

**Miramichi Salmon Restoration
Stocking 2022**

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May 2023

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. To increase efficiency and successful establishment, salmon fry that have incubated at the Miramichi Salmon Conservation Center (MSCC) are placed strategically in 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, 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 MSCC, and the improved capacity to develop wild behaviour tendencies at a younger age. First-feeding fry are stocked in June at an average size of 0.5g. The objective of this stocking program is to improve Atlantic salmon production in the headwaters of the Miramichi watershed using first-feeding fry.

Methods

Wild adult salmon were collected from September to October 2021 for broodstock from two locations on the Southwest Miramichi River – the Cains River 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 wild adults were released back into the wild via Stewart Brook, which runs beside the MSCC. Eggs from both groups were incubated on brook water in trays until the eyed stage, when dead eggs were then 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 3 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.

Permits

Scientific Permits from the Department of Fisheries and Oceans (SG-RHQ-21-112 and SG-RHQ-22-117) were obtained prior to starting this project.

Results and Discussion

Approximately 70,803 first-feeding Atlantic salmon fry were stocked into 29 sites of the Southwest Miramichi River system (Figure 1a,b). The Cains River received 19,853 fry and the Juniper area of the Main Southwest received 50,950 fry (Table 1). The water levels were very low in summer 2022, so some sites had additional buckets of fry added due to lack of available and accessible habitat elsewhere.

This program allows a higher proportion of salmon eggs and fry to be produced and released back into the wild. This program also connects anglers to the Miramichi Salmon Conservation Centre and provides wild fry back to the Miramichi River system, with the goal to sustain and enhance Atlantic salmon populations.

Acknowledgements

The Miramichi Salmon Association acknowledges the financial contributions of Canada Summer Jobs (CSJ) and the Student Employment Experience Development (SEED). We also thank the many volunteer outfitters and anglers involved in wild broodstock collection in Fall 2021.

Appendix

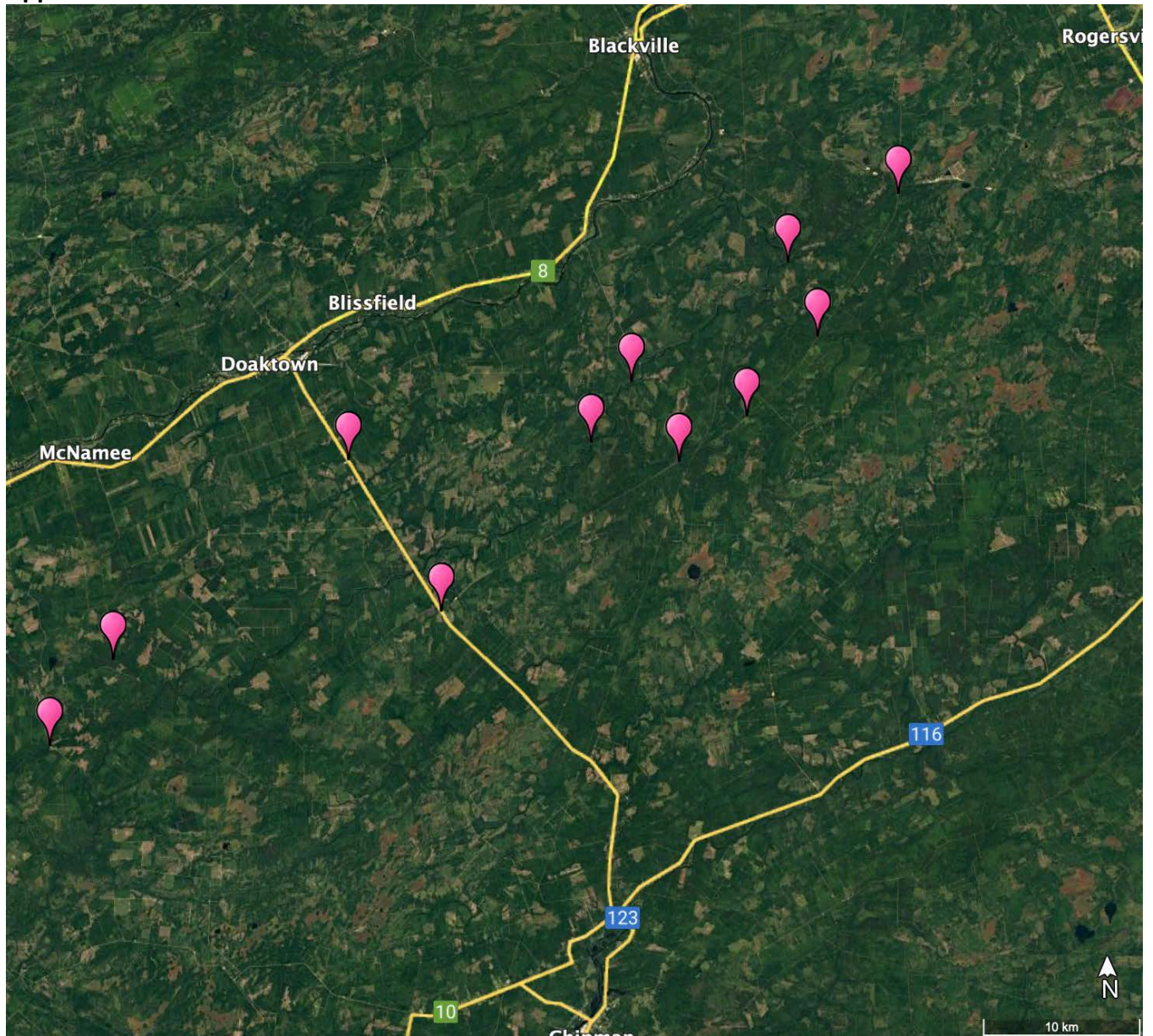


Figure 1a. Stocking sites of wild Atlantic salmon fry distributed to the Cains River in 2022.

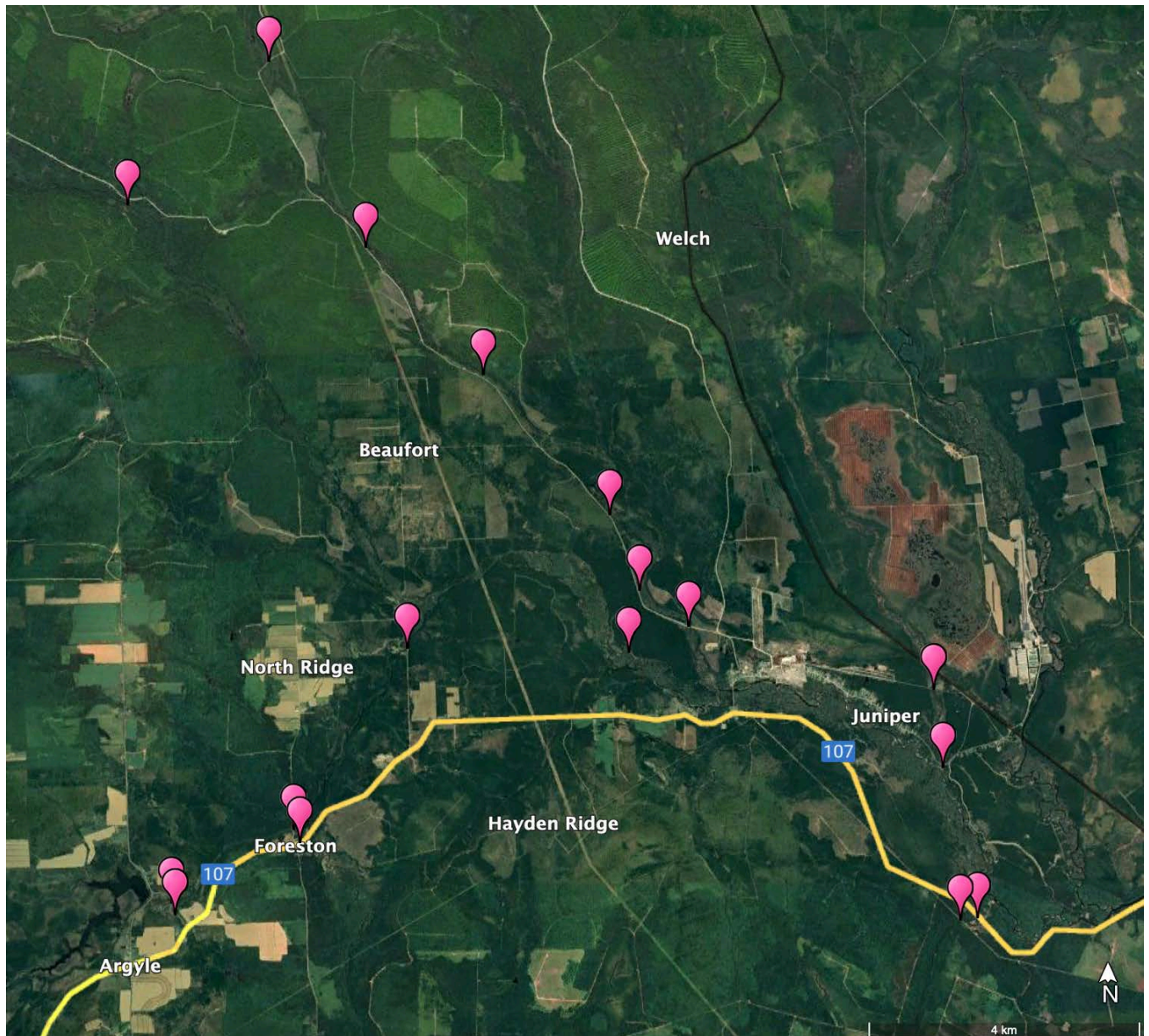


Figure 1b. Stocking sites of wild Atlantic salmon fry distributed to the Main Southwest River in Juniper in 2022.

Table 1. Distribution of wild first-feeding Atlantic salmon fry from the Miramichi Salmon Conservation Centre to the Southwest Miramichi River system in 2022.

Stock Origin	Site	# of fish	Latitude	Longitude
Cains	Main Cains River 2	2,000	46.50581	-65.87241
Cains	Main Cains River 1	1,912	46.54015	-65.83801
Cains	Muzzeroll Brook Connector	2,000	46.49793	-66.07334
Cains	North Cains Branch	1,882	46.33772	-66.32250
Cains	Otter Brook 2	2,206	46.38624	-66.26956
Cains	Sabbies Brook 2	1,853	46.56372	-65.68307
Cains	Sabbies Brook 3	2,044	46.51912	-65.74315
Cains	Salmon Brook 1	1,721	46.60656	-65.70621
Cains	Salmon Brook 2	1,471	46.64460	-65.61314
Cains	Six Mile Brook 1	1,735	46.49401	-65.79994
Cains	Ten Mile Brook	1,029	46.41104	-65.99852
Juniper	Big Teague Brook 1	2,525	46.55786	-67.23354
Juniper	Big Teague Brook 2	2,575	46.56288	-67.24316
Juniper	Big Teague Brook 3	2,825	46.57310	-67.24873
Juniper	Clearwater Brook 1	2,525	46.51842	-67.17828
Juniper	Clearwater Brook 2	2,525	46.51812	-67.18161
Juniper	Elliott Brook 2	2,525	46.61548	-67.34229
Juniper	Elliott Brook 3	2,550	46.58265	-67.30703
Juniper	Juniper Brook 1	3,350	46.53867	-67.18463
Juniper	Juniper Brook 2	2,600	46.54930	-67.18627
Juniper	Lake Brook 1	4,000	46.52863	-67.30830
Juniper	Lake Brook 2	2,600	46.55489	-67.28783
Juniper	Lake Brook 3	2,825	46.51897	-67.33208
Juniper	Lake Brook 4	2,925	46.52055	-67.33279
Juniper	Lake Brook 5	2,600	46.53039	-67.30951
Juniper	Little Teague Brook 1	2,575	46.59225	-67.27322
Juniper	Little Teague Brook 2	3,100	46.60965	-67.29605
Juniper	Little Teague Brook 3	3,125	46.63515	-67.31494
Juniper	MSW South Branch 1	3,200	46.55436	-67.24509