

Miramichi Salmon and Trout Restoration – Stocking 2020

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Introduction

Stocking Atlantic salmon (*Salmo salar*) first-feeding fry can improve the juvenile production capacity of the Miramichi River by targeting areas that are under-seeded or inaccessible 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 could destroy a redd, or suboptimal water conditions. Areas with zero/minimal fry present were targeted to stock and efforts were made to identify and remove any impediments to natural spawning. Most of these areas were in small tributaries in 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 number 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/100m² is not considered for stocking as it appears to reflect a healthy natural population. Sites with less than 50 fry/100m² are considered candidates for stocking. The absence of fry at a previously 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 focus from stocking Atlantic salmon fall fingerlings to stocking first-feeding salmon fry in the early summer. These fry were incubated as eggs on brook water to ensure 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 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. Brook trout fry were raised this year in satellite rearing stations run in collaboration with J.D. Irving Ltd. 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 Miramichi River 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. This program is called “Smolt to Adult Supplementation”, or SAS. Smolt to adult survival has decreased on the Miramichi River in the last decade, resulting in fewer adults returning to the river. This part of the CAST initiative would increase the number of spawning adults in the Northwest Miramichi River. A permit was not issued to released mature adults in 2019 so these fish were spawned at the hatchery. A permit to release SAS fry in 2020 was not received until July and only permitted fry release in the Northwest Millstream as part of the ongoing research in that area by UNB PhD candidate, David Roth. The remaining SAS fry at the MSCC did not survive this long duration in captivity because of high densities and increased brook water temperatures.

Methods

Wild adult salmon were collected from September to October 2019 for broodstock from 3 tributaries on the Miramichi River – the Northwest River, the Main Southwest River in Juniper, and Burnthill Brook. 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 wild adults were released back into the wild via Stewart Brook, which runs beside the MSCC. SAS adults at the hatchery, not permitted for release, were spawned in the same manner and then destroyed. Eggs from both groups were incubated on brook water in trays until the eyed stage, when dead eggs were removed daily. Eyed eggs were transferred to upwelling incubation boxes in preparation for hatching. After hatching, fry were fed a formulated salmonid diet (Skretting Nutra XP 0.5mm/0.7mm) for approximately 5 weeks until stocking. All salmon fry were stocked into their native river of origin.

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 trout fry were taken to satellite rearing sites for continued growth before stocking.

Results

Approximately 88,156 first-feeding Atlantic salmon fry were stocked into 17 sites in four tributaries of the Miramichi River (Figures 1a&b, Figure 2). The Northwest Miramichi River received 23,567 wild fry (Table 1a) and the Northwest Millstream 30,118 SAS fry (Table 1b). The Southwest Miramichi River system received 34,471 wild fry – 9,853 in Burnthill and 24,618 in Juniper (Table 2). The water levels were very low this summer and a fire ban was in place to keep vehicles out of the woods during our stocking days, so some sites had additional buckets of fry added due to lack of available and accessible habitat. A further 12,766 brook trout fry were distributed to a satellite tank rearing location for future release (Table 3).

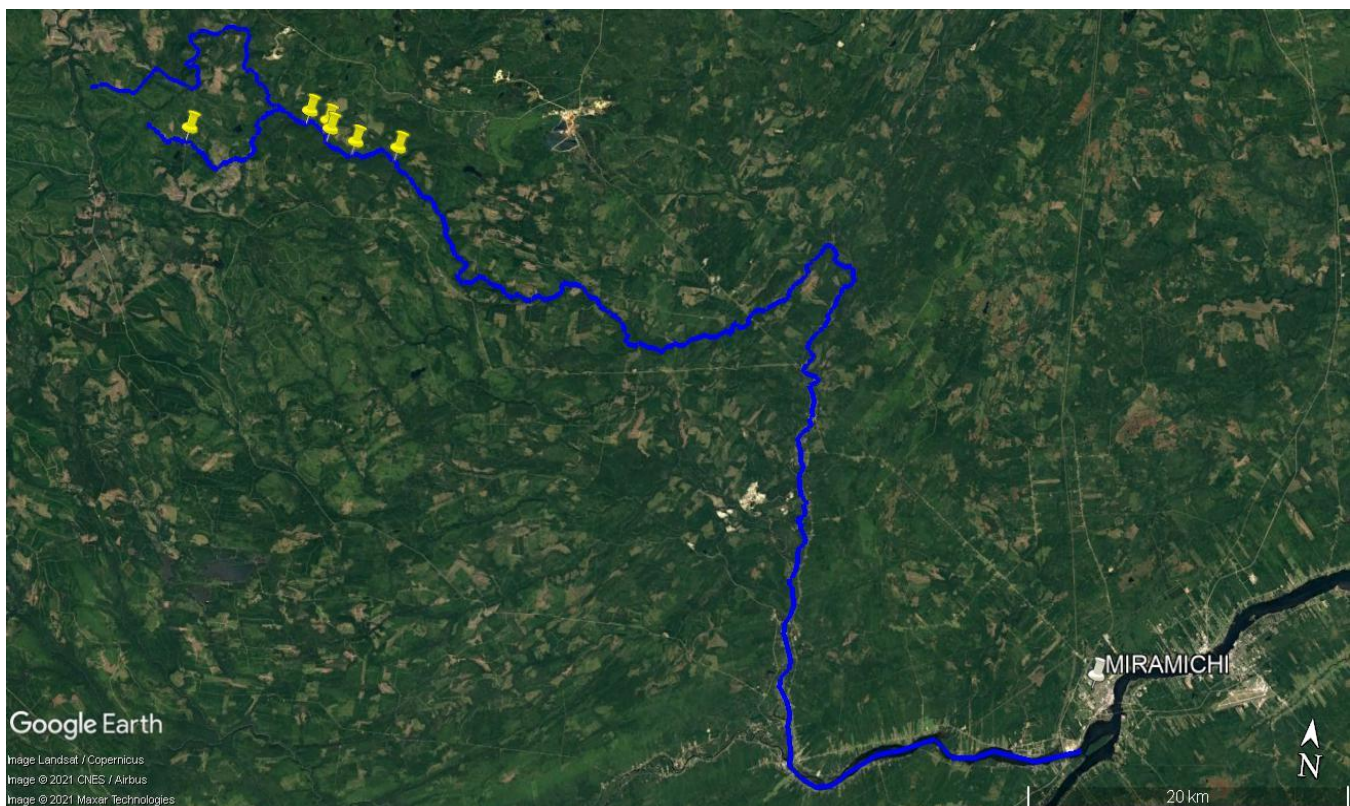


Figure 1a. Stocking sites of wild salmon fry distributed to the Northwest Miramichi River in 2020.

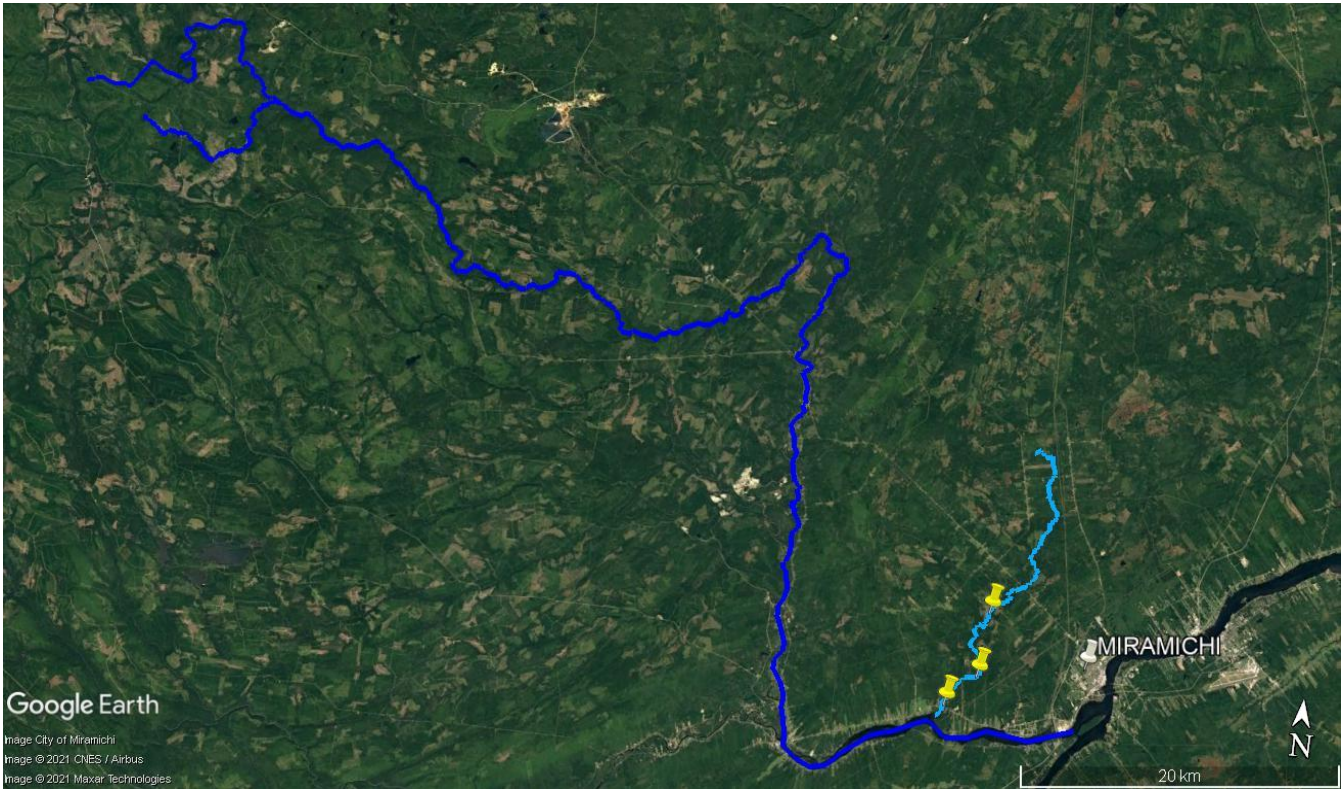


Figure 1b. Stocking sites of SAS salmon fry distributed to the Northwest Miramichi Millstream in 2020.

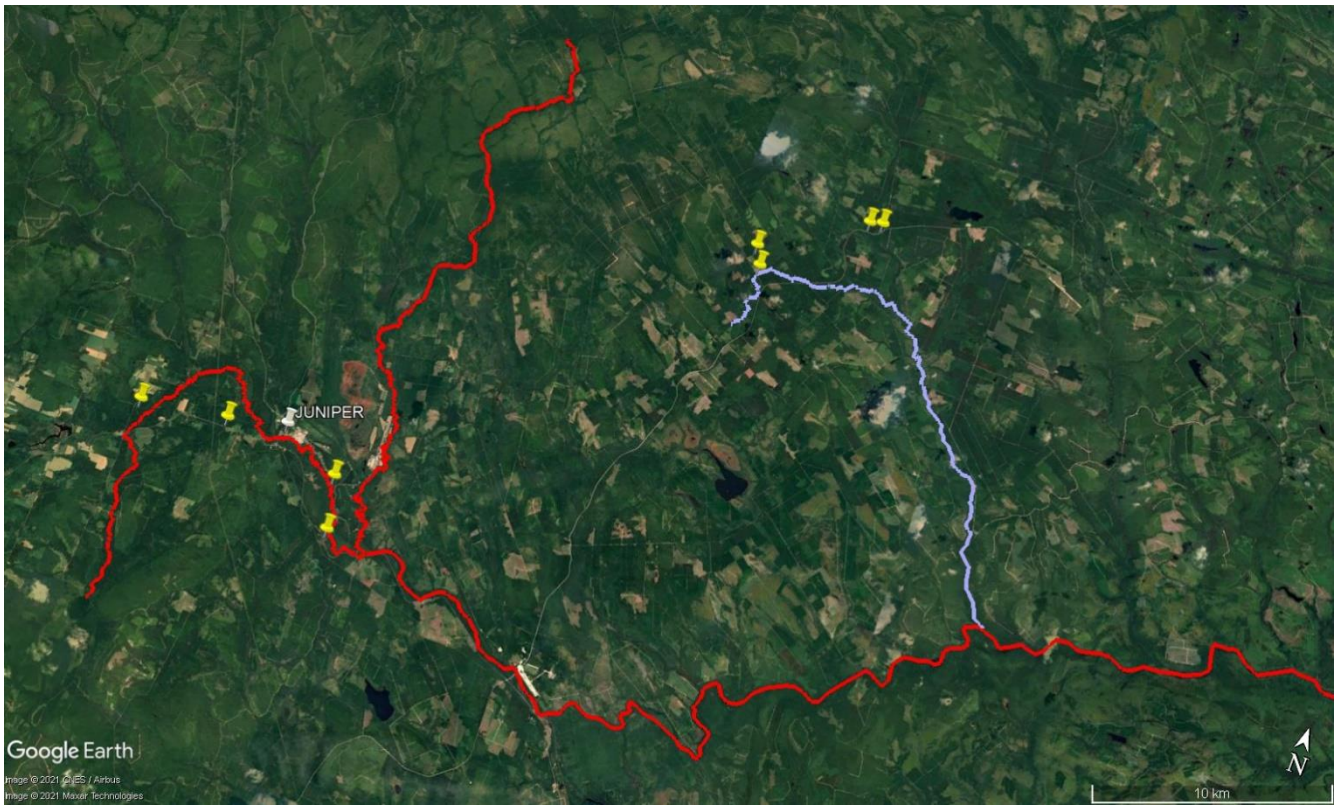


Figure 2. Stocking sites of wild salmon fry distributed to the Southwest Miramichi River in 2020.

Table 1a. Distribution of wild first-feeding Atlantic salmon fry from the Miramichi Salmon Conservation Centre the Northwest Miramichi River system in 2020.

Stock Origin	Site	# of fish	Latitude	Longitude
NW Miramichi River	Spruce Lake Road	7508	47.24927	-66.39231
NW Miramichi River	Depot Camp	3630	47.25179	-66.21174
NW Miramichi River	Black and White Pool	3578	47.25237	-66.24859
NW Miramichi River	White Horse Pool	3613	47.25813	-66.27179
NW Miramichi River	Duncan Run Pool	3684	47.26285	-66.27593
NW Miramichi River	Split Rock Pool	1554	47.26726	-66.29175

Table 1b. Distribution of SAS first-feeding Atlantic salmon fry from the Miramichi Salmon Conservation Centre to the Northwest Millstream in 2020.

Stock Origin	Site	# of fish	Latitude	Longitude
NW Miramichi River	Pump House	9999	46.99163	-65.66945
NW Miramichi River	Upper Clear Cut	13453	47.02776	-65.66325
NW Miramichi River	Bridge	6666	46.97420	-65.69428

Table 2. Distribution of wild first-feeding Atlantic salmon fry from the Miramichi Salmon Conservation Centre to the Southwest Miramichi River system in 2020.

Stock Origin	Site	# of fish	Latitude	Longitude
Juniper	Clearwater Brook	14624	46.51878	-67.17789
Juniper	Juniper Brook	3353	46.53901	-67.18600
Juniper	Beaver Brook	3338	46.54557	-67.25680
Juniper	Wiley Brook	3303	46.54035	-67.30801
Burnthill	South Burnthill	1134	46.67724	-67.00084
Burnthill	Green Brook	2500	46.68495	-67.00629
Burnthill	Little South Burnthill	1591	46.70993	-66.94833
Burnthill	North Branch	4628	46.71120	-66.94096

Table 3. Distribution of brook trout fry to satellite tanks for continued growth and stocking in 2020.

Stock Origin	Organization	# of fish	Latitude	Longitude
Moose Lake	J.D. Irving Ltd.	4366	46.55475	-67.16395
Beadle Brook	J.D. Irving Ltd.	8400	46.55475	-67.16395

Acknowledgements

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- J.D. Irving Ltd. (rearing trout fry for fall distribution)