

**Beaver Dam Management Report
2023**

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April 2024

Introduction

Beaver dams are known barriers to adult Atlantic salmon (*Salmo salar*) migrating upstream to spawn, blocking access to habitat in the upper reaches of brooks and streams. Female salmon have been observed below beaver dams in large numbers. These females are then forced to build multiple redds in confined areas of the stream, often with a habitat of lower quality than would otherwise be available above beaver dams. The survival of eggs in these crowded, overlapping redds is severely reduced and can negatively impact juvenile salmon production within the stream. Upstream areas of brooks and streams are often excellent spawning and juvenile habitat with a high percentage of gravel and cobble substrates, cold ground-fed water, and low numbers of predators. After several years of blocked access, these upstream reaches run the risk of becoming devoid of salmon fry and parr, potentially lowering the number of stream-imprinted adult salmon returning to these areas. Improving access to upstream habitat on individual streams could benefit egg survival and juvenile production.

To achieve the maximum benefit of dam-breaching efforts, the timing of behaviour changes and movements of salmon must be considered. In the Miramichi River, salmon typically begin moving out of large holding pools and travelling upstream to find spawning habitat from late September to late October. Salmon are likely to encounter beaver dams in these upstream areas with high populations of beavers. Small dams may not pose much of an issue during high water flows, as the fish are able to swim or leap over them, but large dams may restrict any further upstream movements. Beavers can repair active dams within a 24-48 hour time frame, meaning the notching or removal of the dams must be correctly timed with the upstream migrations of the salmon, so as not to waste time and resources.

Beaver dam removal initiatives by the Miramichi Salmon Association (MSA) have shown potential as a tool for salmon conservation. Several locations within the watershed have demonstrated improved juvenile counts after dams were notched during critical salmon migrations. For example, before 2006, very few salmon fry were found on Betts Mills Brook near Doaktown, NB, despite constructing a fish ladder just upstream from the mouth of the brook at a highway crossing. In 2006, a large beaver dam blocking the fish ladder was removed, and an additional 21 dams were notched or removed on the brook. This opened more than 50,000 m² of spawning habitat for salmon. Electrofishing results by the Department of Fisheries and Oceans (DFO) and MSA showed salmon fry present in Betts Mills Brook the following year. In another instance, Big Hole Brook (also near Doaktown) and Porter Brook (near Boiestown) both provide high-quality salmon habitat. With the removal of dams on these watercourses, adult salmon were able to access upstream sections, as observed by high densities of salmon fry the following year.

By providing access to crucial spawning habitat for adult Atlantic salmon in the Miramichi River, the MSA can ensure that a strong juvenile production rate is maintained. High numbers of juvenile salmon migrating to the ocean could potentially increase the number of adult salmon returning, improving the conservation outlook for this iconic Miramichi River species.

Methods

The Miramichi Salmon Association conducted ground reconnaissance on the Southwest Miramichi River watershed to locate and GPS beaver dams in the summer and autumn of 2023. The assessed locations were determined ahead of time and were based on previous dam management reports and known beaver dam areas.

The MSA field crew accessed and notched dams from October 9th to November 17th, 2023. Any dams discovered were marked with hand-held Garmin GPS units and mapped using Google Earth to coordinate ground crew activities. Dams were accessed on foot and notched when possible; otherwise, stream sections were canoed to remove the impoundments. Active dams were notched on multiple occasions following repairs by beavers.

Permits

A Scientific Permit for Watercourse and Wetland Alteration (ALT 51881'20) was obtained prior to starting this project.

Results

In the Southwest and Northwest Miramichi basin, 48 dams were breached by the field crew on 18 tributaries (Figure 1). Dams on Betts Mills Brook had to be breached on multiple occasions after beavers repaired them. A large dam located at the mouth was a high priority as the dam's height was over 4 meters, preventing any passage to spawning fish trapped at the base of the dam. All dams breached were recorded with names and GPS locations (Table 1).

Discussion

The Miramichi watershed has a large number of tributaries with beaver dam activities, and accessing and notching all dams is beyond current staff capacity. Beaver dam management in 2023 focused on vital salmon habitats that historically had high beaver activity. All dams were accessed on foot, as water levels were too dangerous for canoeing. Due to a tremendous amount of rain received during September, the proposed start date had to be delayed as it was unsafe to notch beaver dams. However, many pre-existing beaver dams were blown out due to high water levels.

The number of dams breached in 2023 (48) was higher than in 2022 and consistent with numbers from 2021. Before 2020, crews were able to notch more than 100 dams in a season with increased resources (funding, staffing, helicopter surveys).

Although beaver activity was present throughout the watershed, levels of activity varied between locations along the river system. In certain areas of the Miramichi River system, including Elliott Brook, Upper Sabbies Brook, Ledbetters Brook, Little Southwest Tributary near Loggie Lodge, Little North Branch Big Sevogle River Tributary, and North Branch Cains River, relatively low levels of beaver activity were observed. In contrast, Betts Mills Brook, Doak Brook, near Big Hole Lake, Muzeroll Brook, Ten Mile Brook, and Salmon Brook had higher activity levels.

MSA completed seven electrofishing surveys in the summer of 2023 focused on areas upstream of beaver dams notched on the Southwest Miramichi River in 2022. Beavers can repair active dams within a 24-48 hour time frame, so the timing of notching/breaching dams is crucial in helping the fish access ideal spawning habitat. Field crews can only access and remove so many dams per day, and the efficiency of the beavers in repairing them can still pose problems for adult salmon migrating upstream to spawn.

In the summer of 2024, electrofishing surveys will be conducted upstream of dams breached/notched in 2023 to assess the program's impact on Atlantic salmon fry production.

Acknowledgements

The Miramichi Salmon Association acknowledges the financial contributions of the New Brunswick Wildlife Trust Fund (NBWTF).

Appendix

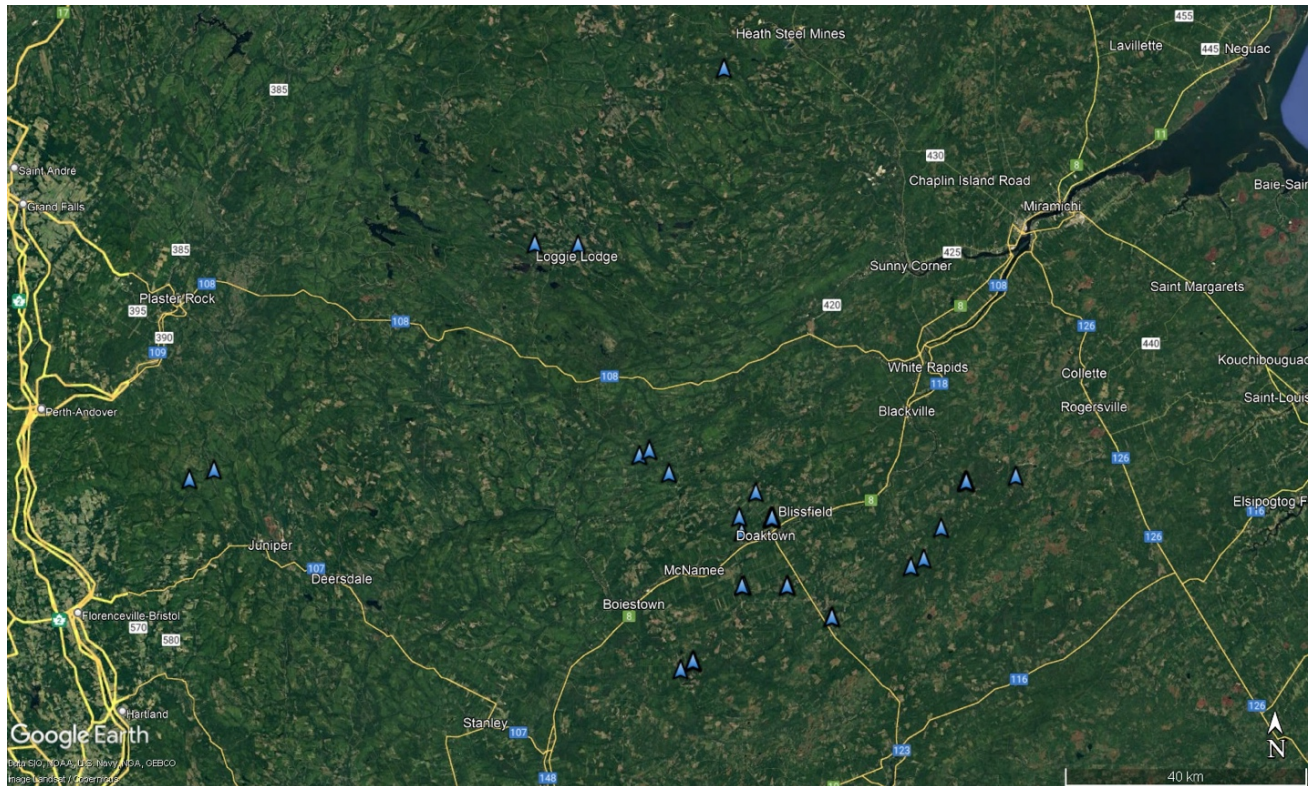


Figure 1: Tributaries of the Southwest and Northwest Miramichi watersheds. Beaver dams breached in 2023 are marked with a '▲'.

Table 1. GPS coordinates of breached beaver dams in 2023.

Tributary	Location	Latitude	Latitude
NW	Jacks Lake Lower Branch	46.96460	-66.62395
NW	Little North Branch Big Sevogle River Tributary	47.21842	-66.21181
NW	Little Southwest Tributary near Loggie Lodge	46.96250	-66.53087
NW	Tuadook River/ Jacks Lake	46.96460	-66.62395
SW	Betts Mills Brook	46.53863	-66.18807
SW	Betts Mills Brook	46.55867	-66.12301
SW	Betts Mills Brook	46.55867	-66.12301
SW	Brandy Brook	46.34994	-66.29566
SW	Brandy Brook	46.34912	-66.29515
SW	Brandy Brook	46.34852	-66.29444
SW	Doak Brook	46.55864	-66.12334
SW	Doak Brook	46.55865	-66.12306
SW	Doak Brook	46.55869	-66.12327
SW	Doak Brook	46.55869	-66.12327
SW	Doak Brook	46.55866	-66.12303
SW	Doak Brook	46.55761	-66.12423
SW	Doak Brook	46.55866	-66.12303
SW	Doak Brook	46.55866	-66.12303
SW	Elliott Brook	46.62127	-67.36760
SW	Ledbetters Brook	46.59631	-66.15665
SW	Little Teague Brook	46.63531	-67.31480
SW	Little Teague Brook	46.63531	-67.31480
SW	Meadow Brook	46.56044	-66.19275
SW	Meadow Brook	46.56044	-66.19275
SW	Middle Sabbies Brook	46.53920	-65.76165
SW	Middle Sabbies Brook	46.53920	-65.76165
SW	Muzeroll Brook	46.45964	-66.18524
SW	Muzeroll Brook	46.45893	-66.09171
SW	Muzeroll Brook	46.45829	-66.09288
SW	Muzeroll Brook	46.45924	-66.18904
SW	Near Big Hole Lake	46.65288	-66.40458
SW	Near Big Hole Lake	46.66012	-66.38301
SW	Near Big Hole Lake	46.62615	-66.34159
SW	North Branch Cains River	46.33763	-66.32220
SW	Salmon Brook	46.60650	-65.70591
SW	Salmon Brook	46.60650	-65.70591
SW	Salmon Brook	46.60648	-65.70594
SW	Salmon Brook	46.60655	-65.70664
SW	Salmon Brook	46.60642	-65.70638
SW	Salmon Brook	46.60660	-65.70652
SW	Salmon Brook	46.60648	-65.70594
SW	Salmon Brook	46.60648	-65.70594

Table 1. GPS coordinates of breached beaver dams in 2023 (continued).

Tributary	Location	Latitude	Latitude
SW	Six Mile Brook	46.48312	-65.82788
SW	Six Mile Brook	46.49422	-65.79996
SW	Ten Mile Brook	46.41135	-65.99882
SW	Ten Mile Brook	46.41135	-65.99882
SW	Ten Mile Brook	46.41106	-65.99844
SW	Upper Sabbies Brook	46.61295	-65.59937