

APPENDIX N

Educational Materials Supporting Documentation

Who we are

The Working Group on Smallmouth Bass Eradication in the Miramichi was formed in 2016. Our members include Indigenous organizations and NGOs dedicated to preserving the ecosystem of the Miramichi River for future generations.

- Atlantic Salmon Federation
- Maliseet Nation Conservation Council
- Miramichi Salmon Association
- Miramichi Watershed Management Committee
- New Brunswick Salmon Council
- New Brunswick Wildlife Federation
- North Shore Micmac District Council

Contact Us

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Eradicating smallmouth bass from the Miramichi



Rotenone in fisheries management:
safety, health, environment, & use

JANUARY 2020



Our presenters:



Brian Finlayson spent his career as a biologist with the California Department of Fish and Game and now works as a consultant on rotenone eradication projects around the world. He authored a manual for the American Fisheries Society entitled *Planning and Executing Successful Rotenone and Antimycin Projects* which has become standard operating procedure. Finlayson visited Miramichi Lake in July 2017 and co-authored the original expert report on eradication commissioned by the Working Group. He has recently developed a plan to use rotenone in the Southwest Miramichi River where smallmouth bass are present.



Steve Maricle is a fisheries biologist who spent his career with the Government of British Columbia's Ministry of Environment. He was the driving force behind a multi-year rotenone eradication campaign that successfully removed non-native smallmouth bass and yellow perch from 12 lakes in the Thompson River watershed, a major conservation program to safeguard Pacific salmon and endangered Steelhead trout. Steve's work included liaising with First Nations, camp owners, local residents, and stakeholders to build support for eradication efforts.

Alternatives to rotenone

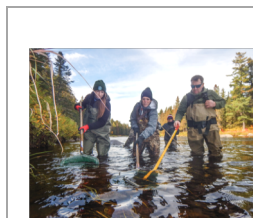
As part of the 2017 Expert Report on eradicating smallmouth bass in Miramichi Lake commissioned by the working group, the authors considered options for eradication including:

Dewatering Miramichi Lake



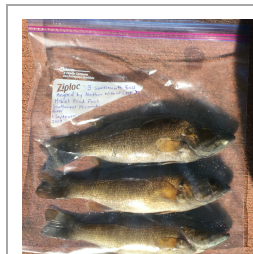
With a surface area of 2.2 square kilometres and an estimated water volume of 5.8 million cubic metres, dewatering was considered 'impractical' and would have negative environmental consequences.

Physical removals



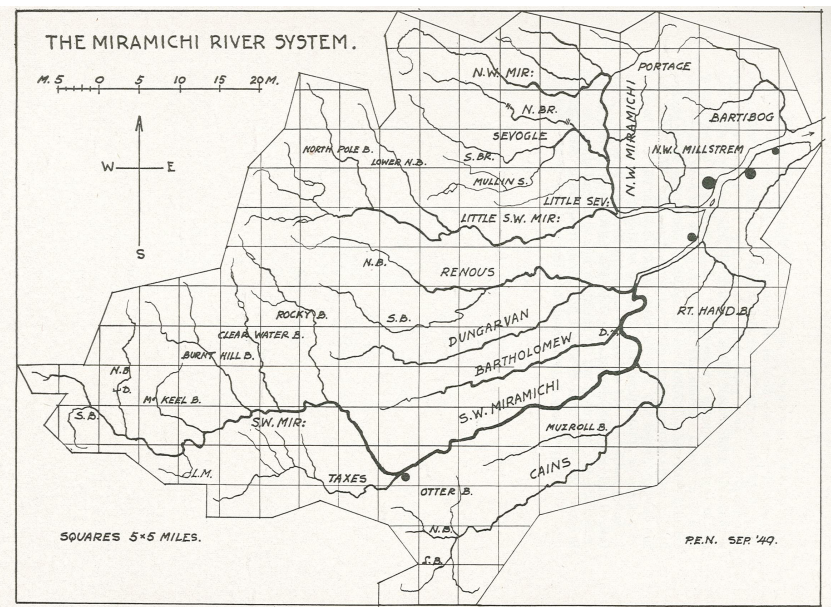
Between 2010 and 2012, DFO initiated a program to eradicate smallmouth bass by removing as many as possible from Miramichi Lake. It failed. 2,584 bass were removed in the first year with numbers decreasing in following years. Regardless, smallmouth of all age classes are caught each year.

Pathogens, explosives, genetic modification



Introducing a fish killing disease to Miramichi Lake is unlikely to eradicate bass and would have unpredictable consequences. The use of dynamite and the introduction of genetically modified, sterile smallmouth bass were deemed risky with minimal chance of success

The Miramichi: part of our history & worth protecting



- The Miramichi River system, despite recent declines, still hosts one of the largest wild Atlantic salmon populations in North America.
- First Nations have harvested wild Atlantic salmon continuously from the Miramichi for thousands of years, a source of food that is threatened by aquatic invasive species
- The recreational Atlantic salmon fishery contributes \$20 million in spending to the local economy and creates 630 full-time equivalent jobs (Gardner Pinfold 2011)

Miramichi smallmouth timeline

2008: In September, an individual reports to N.B. DNR that a 20 cm smallmouth bass was recently angled in Miramichi Lake. Containment and removal efforts begin, salmon conservationists call for swift eradication.

2009: DFO publishes a risk assessment of smallmouth bass becoming established in the Miramichi River and concludes that “a measurable decrease in abundance of native populations is likely to occur.”

2010: DFO publishes a review of options for preventing the spread of smallmouth bass in the Miramichi watershed. The authors conclude “chemical reclamation offers the highest potential for eradicating undesirable fish.”

2015: National Ministerial Advisory for Atlantic Salmon recommends “more aggressive approaches” to smallmouth bass removal. Canada enacts *Aquatic Invasive Species Regulations* which permit the routine use of rotenone.

2017: The Working Group on Smallmouth Bass Eradication in the Miramichi contracts Fish Control Solutions (Brian Finlayson) to produce an expert report on smallmouth bass eradication. It concluded that the use of rotenone presented the least risk and highest likelihood of success.

2019: Smallmouth bass are discovered in the Southwest Miramichi River after escaping Miramichi Lake. Twenty-two bass are captured and removed from the river.

2020: DFO completes science advisory review of proposal by North Shore Micmac District Council and partners to eradicate smallmouth bass from Miramichi Lake and concludes that the use of rotenone “for eradication of smallmouth bass is the most effective approach.”

“In their new ecosystems, invasive alien species become predators, competitors, parasites, hybridizers, and diseases of our native and domesticated plants and animals.” – Environment Canada



ASF researcher Jonathan Carr holds an Atlantic salmon parr found on the mouth of a smallmouth bass taken from the Magaguadavic River in N.B. Smallmouth bass in the Miramichi will consume and displace native species like trout and salmon, having irreversible, negative effects on the ecosystem, fisheries, and the economy of the region. *Photo: ASF*

“The impact of invasive species on native ecosystems, habitats and species is severe and often irreversible, and can cost billions of dollars each year.” – Environment Canada

Rotenone is used worldwide, safely and regularly to save places from invasive species. Here are two examples close to home:

MAINE



In 2010 and 2012, biologists with Maine’s Department of Inland Fish and Wildlife used rotenone in two remote lakes to successfully remove smelt, illegally introduced by ice fishermen, to save the state’s rare landlocked Arctic charr. *Photo: Frank Frost*

NEW BRUNSWICK



In 2001, biologists with the N.B. Department of Natural Resources used rotenone in Despres Lake, part of the Miramichi watershed, to successfully remove illegally introduced chain pickerel. *Photo: N.B. DNR*