Conservation Status of Sea Lamprey in Canada
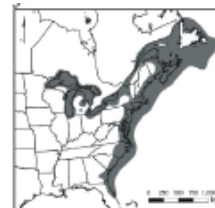
Margaret F. Docker
Margaret.Docker@umanitoba.ca

1

Bad Reputation from Invasive Sea Lamprey

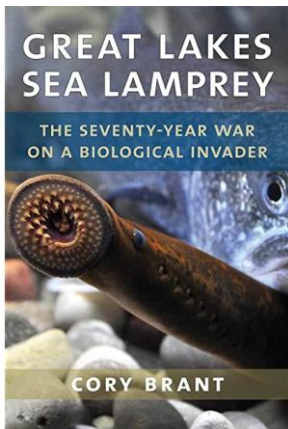

Native to Atlantic Ocean

Invasive pest in Great Lakes

glfc.org

- L Ontario: post-glacially or via manmade canals?

- L Erie and upper Great Lakes 1921–1938 (Welland Ship Canal)

Niagara Falls

2

Slide 3

GREAT LAKES
SEA LAMPREY
THE SEVENTY-YEAR WAR
ON A BIOLOGICAL INVADER
CORY BRANT

- Sea lamprey main contributor to crash of lake trout populations
- Multibillion dollar commercial and recreational fisheries

- Binational GLFC in 1955
- Sea Lamprey Control Program

Barrier dams

glfc.org

Lampricide

dec.ny.gov

3

Slide 4

Sympathy for the lamprey

"Lampreys don't charm most people," begins a pamphlet from the Minnesota Sea Grant.

Truer words, my environmental research friends, truer words

Yes, it's hard out there for a lamprey. Already cursed with a face not even their mothers (who die shortly after spawning) could love, these fish were further saddled with 50 years of bad PR brought on when one invasive species, the sea lamprey, moved into the Great Lakes and wreaked a trail of parasitic havoc from New York to Minnesota. Lost in the shuffle were several native lamprey species, some of which aren't even parasitic. Despite living in the Great Lakes for 1000s of years in co-evolved cooperation with other fish, non-invasive lamprey have paid the price for their cousin's misdeeds.
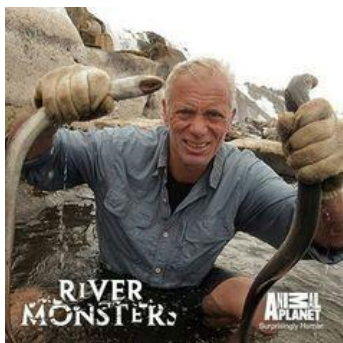
4

Even within native range

Blood-sucking, snake-like fish arrive in New Brunswick waterways to spawn

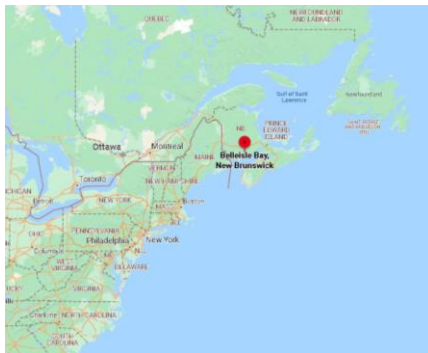Video taken near Belleisle shows the parasitic fish spawning and building nests

Mia Urquhart · CBC News · Posted: Jun 13, 2022 5:00 AM CDT | Last Updated: June 13, 2022

The mouth of a sea lamprey, a species of fish that attaches to a host, feeds on blood and has teeth on its tongue. (Tina Weltz/ROM)

'Tis the season for alien-like fish to spawn and die in N.B. fresh water

It could be right out of a Stephen King novel — or maybe just the next chapter of 2020, the one that follows COVID-19 and murder hornets.

It may be bad news that it's once again spawning season for the parasitic sea lamprey, meaning they're moving upriver in New Brunswick in droves.

5

Although that is starting to change

UNB News

News and stories from one of Canada's top universities

Seemingly scary fish important for marine life in Atlantic Canada

Author: UNB Newsroom

Posted on Jul 7, 2020

Category: UNB Saint John

Dr Kurt Samways (University of New Brunswick)

Same fish, different story

Sea lampreys are native to Atlantic Canada. They are part of the ecosystem, and other species have learned to evolve with them. They are even beneficial to fish such as salmon, by returning valuable nutrients to the environment when scores of them die after spawning.

Dr Marc Gaden (Great Lakes Fishery Commission)

6

3

Slide 7

2009

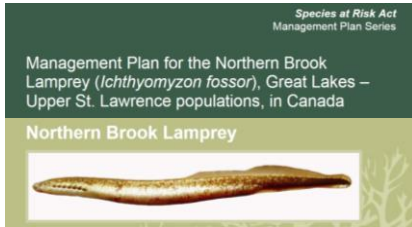Taxonomy, Distribution, and Conservation of Lampreys in Canada

CLAUDE B. RENAUD*
Canadian Museum of Nature
Post Office Box 3443, Station D, Ottawa, Ontario K1P 6P4, Canada

MARGARET F. DOCKER
Department of Biological Sciences, University of Manitoba
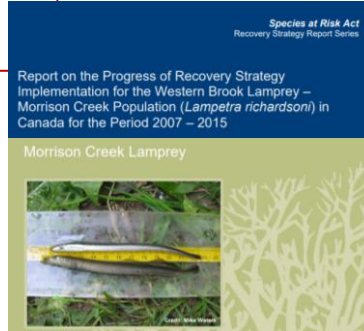Winnipeg, Manitoba R3T 2N2, Canada

NICHOLAS E. MANDRAK
Fisheries and Oceans Canada, Burlington, Ontario L7R 4A6, Canada
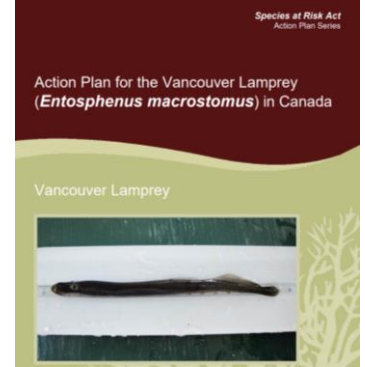
4/11 lamprey species in Canada

Species at Risk Act (SARA)

Species at Risk Act
Recovery Strategy Report Series

Report on the Progress of Recovery Strategy Implementation for the Western Brook Lamprey – Morrison Creek Population (*Lampetra richardsoni*) in Canada for the Period 2007 – 2015

Morrison Creek Lamprey

Endangered

Species at Risk Act
Action Plan Series

Action Plan for the Vancouver Lamprey (***Entosphenus macrostomus***) in Canada

Vancouver Lamprey

Species at Risk Act
Management Plan Series

Management Plan for the Northern Brook Lamprey (*Ichthyomyzon fossor*), Great Lakes – Upper St. Lawrence populations, in Canada

Northern Brook Lamprey

Northern Brook and Silver Lampreys
(Special Concern)

Threatened

7

Slide 8

And 2/11 identified as priority for assessment

COSEWIC
Committee on the Status of
Endangered Wildlife in Canada

COSEPAC
Comité sur la situation des
espèces en péril au Canada

Freshwater Fishes (68)

Group 1 - High priority candidates		
Lake Whitefish	*Coregonus clupeaformis*	AB, BC, CWS, DFO, FJMC, GRRB, HFTCC, MB, NB, NL, NS, NT, NU, NWMB, ON, Parks, QC, SK, SRRB, YFWMB, YT
European Whitefish	*Coregonus lavaretus*	CWS, DFO, NT, Parks, YT
Blackfin Cisco	*Coregonus nigripinnis*	CWS, DFO, ON, Parks
Pacific Lamprey	*Entosphenus tridentatus*	BC, CWS, DFO, Parks
Banded Killifish (Mainland populations)	*Fundulus diaphanus*	CWS, DFO, MB, NB, NS, ON, Parks, PE, QC
Chestnut Lamprey (Great Lakes - Upper St. Lawrence populations)	*Ichthyomyzon castaneus*	CWS, DFO, ON, Parks, QC

8

But little attention to sea lamprey in Atlantic Canada
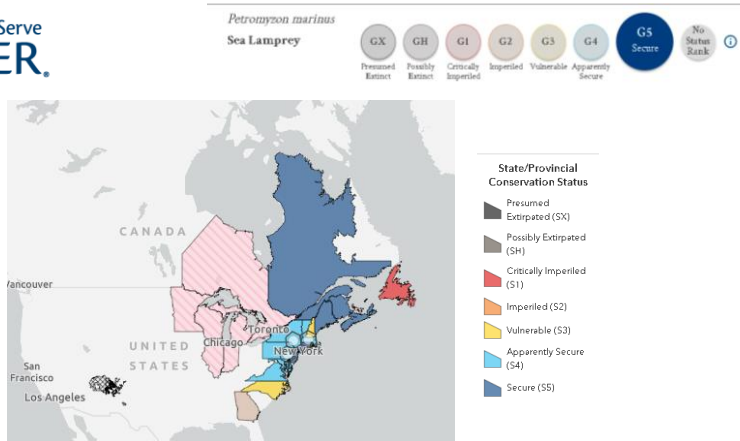
- Generally Secure (S5)
- Although most surveys were conducted decades ago with little monitoring since

9

1980

Biology of the North American Anadromous Sea Lamprey,
Petromyzon marinus[1]

F. W. H. BEAMISH
Department of Zoology, University of Guelph, Guelph, Ont. N1G 2W1

1993

Occurrence of Sea Lamprey, *Petromyzon marinus*, in a
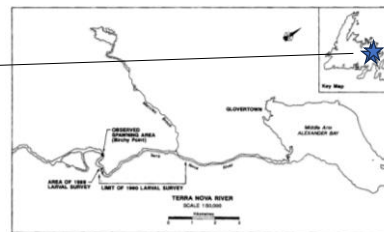Newfoundland River, with Additional Records from the
Northwest Atlantic
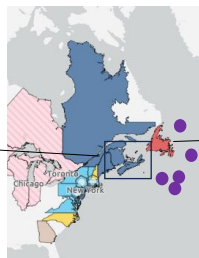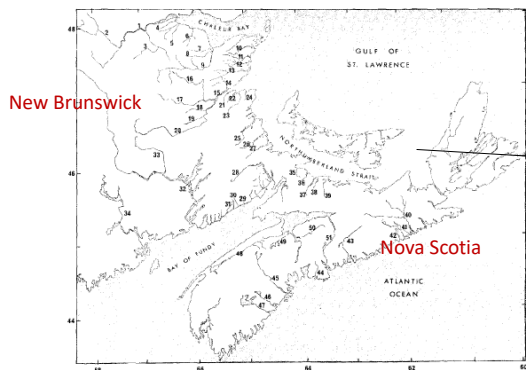
J.B. Dempson and T.R. Porter

- 51 tributaries (34 NB + 17 NS) which support spawning migrations of anadromous sea lamprey

- Terra Nova River (48°40'N, 50°00'W) first documented occurrence of spawning population of sea lamprey in Newfoundland

10

## Relatively few impassable dams in Atlantic Canada

1975

The biology of the anadromous Sea lamprey (*Petromyzon marinus*) in New Brunswick

F. W. H. BEAMISH
Department of Zoology, University of Guelph, Guelph, Ontario, Canada

AND

I. C. POTTER
School of Biological Sciences, University of Bath, Claverton Down, Bath, Somerset, U.K.

1) Saint John River, New Brunswick:
   a) Mactaquac Dam (~140 km upstream; 1968)
   b) Beechwood Dam (~260 km upstream; 1957)
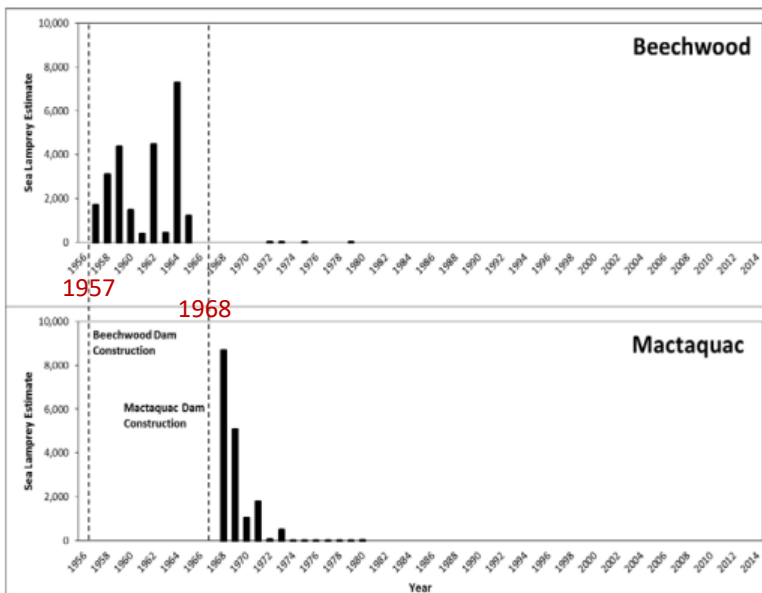   c) Tobique-Narrows (~290 km upstream; 1953)

Beechwood Dam
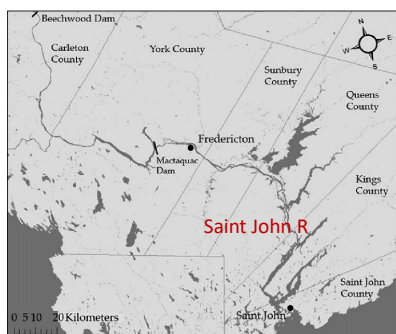
Saint John R.

Mactaquac Dam

11

Saint John River, New Brunswick

Mactaquac Aquatic Ecosystem Study
Report Series 2018-024

MAES Fish Passage at Tobique-Narrows, Beechwood, and Mactaquac Hydropower Generating Facilities in the Saint John River System, New Brunswick.

Adam Chateauvert, Tommi Linnansaari, Kurt Samways, and R. Allen Curry

October 2018

Beechwood

1957

1968

Beechwood Dam Construction

Mactaquac Dam Construction

Mactaquac

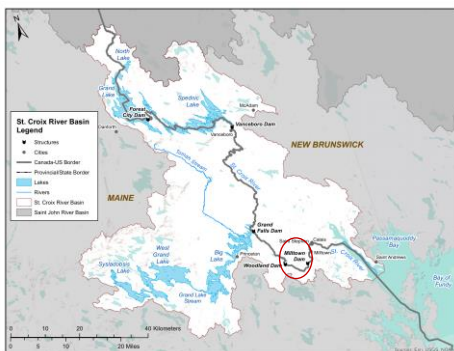- Thousands of sea lamprey removed at dams each year and destroyed

12
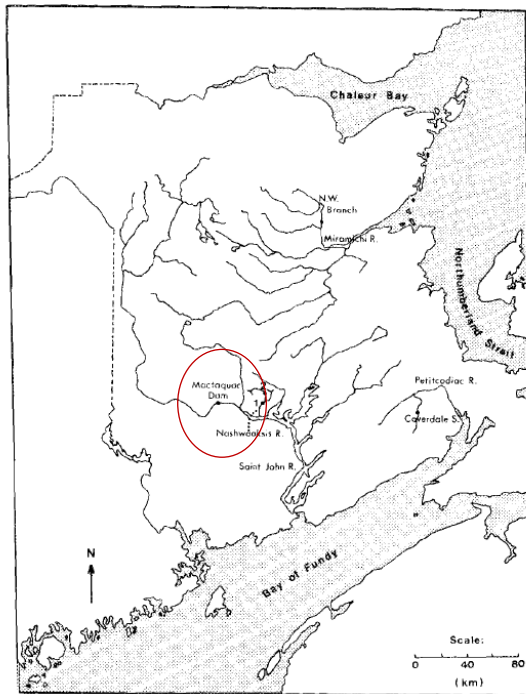
- Removing sea lamprey at dams eventually stopped ("to reduce the chance of injury to Atlantic salmon")

- Ample spawning and larval rearing habitat downstream of Mactaquac Dam

13

2) St. Croix River, New Brunswick (Canada) / Maine (USA)

- ~5 million m^2 of spawning habitat to anadromous fishes

July 2023

14

Nova Scotia

Nova Scotia Power to pull plug on tidal station, seeks $25M from ratepayers

f X ✉ 🍁 in

Company wants customers to pay to write off Annapolis Royal, N.S., plant

Paul Withers · CBC News · Posted: Feb 23, 2021 12:36 PM CST | Last Updated: February 23, 2021

Nova Scotia Power is permanently retiring its Annapolis Royal, N.S., generating station, which has been shut down since 2019. (Patrick Callaghan/CBC)

Nova Scotia Power has decided to pull the plug on North America's only tidal power generating station and wants its customers to pay $25 million over the next decade to write off the asset.

The utility says the decision to permanently retire the 37-year old Annapolis Generating Station in Annapolis Royal, N.S., was due to the failure of a "crucial component" in the generator and an authorization required by the Department of Fisheries Oceans after it determined the facility caused serious harm to fish.

15

Northward expansion with climate change?

2021

BRIEF COMMUNICATION

JOURNAL OF **FISH** BIOLOGY

Incursions of sea lamprey, *Petromyzon marinus*, and striped bass, *Morone saxatilis*, in Labrador waters: Episodic events or evidence of a northward range expansion?

Travis E. Van Leeuwen[1] | David Cote[1] | Christina Pretty[1] | Joseph Townley[2] | Rebecca Poole[3] | Brian Dempson[1] | Tomas J. Bird[1] | Charlene Kippenhuck[4] | Corey Morris[1]

Mostly offshore, but reports in Lake Melville (2020)

Previous northernmost record in fresh water (1971)

Northernmost confirmed spawning population

16

8
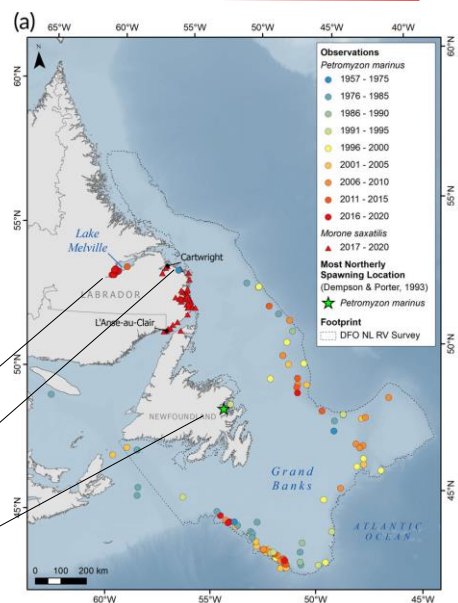
Knowledge Gaps

- Current distribution and abundance?

2019

Correlating sea lamprey density with environmental DNA detections in the lab

Nicholas A. Schloesser[1,*], Christopher M. Merkes[1], Christopher B. Rees[2], Jon J. Amberg[1],
Todd B. Steeves[3] and Margaret F. Docker[4]

- Threats?
  - e.g., declining prey, changes in temperature and water levels, urbanization

- For more accurate assessments of conservation status and more directed recovery actions

17

Questions?

Margaret.Docker@umanitoba.ca

18