

The Southwest Miramichi Smolt Study 2009

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By

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Introduction

Over the past three decades, there has been a continuing and recognizable need for conservation efforts to sustain Atlantic salmon stocks in the Miramichi River. Over that time, despite major management actions such as the closing of commercial fisheries in both the Maritimes and Newfoundland, annual returns have fallen below expectations. In very recent years, minimum spawning requirements for Atlantic salmon have just been met in the Miramichi River system.

An accurate estimation of the total smolt population migrating from the Miramichi River is an essential component to understanding and managing the Atlantic salmon in this watershed. Currently, work is being conducted to estimate the population of fry, 1+ and 2+ parr in the watershed using electrofishing; smolt wheels are used to estimate the number of smolts migrating from the Miramichi River; and trap nets are used to estimate an adult population. By having a population estimate for all of the different life stages it allows us to look at trends in the production of salmon between the various life stages and to pin point areas in the life cycle of Atlantic salmon where the most mortality is occurring.

Methods

The method used to obtain the smolt inventory estimates was a mark and recapture concept. On the Cains and Dungarvon Rivers, rotary screw traps (RST) or smolt wheels were used to capture smolts for tagging. The smolt wheel was strung across the river by an overhead cable and floated on the top of the water by two large pontoons. The current forced the partially submerged wheel to rotate. Any fish that entered the trap were guided into the trap's holding box which is located at the back of the smolt wheel. The rotating wheel prevented the fish from swimming out of the trap. All the fish in the live-box were collected and sorted. Each species caught was identified, counted and released, except for salmon smolts, which were measured for fork length and then tagged with streamer research tags. Scale samples were also taken from up to five smolts per day for age analysis. After the smolts were tagged they were moved upstream of the smolt wheel. The percent of tagged smolts that are recaptured at the smolt wheel allow us to estimate the number of smolts moving out of that particular tributary.

A single large trapnet was installed in the estuary of the Southwest Miramichi at Millerton to capture smolts moving from freshwater into the estuary. Tagged smolts captured at the Millerton trap net allow us to get an estimate of the smolts moving out of the Southwest Miramichi. The Millerton trapnet efficiency is calculated by the percentage of these tagged smolts that are recaptured, and this trap efficiency is then extrapolated to estimate the total smolt run from the number of untagged smolts also captured there. This latter facility was fished daily, generally at low tide, and the smolts were sorted from the rest of the species captured. Each day, sub-samples of up to 100 smolts were measured and 20 were sampled in detail for length, weight, sex and age. All smolts captured were counted and checked for missing adipose fin clips and streamer tags.

Results

The Cains smolt wheel operated from May 5 to June 2 and Dungarvon smolt wheel operated from May 6 to June 3, because of high water conditions within the tributaries. The estuary trap net at Millerton fished later, from May 14 to June 9, 2009, also because of high water conditions.

The peak of the smolt run for the Cains River was May 17 and 65 smolts were captured. The peak of the smolt run on the Dungarvon River was May 11 with 750 smolts being captured that day. The peak of the smolt run in 2009 was more than a week earlier than 2008, possibly due to the large amount of rain we received which facilitated the warming of the river and movement of smolts. This year we tagged 557 smolts on the Cains and 2187 smolts on the Dungarvon River and were able to capture approximately 646 smolts in the Cains smolt wheel and 2524 smolts on the Dungarvon smolt wheel over the entire season.

At the Millerton trap, we captured 14,000 smolts, 42,000 smelts and 3500 gaspereau as well as many other species throughout the season. We were able to recapture 43 smolts with streamer tags at the Millerton trap net which were tagged at the Cains, Dungarvon or Rocky Brook smolt wheels upstream. The smolt estimate for 2009 on the Cains River was 51,600 (CI 23,000 to 113,000), which worked out to 1.1 smolts per 100m², about 1/3 of the target for the Miramichi River. The smolt estimate for the Dungarvon for 2009 was 48,700 (CI 40,000 to 59,000), which worked out to be 2.2 smolts per 100m², approximately 2/3 of the Dungarvon target for the Miramichi River. Overall, smolt production on the Cains and Dungarvon Rivers was moderate in 2009. Smolt production on the Southwest Miramichi in 2009 was 1.1 millions smolts (3.1 smolts per 100m²). The Southwest Miramichi reached the desired smolt production in 2009 of 3.0 smolts per 100m², which it has in the 4 of the last 5 years (not including 2005 in which there was no estimate as the trap was washed out). In addition, 0.6% of the Cains, 1.5% of the Dungarvon and 0.3% of the Southwest Miramichi smolt runs were comprised of salmon smolts with clipped adipose fins which were stocked by MSA a few years earlier.

The data collected from this project will be published in the Canadian Technical Report of Fisheries and Aquatic Sciences as part of two publications documenting the movements and population of Atlantic salmon smolts from two Southwest Miramichi River tributaries (Cains and Dungarvon) and the Southwest Miramichi. Data from this project is also being used to assess the survival of salmon parr (1-2+) to the smolt stage by comparing electrofishing densities the previous year and to assess the survival to the grilse and 2 sea-winter maiden salmon stage by comparing smolt estimates to the returns of grilse and salmon the following years.