Miramichi Salmon Association

Beaver Dam Management Report

2021

Introduction

Beaver dams are known barriers to adult Atlantic salmon 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. On 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 will restrict any further upstream movements. Beavers can repair active dams within a 24-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) in the past 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 m^2 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 have a high-quality salmon habitat. With the removal of dams on these watercourses, adults 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 watershed to locate and GPS beaver dams in the summer and autumn of 2021. 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 12th, 2021 to October 29th, 2021. 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.

Results

In the Southwest Miramichi basin, 48 dams were initially breached by the field crew on seven tributaries: Betts Mills Brook, Big Hole Brook, Muzzeroll Brook, Otter Brook, Sabbies Brook, Salmon Brook, and Six Mile Brook (Figure 1). Dams on Betts Mills Brook had to be breached on multiple occasions after beavers repaired them. A total of 6 dams were breached (or notched) repeatedly in 2021 on Betts Mills Brook. 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 our capacity. Beaver dam management in 2021 focused on vital salmon habitats that historically had high beaver activity. Most dams were accessed on foot, except for those on the Betts Mills Brook and Big Hole Brook on the Southwest branch; these were canoed.

The number of dams breached in 2021 (48) was higher than in recent years, although historic years have realized 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 the Southwest system, Muzzeroll Brook, Otter Brook, Six Mile, and Sabbies Brook had relatively low levels of beaver activity. In contrast, Salmon Brook, Big Hole Brook, and Betts Mills Brook had higher activity levels.

MSA completed six (28.57%) electrofishing surveys conducted in the summer of 2021 focused on areas upstream of beaver dams notched on the Southwest in 2019 due to no dams managed in 2020. These sites had no fry present, which were located on Big Hole Brook,

Salmon Brook, and Otter Brook. Beavers can repair active dams within a 24-hour time frame, so the timing of notching/breaching dams is crucial in helping the fish access the 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 2022, electrofishing surveys will be conducted upstream of dams breached/notched in 2021 to assess the program's impact on Atlantic salmon fry production.

Appendix

Figure 1: Tributaries of the Southwest Miramichi watershed. Beaver dams breached in 2021 are marked with a '▲'.

Table 1. GPS coordinates of initially breached beaver dams in 2021.

Tributary	Latitude	Longitude
Betts Mills Brook	46.53868	-66.18797
Betts Mills Brook	46.53926	-66.18482
Betts Mills Brook	46.53915	-66.18430
Betts Mills Brook	46.48386	-66.20500
Betts Mills Brook	46.48405	-66.20453
Betts Mills Brook	46.48576	-66.20398
Betts Mills Brook	46.48957	-66.20220
Betts Mills Brook	46.49023	-66.20189
Betts Mills Brook	46.49662	-66.19515
Betts Mills Brook	46.49760	-66.19328
Betts Mills Brook	46.49831	-66.19230
Betts Mills Brook	46.49834	-66.19230

Betts Mills Brook	46.50222	-66.18854
Betts Mills Brook	46.50429	-66.18929
Betts Mills Brook	46.50430	-66.18931
Betts Mills Brook	46.50921	-66.19173
Betts Mills Brook	46.50969	-66.19160
Betts Mills Brook	46.51007	-66.19205
Betts Mills Brook	46.51709	-66.18928
Betts Mills Brook	46.51783	-66.18899
Betts Mills Brook	46.51786	-66.18897
Betts Mills Brook	46.51861	-66.18778
Betts Mills Brook	46.51907	-66.18759
Betts Mills Brook	46.51985	-66.18442
Betts Mills Brook	46.52045	-66.18366
Betts Mills Brook	46.52055	-66.18334
Betts Mills Brook	46.52182	-66.18261
Betts Mills Brook	46.52229	-66.18253
Betts Mills Brook	46.52805	-66.18056
Betts Mills Brook	46.52831	-66.18042
Betts Mills Brook	46.52847	-66.18005
Betts Mills Brook	46.52873	-66.17928
Betts Mills Brook	46.53085	-66.18034
Betts Mills Brook	46.53133	-66.18091
Betts Mills Brook	46.53115	-66.18147
Betts Mills Brook	46.53143	-66.18178
Betts Mills Brook	46.53482	-66.18241
Betts Mills Brook	46.53659	-66.18245
Big Hole Brook	46.56112	-66.19814
Big Hole Brook	46.55736	-66.19263
Big Hole Brook	46.56050	-66.19703
Muzzeroll Brook	46.45937	-66.18836
Otter Brook	46.37619	-66.24847
Sabbies	46.56381	-65.68361
Salmon Brook	46.60583	-65.70798
Salmon Brook	46.60612	-65.70706
Salmon Brook	46.60556	-65.70916
Six Mile	46.48313	-65.82794