

## **Miramichi Salmon and Trout Restoration – Stocking 2016**

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## Introduction

Stocking Atlantic salmon first-feeding fry can improve the juvenile production capacity of the Miramichi River by targeting areas that are under-seeded or not accessible to wild spawning adults. An electrofishing survey is carried out each year by the Miramichi Salmon Association (MSA) to assess areas of the river that are lacking adequate numbers of fry or parr. Low fry or parr numbers could be the result of multiple factors, including: poor adult returns, barriers to adult movement into upper stream reaches (i.e.: beaver dams), environmental events such as ice scouring that destroys redd's, or less than optimal water conditions. Areas with zero/minimal fry present will be targeted to stock and efforts will also be made to identify and remove any impediments to natural spawning. The majority of these areas are located in small tributaries and the headwaters of the Miramichi River. Small brooks and streams often have good quality habitat and lower numbers of predators than larger downstream locations. These narrow waterways may be inaccessible however, because of barriers or decreased water levels in low flow years.

Juvenile abundance electrofishing surveys and smolt estimates are used to aid in determining specific tributaries that may need additional stocking. Since it is impossible to stock every small stream in the Miramichi with a limited numbers of fish, it is important to place hatchery salmon fry into streams that will benefit most from their introduction. Stocking salmon fry into a tributary with high salmon fry abundance could negatively impact those fish by increasing the level of competition for food resources. To avoid this, any site containing more than 100 fry/100m<sup>2</sup> is not considered for stocking as it appears to reflect a healthy natural population. Sites with less than 50 fry/100m<sup>2</sup> are considered candidates for further stocking. The absence of fry at an already stocked site may indicate that the site does not contain the appropriate habitat or it may have too many predators.

Prior to 2010, fall fingerlings were stocked and identified by an adipose clip (removal of the adipose fin). In 2010 the MSA shifted the focus from Atlantic salmon fall fingerlings to stocking first-feeding salmon fry in the early summer. These fry are incubated as eggs on unheated brook water to ensure that the rate of egg development is similar in timing to that of wild eggs. The stocking of fry over fingerlings has several benefits, including the reduced risk of

fish contracting a pathogen while in artificially high densities at the hatchery, and the improved capacity to develop “wild” behaviour tendencies at a younger age. First-feeding fry are stocked out in June/July at an average size of 0.5g which makes fin clipping impossible. However, there are still locations that raise fall fingerlings for stocking purposes. Atlantic salmon and brook trout fry were raised this year in satellite rearing stations run in collaboration with J.D. Irving Ltd., the Miramichi Headwaters Salmon Federation, and Rocky Brook Camp & Barbour’s. The objective of the stocking program is to improve Atlantic salmon production in the headwaters of the Miramichi watershed.

The number of broodstock collected from the Northwest system was decreased in 2015 because of a new initiative, which would see a decreased need for stocking on this branch. The Collaboration for Atlantic Salmon Tomorrow (CAST) initiative began in 2014 with plans to collect smolts from the Northwest Miramichi River and grow them at the Miramichi Salmon Conservation Centre (MSCC) until maturity, after which they would be released to spawn naturally in the wild. Smolt to adult survival has decreased in the last decade, resulting in a decreased number of adults returning to the river. This part of the CAST initiative would increase the number of spawning adults in the Northwest Miramichi.

## **Methods**

Adult salmon were collected from September to mid-October 2015 for broodstock from five tributaries on the Miramichi River – Northwest River, Sevogle River, Little Southwest River (LSW), Clearwater Brook, and the Main Southwest River in Juniper. These fish were held at the MSCC and kept separated based on their river of origin. Once ripe, female salmon were stripped of their eggs, which were then fertilized by a male salmon from the same river. Immediately following spawning, the adults were released back into the wild via Stewart Brook, which runs beside the MSCC. Eggs were incubated on brook water until the eyed stage, when dead eggs were removed daily. Eyed eggs were transferred to incubation boxes in preparation for hatching. After hatching, fry were fed a formulated salmonid diet (Corey 0.7CR/EWOS #1CR)

for approximately 4 weeks until stocking. All salmon fry were stocked in their river of origin (“river specific stocking”).

Stocking sites were selected based on low juvenile densities found at the exact or nearby locations from the previous year’s electrofishing results and in tributaries that typically have low juvenile production. Additional salmon fry were taken to satellite rearing sites for continued growth before stocking.

## **Results**

Approximately 91,171 first-feeding Atlantic salmon fry were stocked into 45 sites in five tributaries of the Miramichi River (Figure 1a&b). The Northwest system received 15,483 fry and the Southwest system 75,688 (Table 1). An additional 21,100 fry were taken to satellite holding tanks for future release by local conservation groups (Table 2). Additionally, 22,913 brook trout fry were distributed to a satellite tank rearing location (Table 3).

## **Acknowledgements**

The MSA would like to thank the following groups for their support with this project:

- J.D. Irving Ltd. (rearing salmon and trout fry for fall distribution)
- Miramichi Headwaters Salmon Federation (rearing salmon fry for fall distribution)
- Rocky Brook Camp & Barbour’s (rearing salmon fry for fall distribution)
- White Rapids and Other Small Streams Enhancement Association (salmon fry stocking)
- Chris Elvidge, PhD., Carleton University (experimental salmon fry stocking)

Table 1. Distribution of first-feeding Atlantic salmon fry from the Miramichi Salmon Conservation Centre in 2016.

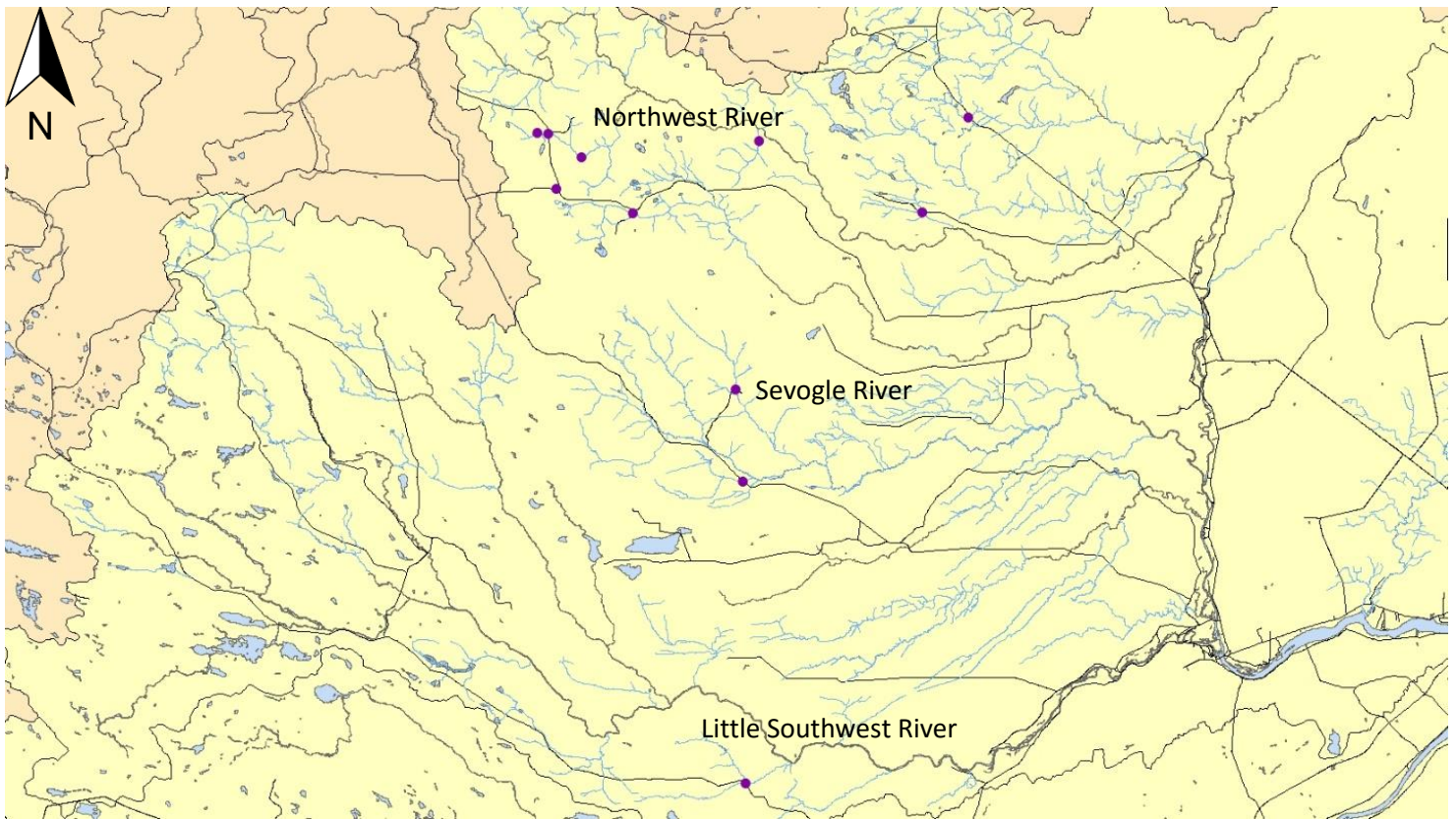
Branch	Stock Origin	Site	# of fish	Latitude	Longitude
Northwest	NW	NW SB 2	2500	47.24944	-66.39252
Northwest	NW	NW SB 3	1064	47.23574	-66.36398
Northwest	NW	NW SB 1	1064	47.24995	-66.40211
Northwest	NW	Gill Brook	1250	47.24480	-66.21261
Northwest	NW	Mountain Brook	1064	47.20335	-66.07351
Northwest	NW	South Branch Tomogonops	1250	47.25817	-66.03375
Northwest	SEV	SEV NB (Slack Lake Rd)	1038	47.20328	-66.32071
Northwest	SEV	SEV NB 1	397	47.21757	-66.38605
Northwest	SEV	Clearwater Bk	520	47.10082	-66.23351
Northwest	SEV	Travis Bk	346	47.04765	-66.22752
Northwest	LSW	Devil's Bk	5000	46.87284	-66.22595
Southwest	CW	Fairley Bk	3009	46.76395	-66.84269
Southwest	CW	NE Branch Clearwater Bk (upper)	2971	46.82116	-66.84944
Southwest	CW	NE Branch Clearwater Bk (lower)	12185	46.79898	-66.86026
Southwest	JUN	South Branch Southwest Mir. R.	2818	46.52848	-67.30871
Southwest	JUN	Lake Bk 1	2977	46.53048	-67.30953
Southwest	JUN	Wiley Bk	2545	46.54117	-67.30985
Southwest	JUN	Rideout Bk	2770	46.48627	-67.30580
Southwest	JUN	South Branch MSW trib.	1557	46.49389	-67.30601
Southwest	JUN	Lake Bk 2	3019	46.51652	-67.33044
Southwest	JUN	Lake Bk 3	3192	46.51900	-67.33231
Southwest	JUN	Lake Bk trib.	1558	46.53720	-67.34145
Southwest	JUN	Beaver Bk	3250	46.54551	-67.25614
Southwest	JUN	Juniper Bk	2500	46.77090	-66.83895
Southwest	JUN	Clearwater Bk	1957	46.51846	-67.17834
Southwest	JUN	White Rapids Bk 1	200	46.76900	-65.85800
Southwest	JUN	North Branch Hudson Bk	100	46.75400	-65.84600
Southwest	JUN	South Branch Hudson Bk	100	46.75700	-65.84400
Southwest	JUN	Brandy-Mersereau Bk	100	46.69219	-65.84292
Southwest	JUN	Zacks Bk	500	46.67400	-65.84700
Southwest	JUN	White Rapids Bk 2	300	46.78200	-65.81500
Southwest	JUN	White Rapids Bk 3	700	46.78500	-65.80900
Southwest	JUN	White Rapids Bk 4	700	46.78900	-65.80800
Southwest	JUN	White Rapids Bk 5	700	46.79100	-65.80300
Southwest	JUN	4 Mile Bk	500	46.60900	-66.07900
Southwest	JUN	Fowler Meador Bk	600	46.61900	-66.10800
Southwest	JUN	Davis Landing Bk	1500	46.59000	-66.22900

Table 2. Distribution of first-feeding Atlantic salmon fry to satellite holding tanks for continued growth and stocking in 2016.

<b>Stock Origin</b>	<b>Organization</b>	<b># of fish</b>	<b>Latitude</b>	<b>Longitude</b>
Juniper	Miramichi Headwaters Salmon Association	5000	46.51831	-67.17829
Clearwater	J.D. Irving Ltd.	10900	46.55475	-67.16395
Clearwater	MSA and Clearwater and Rocky Bend Camps	5000	46.63315	-66.75891

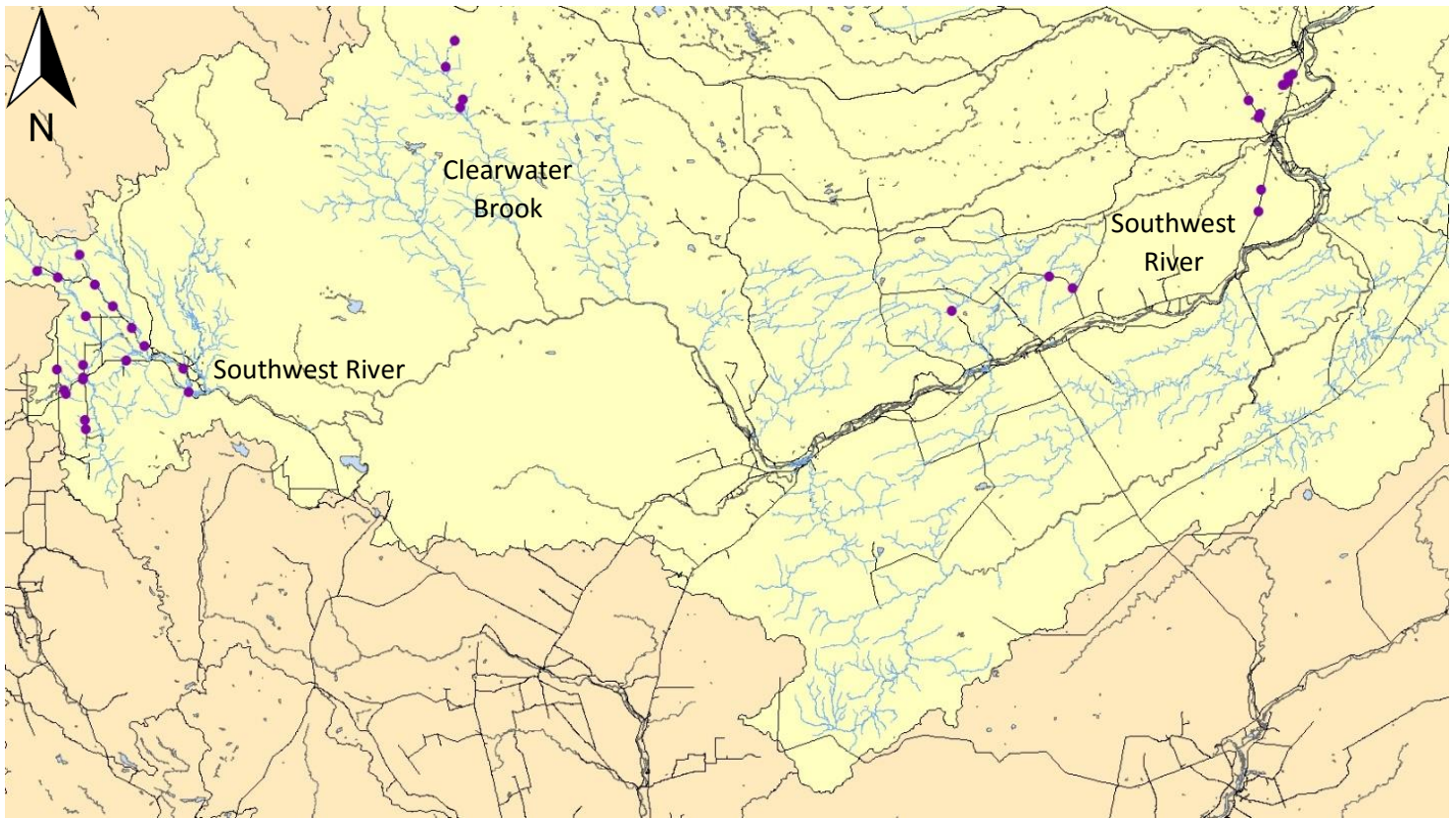
Table 3. Distribution of brook trout fry to satellite tanks for continued growth and stocking in 2016.

<b>Stock Origin</b>	<b>Organization</b>	<b># of fish</b>	<b>Latitude</b>	<b>Longitude</b>
Beadle Brook	J.D. Irving Ltd.	22913	46.55475	-67.16395



1:225,000

(a)



1:350,000

(b)

Figure 1. Stocking sites of salmon fry distributed on the Northwest (a) and Southwest (b) Miramichi Rivers in 2016.