

The Southwest Miramichi Smolt Study 2008

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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 pinpoint 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. Both the Cains and Dungarvon smolt wheels operated from May 10 to June 9, and were put in later because of the late spring and high water conditions. 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 percentage 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 from May 16 to June 12, 2006. 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 tags.

## **Results**

The peak of the smolt run occurred on May 22nd for both the Cains and Dungarvon Rivers. This year we tagged 881 smolts on the Cains and 1223 smolts on the Dungarvon River. We estimated that 22,000 smolts moved from the Dungarvon River and 47,000 from the Cains River downstream to the ocean in the spring of 2008. The smolt production on the Dungarvon River in 2008 was the lowest record in the past 7 years, 22,000, well below the target production of 3.0 smolts per 100m<sup>2</sup> of habitat (Table 1). Of the tagged fish 18 smolts from the Cains and 22 from the Dungarvon River were later recaptured at the trap net near the estuary at Millerton. We estimated a total smolt production of 914,000 smolts in the Southwest Miramichi, which is moderate compared to the past seven years. In addition, 0% of the Cains, 1.4% of the Dungarvon and 0.5% of the Southwest Miramichi smolt runs were comprised of salmon smolts with clipped adipose fins which were stocked by MSA a few years earlier.

Table 1. Estimate for salmon smolt movements (using 0% mortality factor) for SW Miramichi 2001 – 2008, Cains River 2002 – 2008 and Dungarvon River for 2002 - 2008. The desired target for smolt production on the Miramichi River is 3.0 smolts/100m<sup>2</sup> of habitat. \*Note: This is only a minimum smolt estimate as wheel was not operational for three days during typical smolt peak time.

<b>River</b>	<b>Year</b>	<b>Smolt estimate</b>	<b>Smolts/100m<sup>2</sup></b>
<b>SW Miramichi</b>	2001	500,000	1.4
	2002	637,000	1.8
	2003	534,400	1.5
	2004	1,152,000	3.3
	2005	N/A	N/A
	2006	1,336,000	3.8
	2007	1,340,000	3.8
	2008	914,000	2.6
<b>Cains</b>	2002	38,500	0.8
	2003	47,000	1.0
	2004	78,000	1.7
	2005	N/A	N/A
	2006	98,000	2.1
	2007	56,000	1.2
	2008	47,000	1.0
	<b>Dungarvon</b>	2002	43,300
2003		34,700	1.6
2004		38,000	1.7
2005		58,000*	2.6
2006		48,000	2.1
2007		70,000	3.2
2008		22,000	1.1