are established for individual rivers based on 2.4 eggs•m² of river habitat. The objective is to obtain the egg depositions from the large salmon component.

The Fishery

Atlantic salmon were harvested by two user groups: First Nations and recreational fishers. Fishing agreements were signed with five of six First Nations having access to salmon in SFA 16 rivers. Harvests were in most cases less than agreed upon allocations.

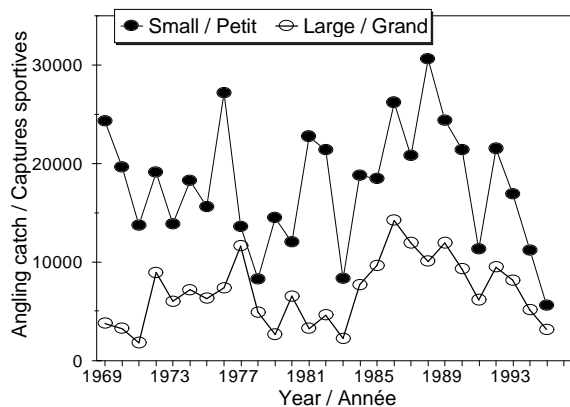
| First Nations allocations (A) and actual harvests (H) from the rivers in SFA 16 assessed in 1996 | | | | | | |
|---|---|------|------|------|-------|-------|
| | | 1992 | 1993 | 1994 | 1995 | 1996 |
| Miramichi River | | | | | | |
| Large | A | | 135 | 120 | 441 | 823 |
| | H | 608 | 208 | 124 | 185 | 372 |
| Small | A | | 8400 | 8400 | 11000 | 11000 |
| | H | 1652 | 601 | 2977 | 3004 | 2583 |
| Buctouche River | | | | | | |
| Large | A | | | 36 | 36 | 36 |
| | H | 12 | 0 | 12 | 0 | 4 |
| Small | A | | | 56 | 56 | 56 |
| | H | 0 | 0 | 11 | 15 | 25 |

The most significant change in recreational fishery management in 1996 was the opening of the bright salmon fishery in the Miramichi River on the same date as the opening of the black salmon fishery, April 15. In the Miramichi River, the season closed August 31 or September 15 for the upper portions of the river and October 15 for the lower

sections. Angling seasons closed October 31 in the other rivers in SFA 16.

The end of season mail-out survey (FISHSYS) of the angling catches for New Brunswick was not conducted in 1996. Crown Reserve catch data for the Northwest Miramichi indicated that the 1996 catches were similar to the 1990 to 1994 averages. For the Miramichi River, this would represent about 17000 small salmon and 8300 large salmon.

In the Miramichi, angling catches of small and large salmon peaked during 1986 to 1989 and have since declined. Reduced catches in 1995 were the result of low water conditions and extensive closures throughout the regular angling season.



Catches in the other rivers of SFA 16 have generally represented less than 10% of the total SFA 16 catch.

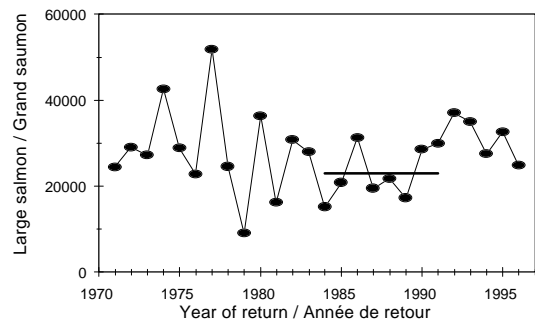
Resource Status

Returns to the Miramichi and Buctouche rivers were estimated using mark and recapture experiments. For the Miramichi River, returns have been estimated separately for the Northwest and Southwest branches since 1992. Escapements are the differences

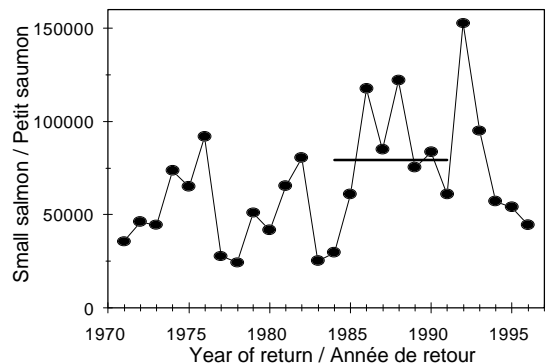
between returns and total removals (including First Nations harvests, angling harvest, hook and release mortality of 3% on large salmon catches, enforcement seizures and broodstock collections). Egg depositions are estimated from the average annual length of fish applied to a length-fecundity relationship and the annual sex ratio from sampling at trapnets.

Returns

The estimated returns of large salmon to the Miramichi River since 1992 have exceeded the average returns for 1984 to 1991 but have declined from the peak returns in 1992.



Estimated returns (number of fish) of small salmon to the Miramichi River peaked in 1992 and have since declined to levels less than the 1984 to 1991 average and similar to returns from the 1970s.



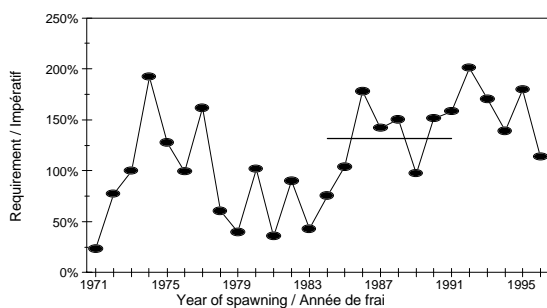
Returns to the Northwest and Southwest branches of the Miramichi River differ from the overall pattern for the Miramichi River. Returns of large salmon to the Northwest Miramichi peaked in 1995 whereas Southwest returns peaked in 1992. Returns in 1996 of both small and large salmon in both branches were among the lowest returns since 1992.

| Returns (number of fish) of small and large salmon | | | | | |
|---|--------|-------|-------|-------|-------|
| N/A means no assessment was conducted. | | | | | |
| | 1992 | 1993 | 1994 | 1995 | 1996 |
| Northwest Miramichi | | | | | |
| Small | 30321 | 46200 | 20600 | 22379 | 18943 |
| Large | 10000 | 10541 | 12600 | 15227 | 7957 |
| Southwest Miramichi | | | | | |
| Small | 120701 | 42600 | 33775 | 31675 | 30241 |
| Large | 25028 | 21900 | 14000 | 17097 | 15734 |
| Buctouche River | | | | | |
| Small | N/A | 78 | 77 | 98 | 127 |
| Large | N/A | 95 | 225 | 154 | 134 |

In the Buctouche River, the returns of large salmon in 1996 declined from the previous two years but small salmon returns were the highest of the four years assessed.

Egg depositions relative to conservation

The egg depositions in 1996 exceeded the conservation requirements for the Miramichi overall and for each of the branches. The conservation requirements in the Miramichi have been exceeded in 11 of 13 years since 1984.



Egg depositions in each branch were exceeded every year since 1992.

Egg depositions relative to conservation requirements (%) N/A means the river was not assessed in that year.

| | 1992 | 1993 | 1994 | 1995 | 1996 |
|----------------------------|------|------|------|------|------|
| Northwest Miramichi | 119% | 177% | 200% | 269% | 134% |
| Southwest Miramichi | 238% | 149% | 108% | 139% | 114% |
| Buctouche River | N/A | 35% | 72% | 58% | 46% |

Conservation requirements for the Buctouche River have not been met in the four years that the river has been assessed. Egg depositions in 1996 were the second lowest since 1993.

Environmental Considerations

Discharge levels were anomalously high in July 1996 which resulted in a widespread distribution and availability of fish to anglers throughout the Miramichi River early in the year. This contrasted with 1995 when water levels were anomalously low in July to September which restricted the availability of salmon to angling. Water temperatures in 1996 were generally cooler in July and August than in 1995 but fall temperatures were comparable. In spite of the lower water levels in 1995, spawning distribution was good throughout the river system as demonstrated by the distribution and abundance of age 0 parr in 1996.

Outlook

Short term

For the Miramichi River, a projection of large salmon returns in 1997 based on the observed small salmon returns in 1996 combined with the observed annual variability in fecundity and sex ratio indicates there is a 77% chance that conservation requirements will be met or exceeded in 1997. Large salmon returns since 1992 have

been declining annually, corresponding with observed declines in sea survival of monitored stocks in the Gulf of St. Lawrence. Decreased sea survival has been offset by increased juvenile production in the river. Taking account of these factors, large salmon returns are not expected to exceed the average returns of 31000 fish observed since 1991. Previous spawners have comprised up to 40% of the large salmon returns since 1992 and are expected to make an important contribution to the large salmon returns in 1997. However, previous spawners from the 1995 returns which would have been destined for the Miramichi in 1997 were intercepted in the Greenland fishery in 1996. Similarly, salmon destined to be Maiden large salmon in 1997 were probably also intercepted. This is a change from the previous two years when this commercial fishery was closed.

There is no short term forecast of small salmon returns but based on the trend in counts of smolts from a tributary of the Northwest Miramichi (Catamaran Brook), returns of small salmon in 1997 are not expected to be any better than the returns observed over the last three years.

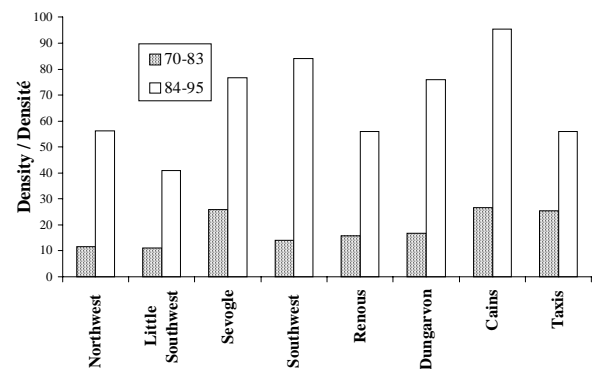
Returns from hatchery progeny are not expected to contribute more than 0.5% of the total returns (small and large) to the river, similar to previous years.

Based on the trend in returns to the Buctouche River between 1993 and 1996, the returns in 1997 are not expected to meet the conservation requirements. Juvenile densities in the Buctouche River are low compared to those of the Miramichi River which supports the estimates of low escapements to the river in recent years and also provides little optimism for increased

returns of salmon to the river over the next five years.

Long term

There has been a four-fold increase in the densities of age 0 and older parr throughout the Miramichi River since the major changes in management introduced in 1984 (Fig. 6). The increased abundance of juveniles provides an optimistic view of the long-term prospects for the Miramichi River of continued and increased abundance relative to previous years.



Management Considerations

Even in the absence of any fisheries-related mortality, there is a 23% chance that the returns to the Miramichi River in 1997 will be lower than the conservation requirements. Under a management plan similar to 1996, the risk of not meeting the conservation requirements increases to 28%. The Miramichi assessment contains numerous uncertainties and a risk-adverse approach is recommended.

For the Buctouche River, there is no expected surplus of large salmon or small salmon to conservation requirements.

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