

**Beaver Dam Management Report
2022**

Prepared by:
Lyndsay Jay-Keating
Biologist
Miramichi Salmon Association
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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 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 2022. 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 7th 2022 to November 2nd, 2022. 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, 15 dams were initially breached by the field crew on six tributaries: Betts Mills Brook, Sabbies Brook, Stewart Brook, Salmon Brook, Renous River, and Six Mile Brook (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 2022 focused on vital salmon habitats that historically had high beaver activity. Most dams were accessed on foot, except for Betts Mills Brook on the Southwest branch; it was canoed.

The number of dams breached in 2022 (15) was lower than in recent years, whereas historic years recorded more than 100 dams notched in a season. 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 Six Mile, Salmon Brook, Sabbies Brook, Stewart Brook, and the Renous River, relatively low levels of beaver activity were observed. In contrast, Betts Mills Brook had higher activity levels.

MSA completed twelve electrofishing surveys in the summer of 2022 focused on areas upstream of beaver dams notched on the Southwest Miramichi River in 2021. 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 2023, electrofishing surveys will be conducted upstream of dams breached/notched in 2022 to assess the program's impact on Atlantic salmon fry production.

Appendix

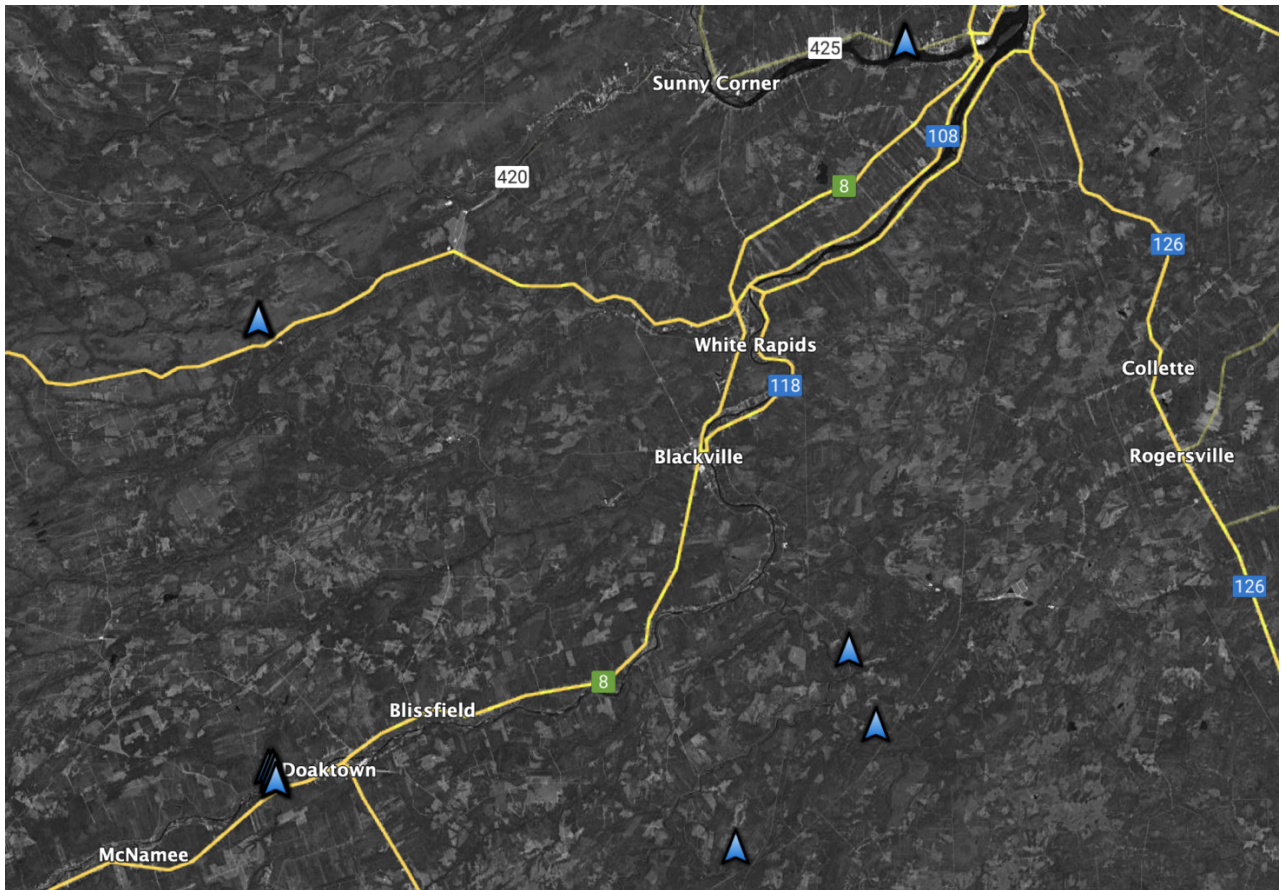


Figure 1: Tributaries of the Southwest and Northwest Miramichi watersheds. Beaver dams breached in 2022 are marked with a '▲'.

Table 1. GPS coordinates of initially breached beaver dams in 2022.

Tributary	Latitude	Longitude
Betts Mills Brook	46.538706	-66.188014
Betts Mills Brook	46.539192	-66.184358
Betts Mills Brook	46.531208	-66.181288
Betts Mills Brook	46.531743	-66.181553
Betts Mills Brook	46.533728	-66.182489
Betts Mills Brook	46.535240	-66.182158
Betts Mills Brook	46.536722	-66.182455
Stewart Brook	46.953512	-65.657929
Stewart Brook	46.953961	-65.658857
Sabbies Brook	46.563810	-65.683610
Salmon Brook	46.606500	-65.705842
Six Mile Brook	46.494044	-65.799990
Renous River	46.794191	-66.197122
Renous River	46.793981	-66.197705
Renous River	46.794041	-66.196833