Sea Lamprey Control – A Pillar of a World Class Fishery

Mike Siefkes
Sea Lamprey Control Director
Great Lakes Fishery Commission
msiefkes@glfc.org
www.sealamprey.org

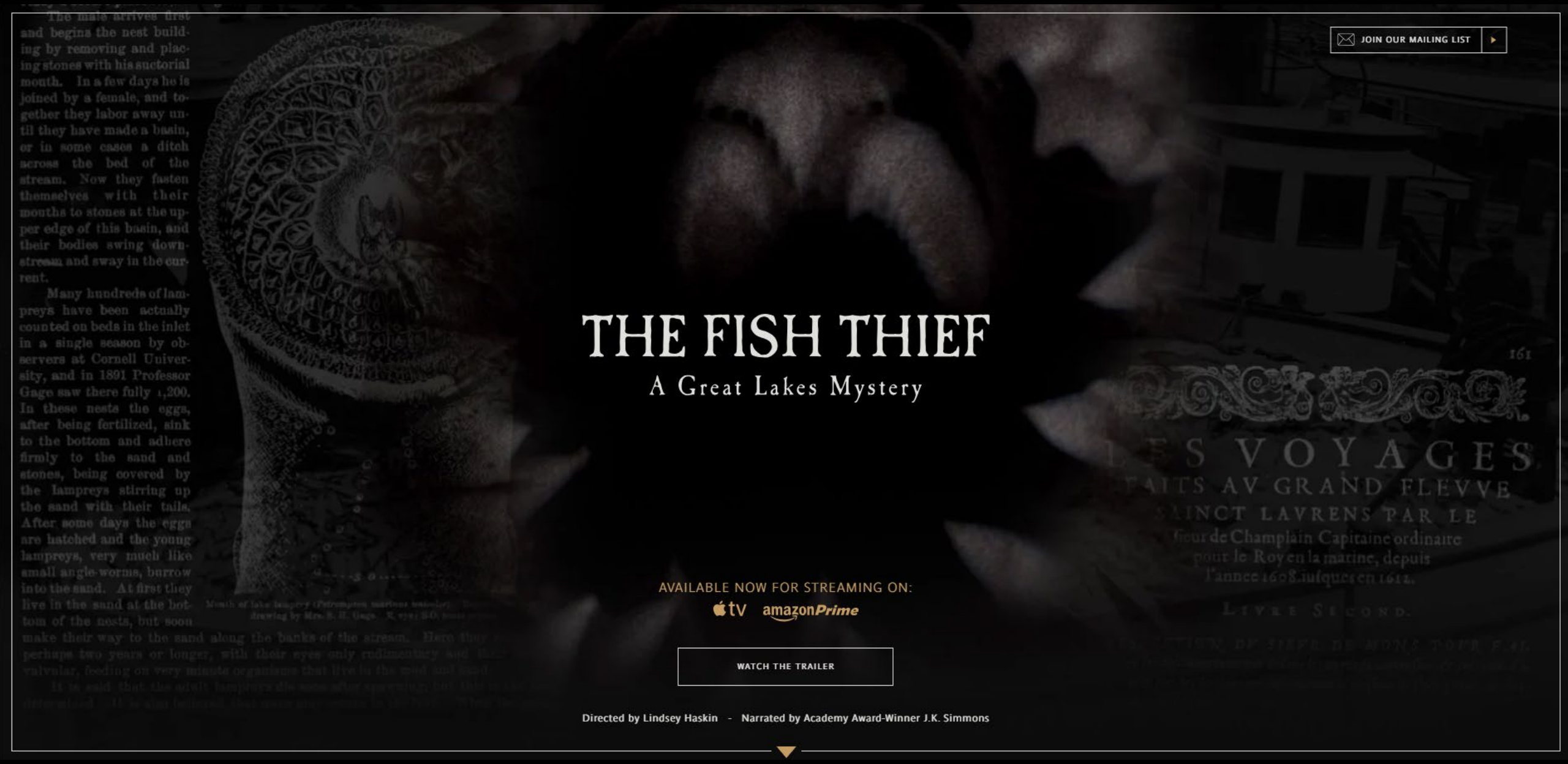
18th Annual Freshwater Summit

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities


JOIN OUR MAILING LIST
THE FISH THIEF
A Great Lakes Mystery
AVAILABLE NOW FOR STREAMING ON:
tv
amazonPrime
WATCH THE TRAILER
Directed by Lindsey Haskin - Narrated by Academy Award-Winner J.K. Simmons

Great Lakes Fishery History – Indigenous Nations

St Marys River Rapids, c. 1860
Library and Archives Canada

Little Traverse Bay Bands of Odawa Indians

Great Lakes Fishery History – Colonization

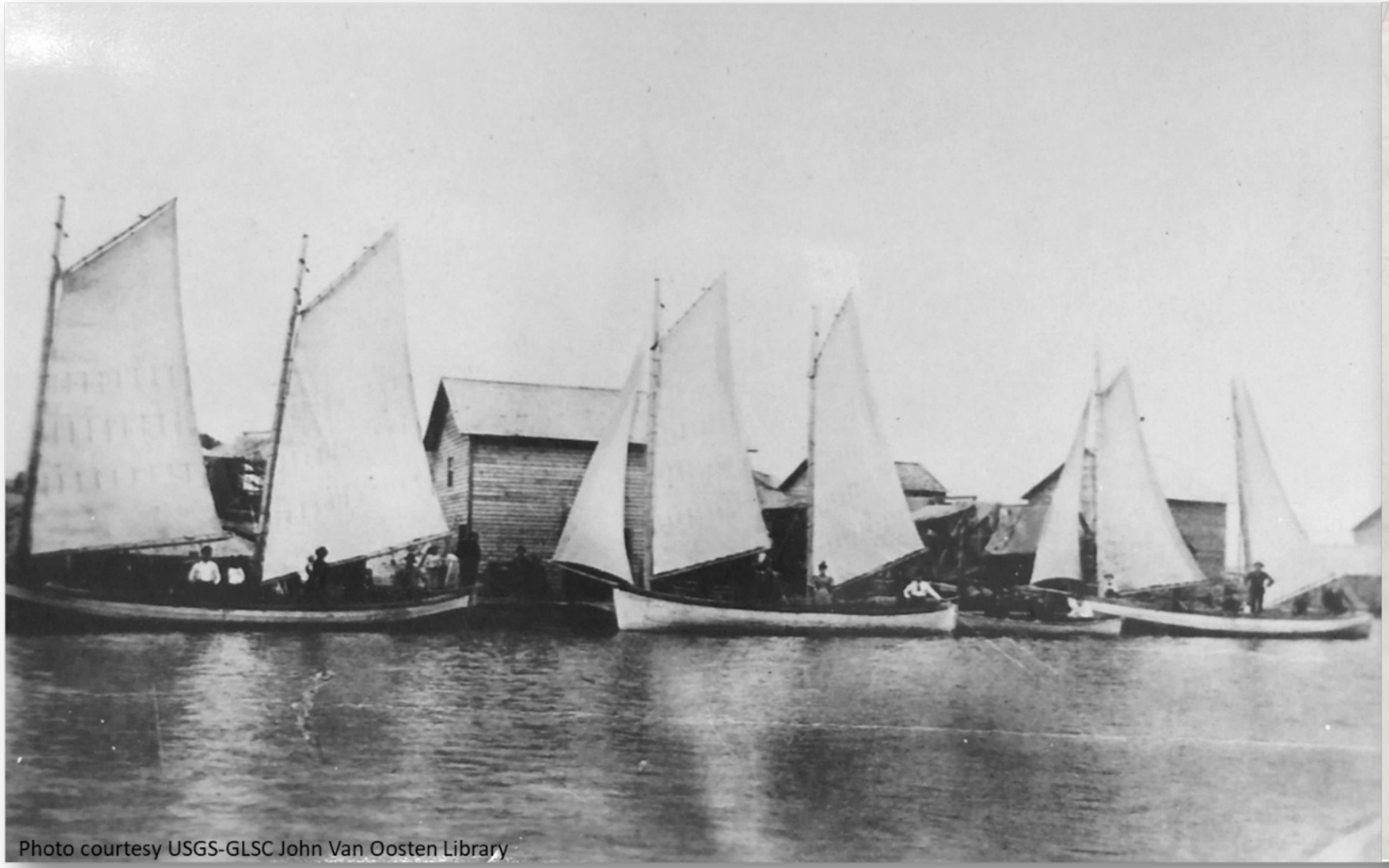


Photo courtesy USGS-GLSC John Van Oosten Library

University of Minnesota – Lake Superior

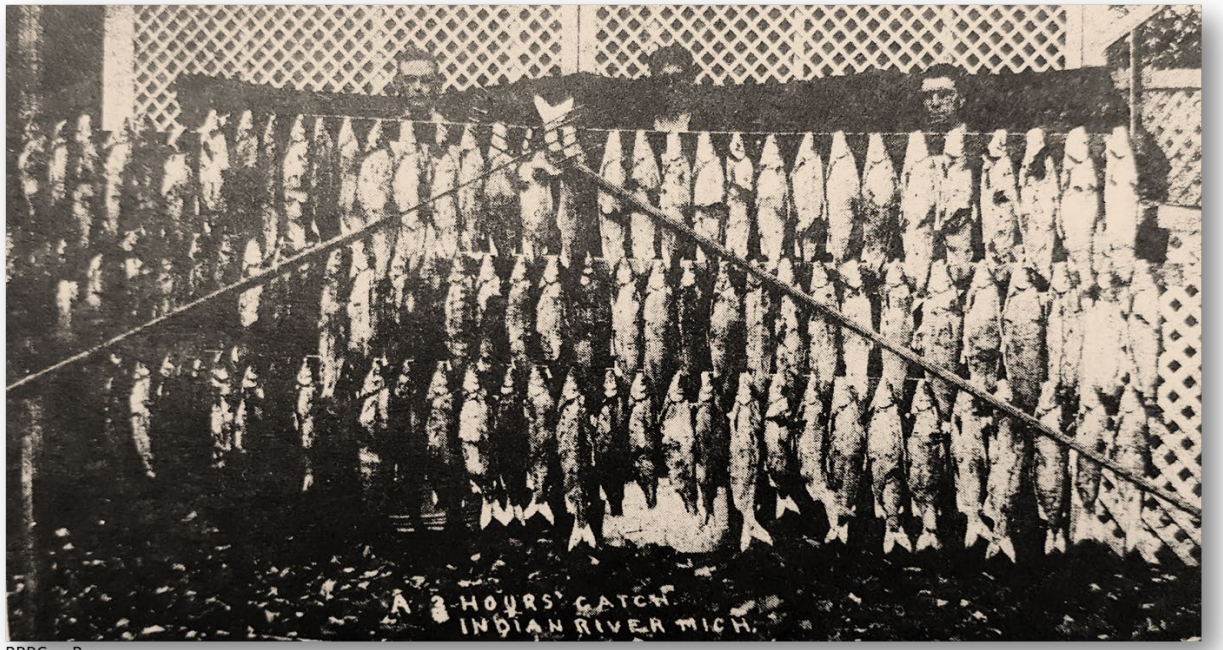
Great Lakes Fishery History – Industrialization

1898, Ocqueoc River at Millersburg, MI. Millersburg Memories.

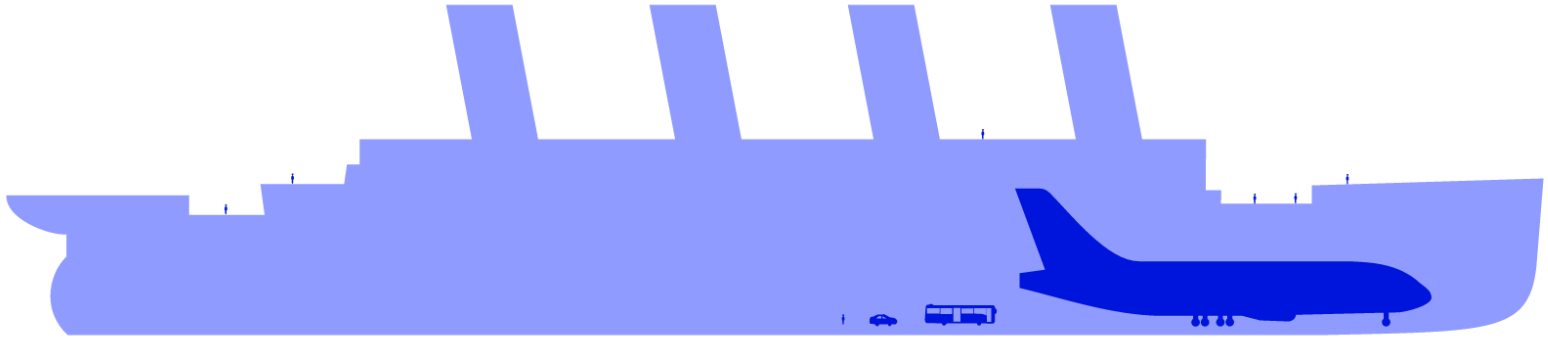
International Joint Commission

Great Lakes Fishery History – Fishery Decline

USBF Doc 1001, 1918, pg 552



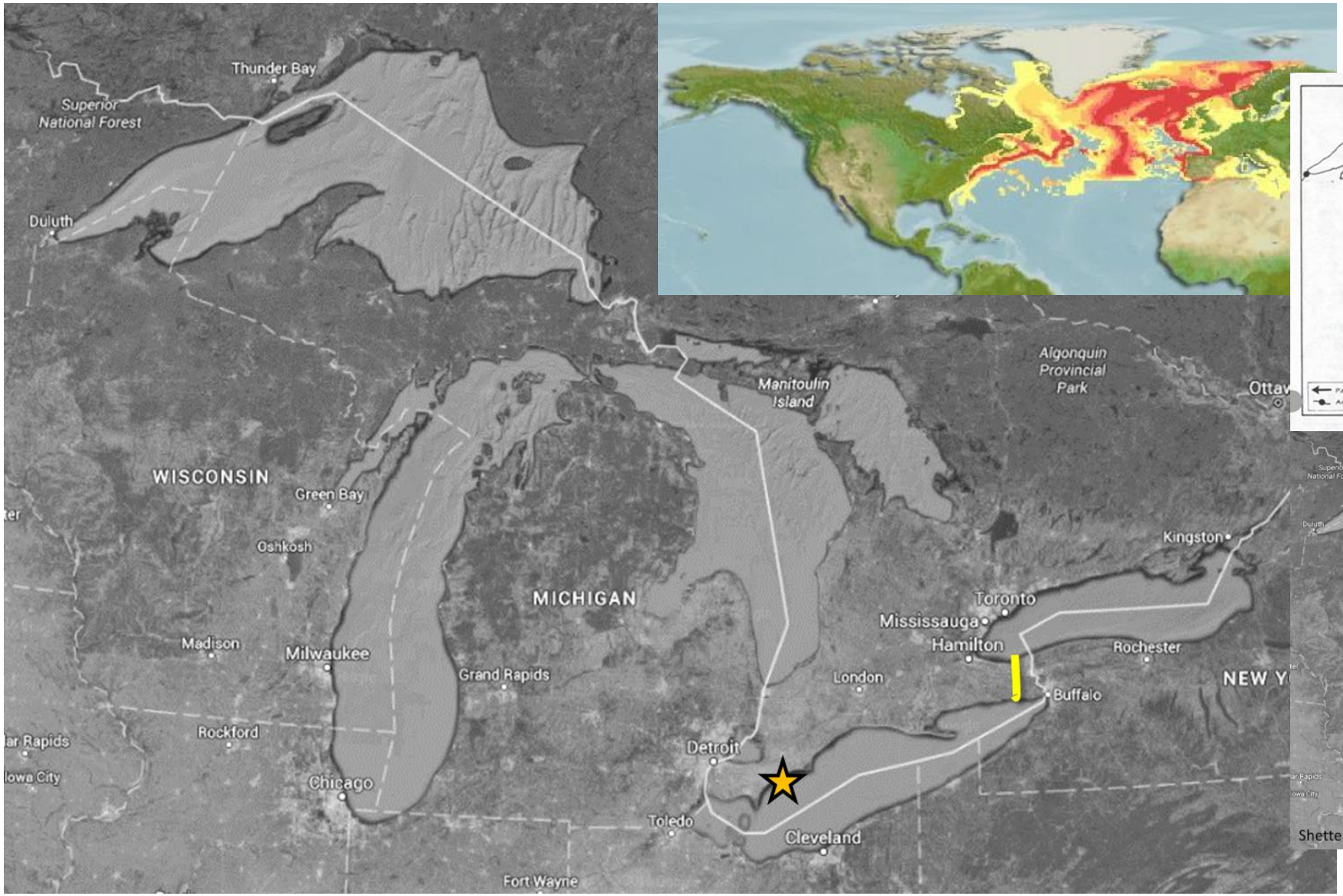
RPPC - eBay

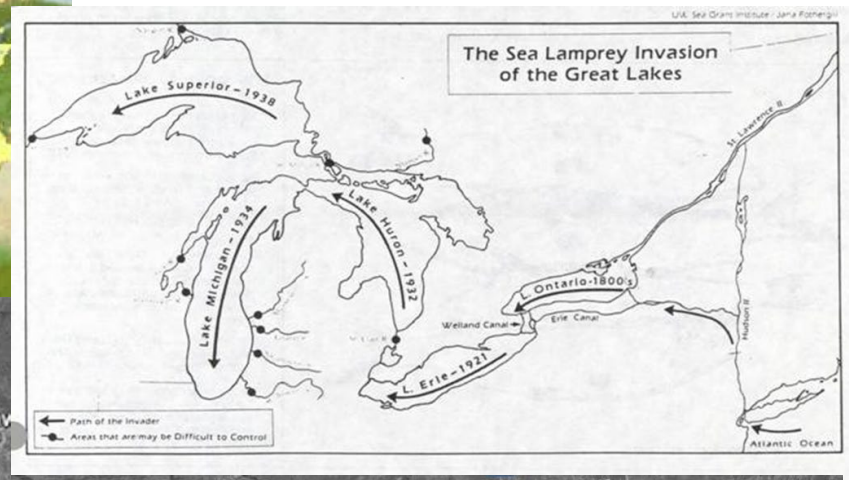


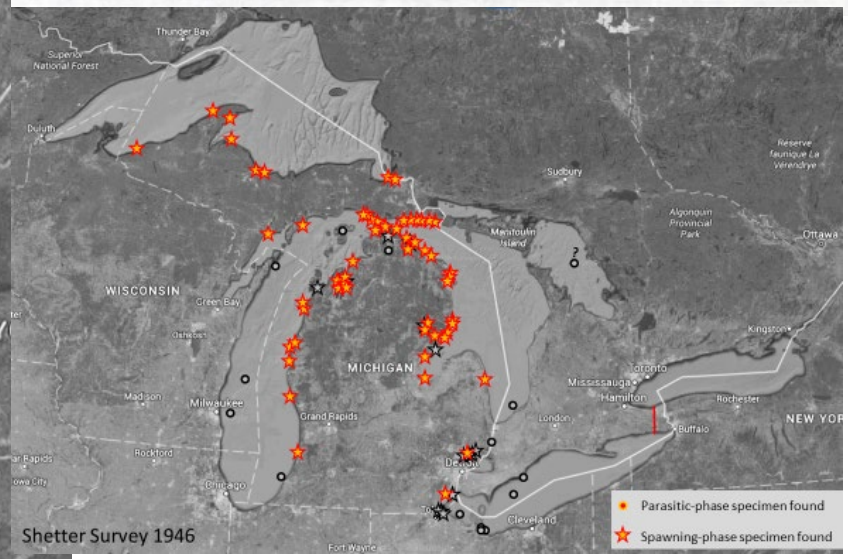
Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

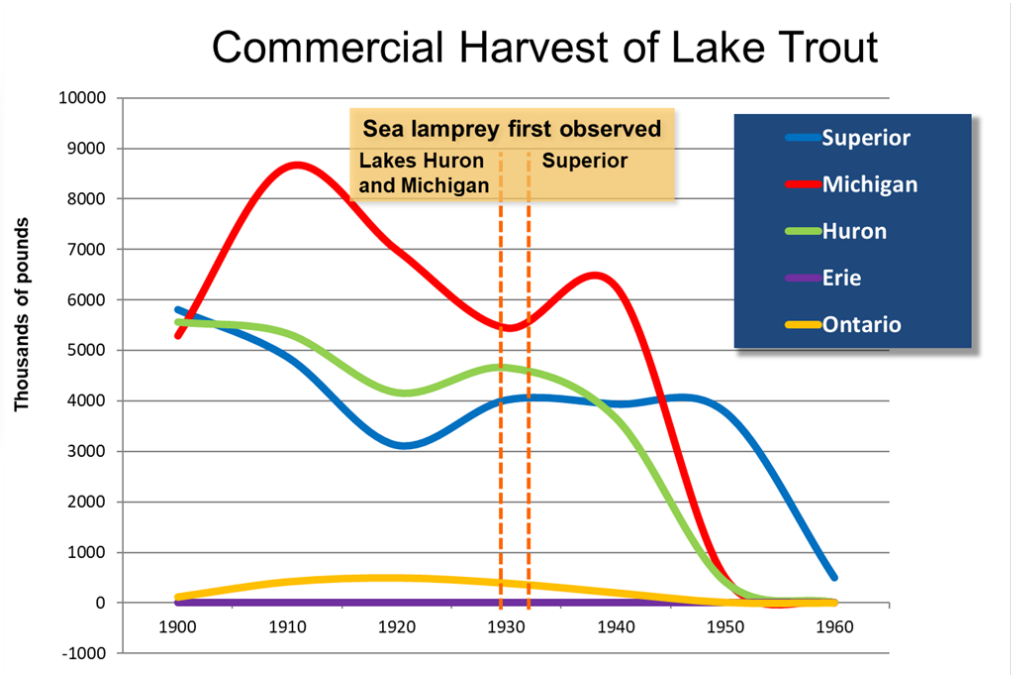
Sea Lamprey Invasion – First Detection

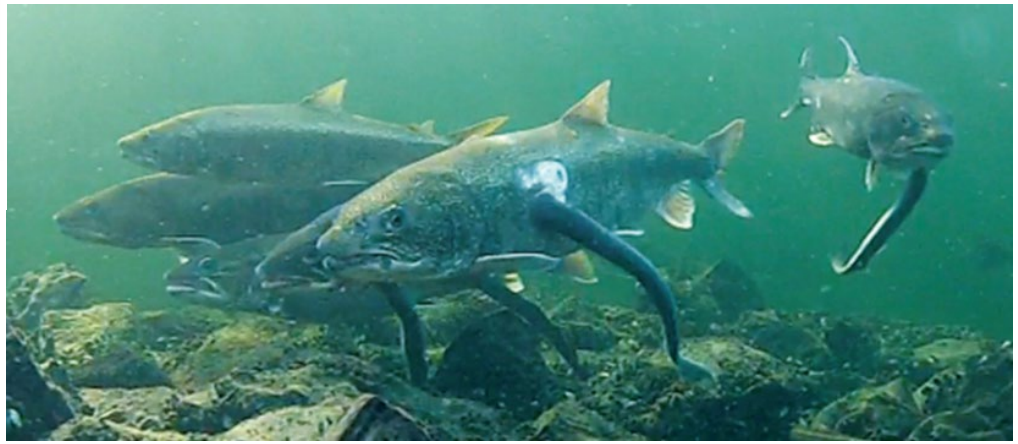




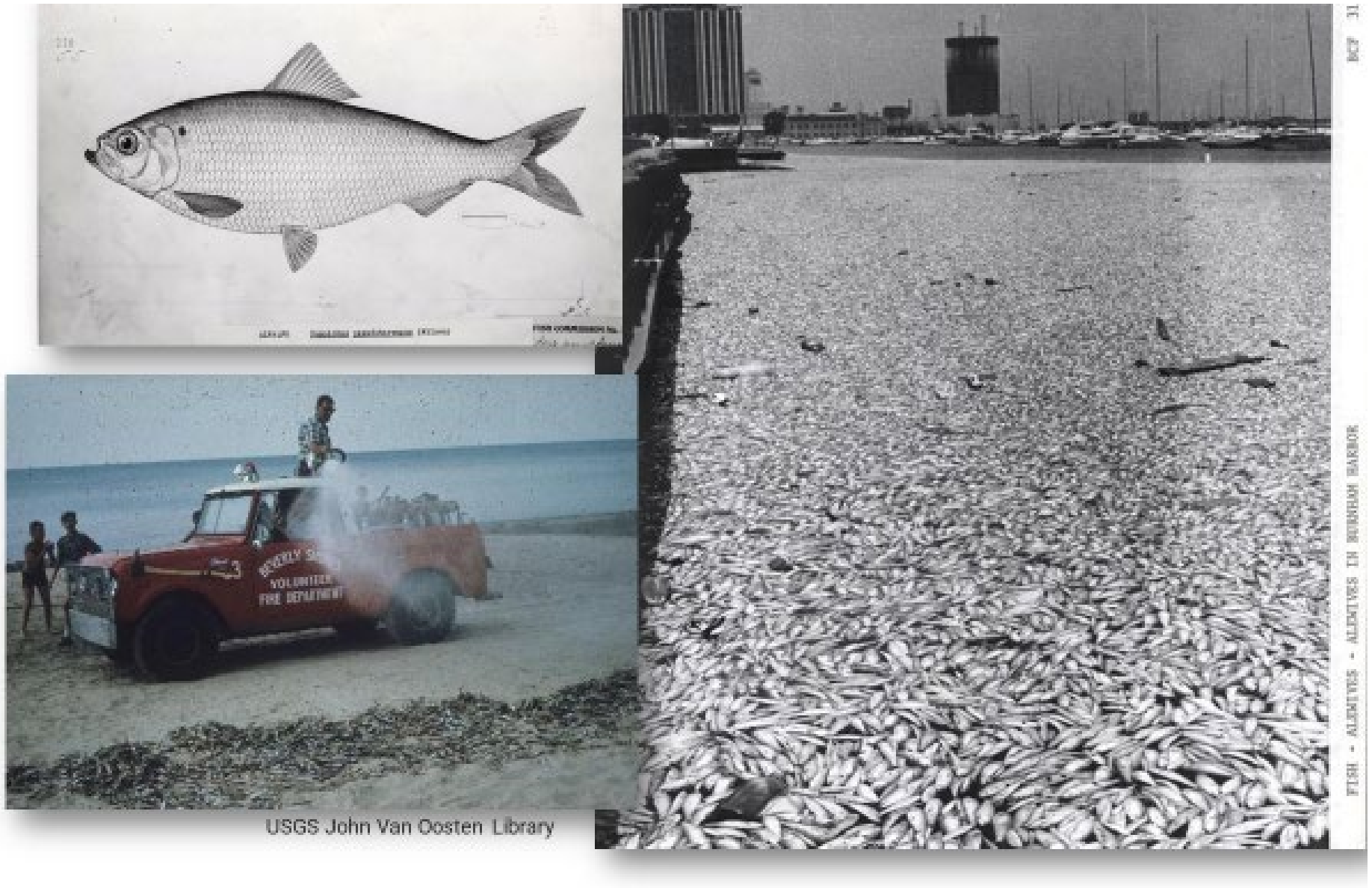


Sea Lamprey Invasion – Fishery Impacts



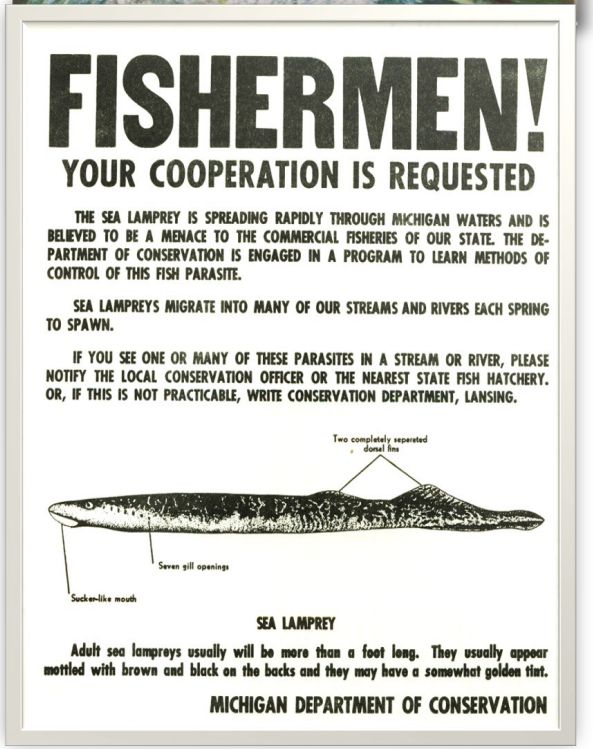


Sea Lamprey Invasion – Ecosystem Impacts



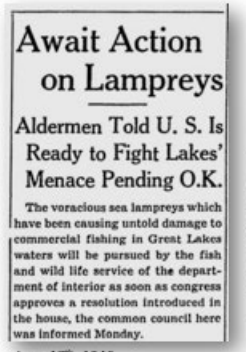
Sea Lamprey Invasion – The Call for Action

Jan. 1956 Stag




Four States Seeking Uniform Code to Control Commercial Fishing

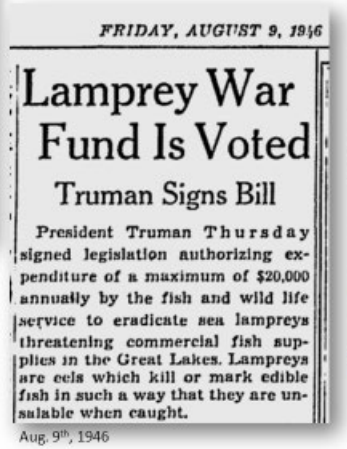
Jan. 27th, 1933: The Milwaukee Journal


Await Action on Lampreys

Aldermen Told U. S. Is Ready to Fight Lakes' Menace Pending O.K.

The voracious sea lampreys which have been causing untold damage to commercial fishing in Great Lakes waters will be pursued by the fish and wild life service of the department of interior as soon as congress approves a resolution introduced in the house, the common council here was informed Monday.

June 17th, 1946
The Milwaukee Journal

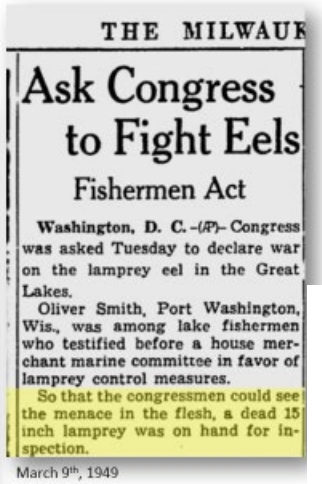

FRIDAY, AUGUST 9, 1946

Lamprey War Fund Is Voted

Truman Signs Bill

President Truman Thursday signed legislation authorizing expenditure of a maximum of $20,000 annually by the fish and wild life service to eradicate sea lampreys threatening commercial fish supplies in the Great Lakes. Lampreys are eels which kill or mark edible fish in such a way that they are unsalable when caught.

Aug. 9th, 1946


THE MILWAUK

Ask Congress to Fight Eels

Fishermen Act

Washington, D. C.–(AP)– Congress was asked Tuesday to declare war on the lamprey eel in the Great Lakes.

Oliver Smith, Port Washington, Wis., was among lake fishermen who testified before a house merchant marine committee in favor of lamprey control measures.

So that the congressmen could see the menace in the flesh, a dead 15 inch lamprey was on hand for inspection.

March 9th, 1949

The destructive power of the sea lamprey joined two nations

- Congressional hearings from 1946-1955: It was the sea lamprey invasion that propelled two nations into cooperative, binational, fisheries management in the Great Lakes

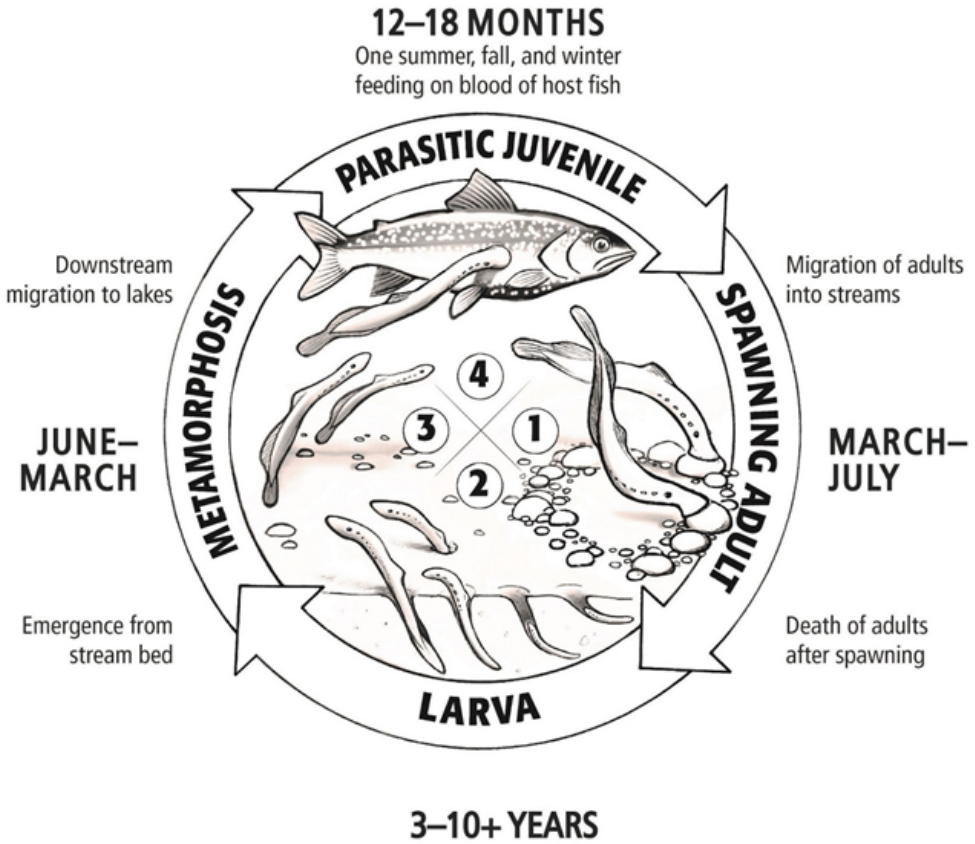
79TH CONGRESS } HOUSE OF REPRESENTATIVES { REPORT
2d Session } { No. 2476

INVESTIGATE AND ERADICATE PREDATORY SEA LAMPREYS OF THE GREAT LAKES

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

Sea Lamprey Control Development – Early Work



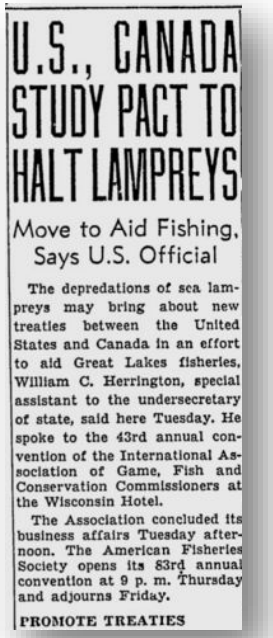
PAGE 22

Lampreys Electrocuted To Preserve Lakes Fish

'Death Fence' In River Makes 'Hot Winter' In Cold Country For Parasites

By Science Service

Sea Lamprey Control Development – Great Lakes Fishery Commission



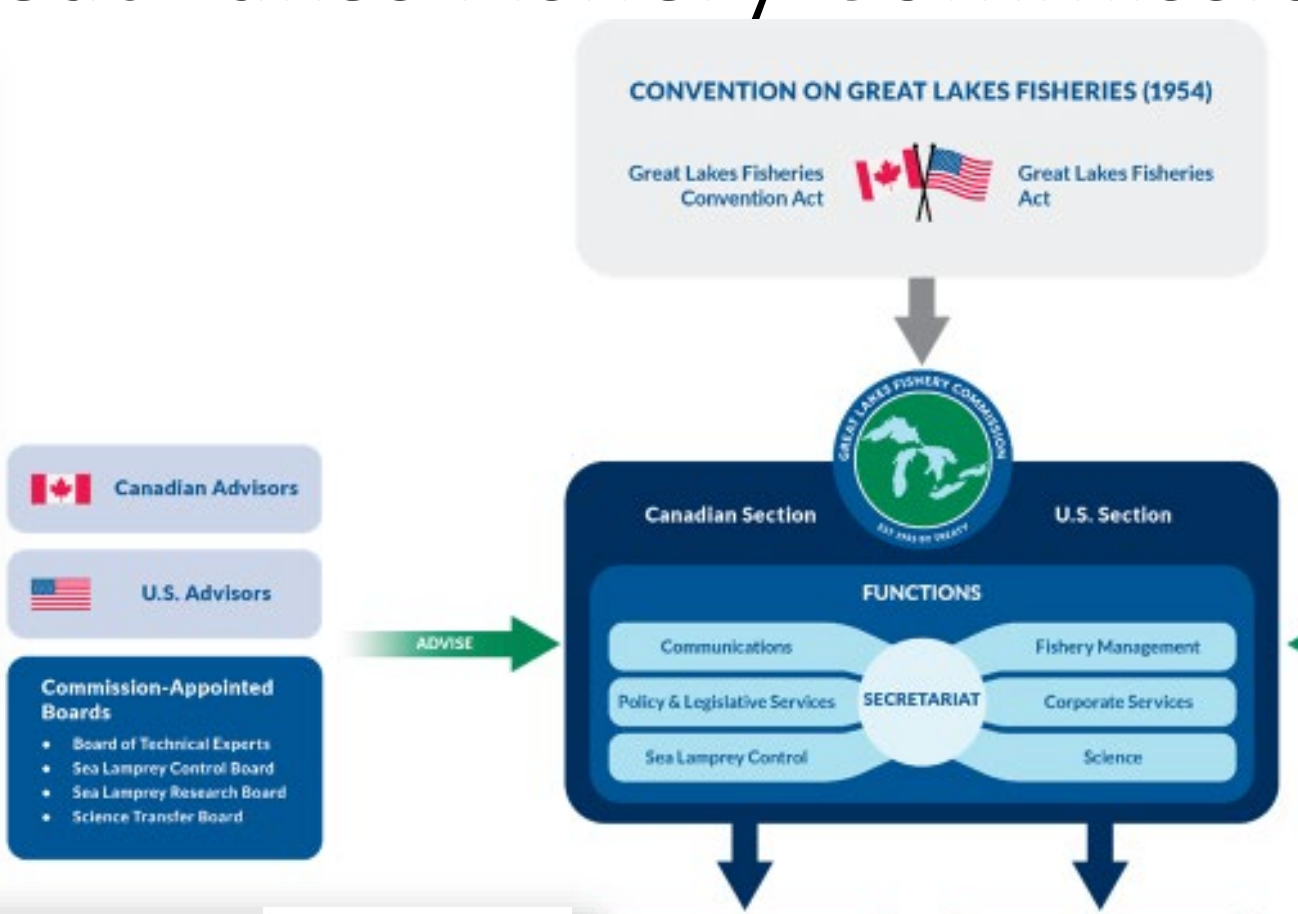
U.S., CANADA STUDY PACT TO HALT LAMPREYS

Move to Aid Fishing, Says U.S. Official

The depredations of sea lampreys may bring about new treaties between the United States and Canada in an effort to aid Great Lakes fisheries, William C. Herrington, special assistant to the undersecretary of state, said here Tuesday. He spoke to the 43rd annual convention of the International Association of Game, Fish and Conservation Commissioners at the Wisconsin Hotel.

The Association concluded its business affairs Tuesday afternoon. The American Fisheries Society opens its 83rd annual convention at 9 p. m. Thursday and adjourns Friday.

PROMOTE TREATIES



TOLEDO BLADE: THURSDAY, DECEMBER 18, 1952
PAGE 10

Eel Invasion Jolts 2 Nations To Action

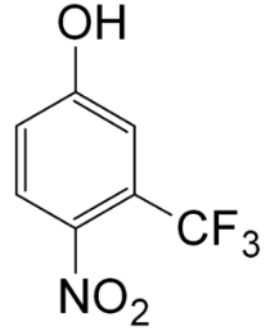
Lakes Fish Worth $5 Million Killed

The U.S. Fish and Wild Life Service, in cooperation with agencies of the Great Lakes states, the department said, has

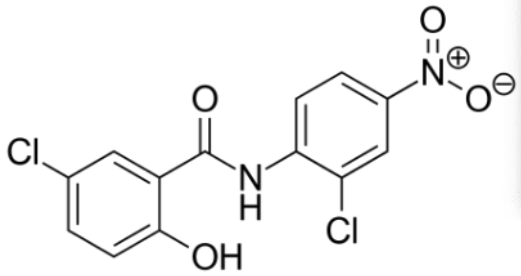
ciation, and F. A. Wasterman, chief of the fish division of the Michigan department of conservation at Lansing.

Senate Ratifies Canadian Pact To Kill Lampreys

Sea Lamprey Control Development – Lampricides



3-trifluoromethyl-
4-nitrophenol
(TFM)



2’,5-dichloro-4’-
nitrosalicylanilide
(Bayluscide)

Selective toxicants

Dec. 1st, 1955
Star News

New Weapons Used To Fight Lampreys

Sea life, like most life on land, feeds upon itself. Big fish eat the smaller ones from whales to sardines, and the fisheries are aroused to concern only when something happens to the balance of this feeding that adversely affects the breeding of some prized species, usually a food

Stream Test Set For Lamprey Poison

MARQUETTE, Mich., May 8 ... barriers ... fects in ... ey may ... on that ... Great ... Since the first weir was put into operation March 20, a total of 2,084 lampreys have come from Lake Michigan streams and 422 from Lake Superior streams.

The East Twin River in Wis-

May 9th, 1956
The Milwaukee Sentinel

Courtesy HBBS

SEC. 4

Chemical Killer May Save Trout

LANSING, Mich., July 27 (AP)—Remember the name Dowlap. Within a year or two it may be hailed as the salvation of commercial lake trout fishermen in the Great Lakes.

July 28th, 1957 Toledo Blade

Sea Lamprey Control Development – Success!

'Dowlap'—Death to the Lamprey

Hammond Bay Experiment With Nitro-Phenol Kills Larvae: Doesn't Affect Fish

By [illegible]

New Anti-Lamprey Chemical Reported

Results Spectacular, Researcher Says

OTTAWA, Ont., July 25 (AP)—

Great Lakes Winning War On Lamprey

ANN ARBOR (AP)—The Great Lakes is winning its chemical war against sea lamprey with negligible casualties among fish.

This battle communique was reported at the annual meeting of the Great Lakes Fishery Commission at the University of Michigan which ended Friday.

Highly favorable results were reported from recent tests in eight Michigan and Wisconsin streams where the lamprey feeds off fish.

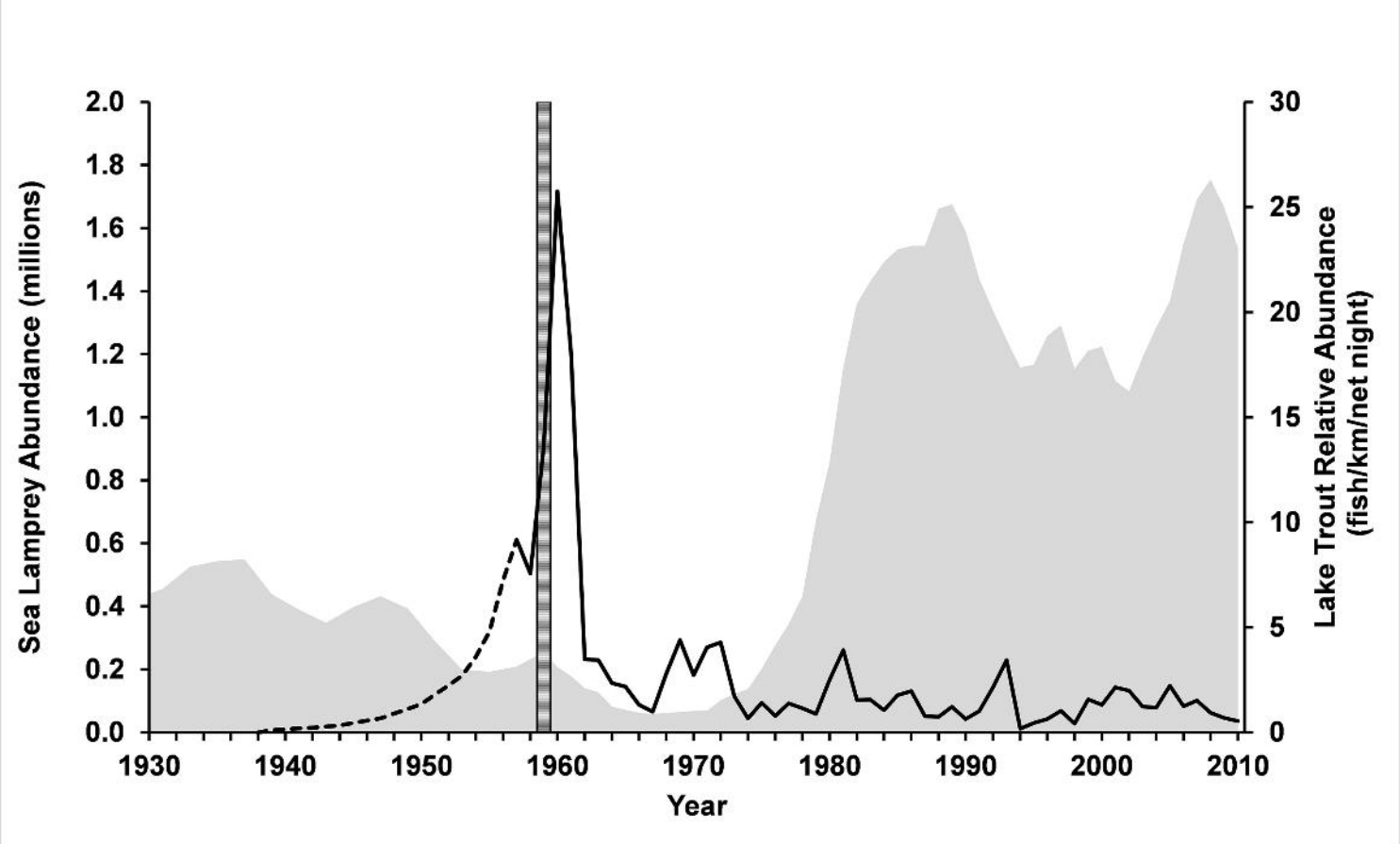
The lamprey is being killed by two chemicals: Dowlap F-40 and Lampricide 2770.

Photos courtesy SLCC, Ludington Bio Station, and HBBS

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

Continued Sea Lamprey Control – Victim of Success



- Great Lakes fishery value = $5.1B US per year…would not exist without sea lamprey control
- Sea lamprey control costs = $25M US per year – a 0.5% investment to protect the Great Lakes fishery

Continued Sea Lamprey Control – COVID Pandemic

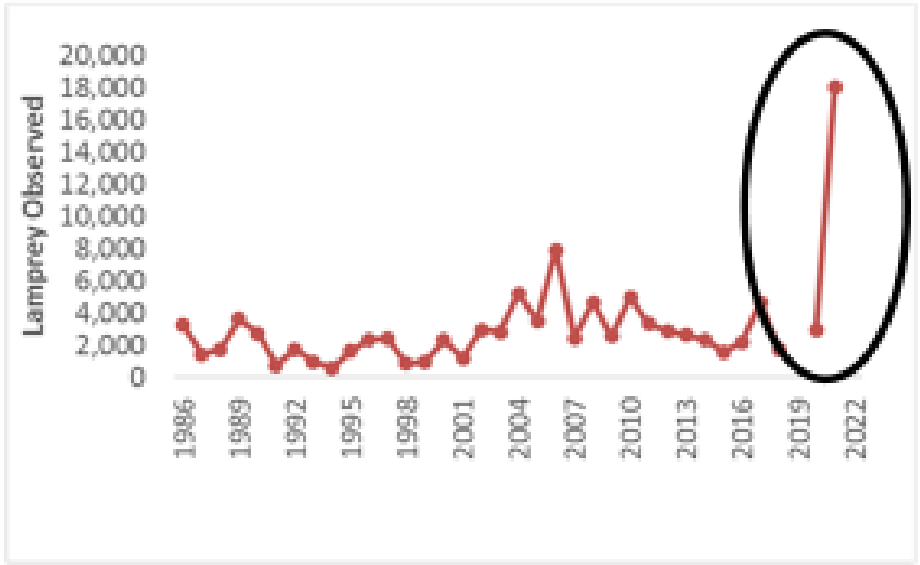
Treatments Conducted

Lake	2020	2021	2022*
Superior	13	23	52
Michigan	13	21	12
Huron	7	24	24
Erie	0	2	3
Ontario	0	11	16

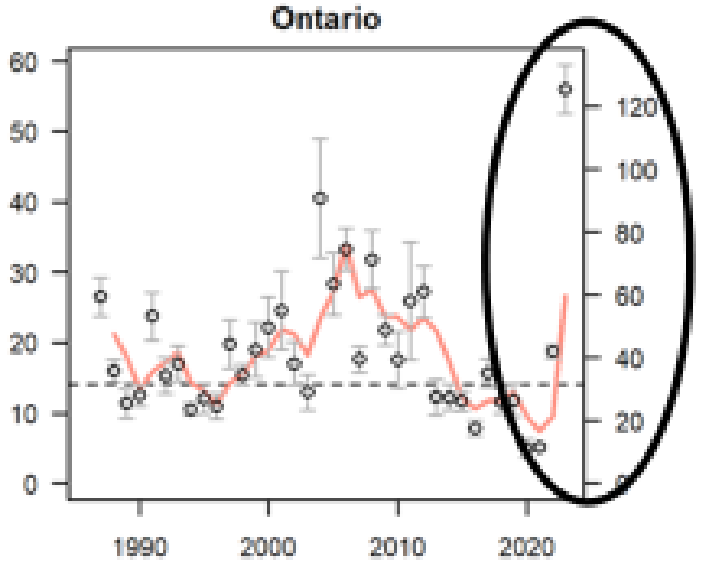
~25% ~75% ~100%

Percentage of planned treatments conducted

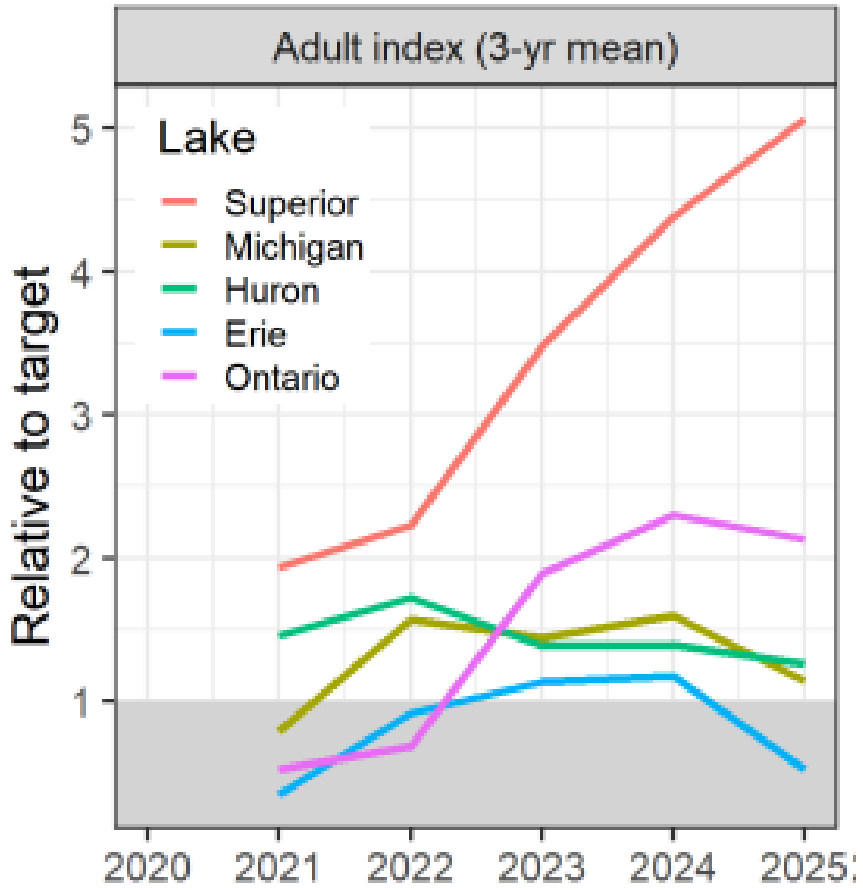
Parasitic Juveniles Observed



Adult Abundance



Continued Sea Lamprey Control is Needed



Lake	Target	2024	2025	Δ
Superior	10,421	55,551	40,610	**-14,941**
Michigan	20,526	24,799	21,273	**-3,526**
Huron	31,274	39,974	44,591	**+4,617**
Erie	3,263	870	803	**-67**
Ontario	14,065	22,374	11,584	**-10,790**

- 3-year averages & 5-year trends
  - > targets in all lakes except Erie
  - Trends flat in all lakes; high variation
- 2025 data points are relevant – COVID
  - Decreases in all lakes except Huron
  - Increase in Huron

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

Current Sea Lamprey Control – Barriers

Without sea lamprey barriers:

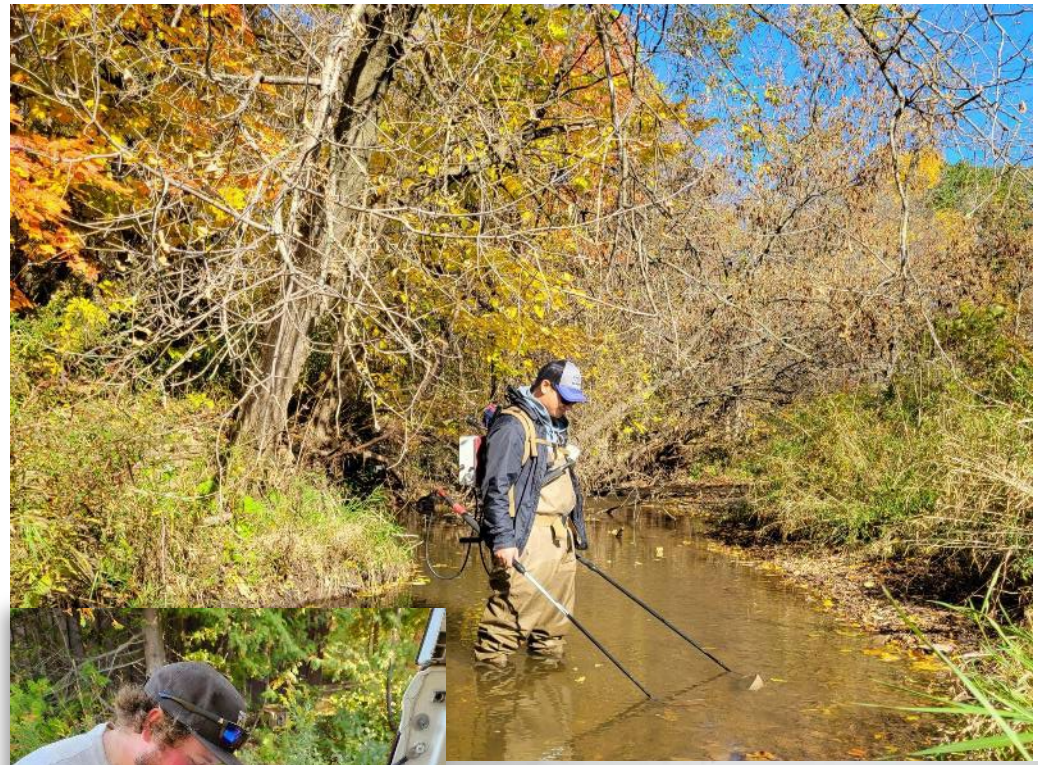
- >31,000 miles open to sea lamprey infestation
- >$17M to treat with lampricides annually

Current Sea Lamprey Control – Lampricides

- ~500 tributaries treated – most on a 3-5 year cycle
- ~120 tributaries treated annually with lampricides

- TFM kills >90% of sea lamprey
- Bayluscide kills ~75% of sea lamprey

Current Sea Lamprey Control – Larval Assessment

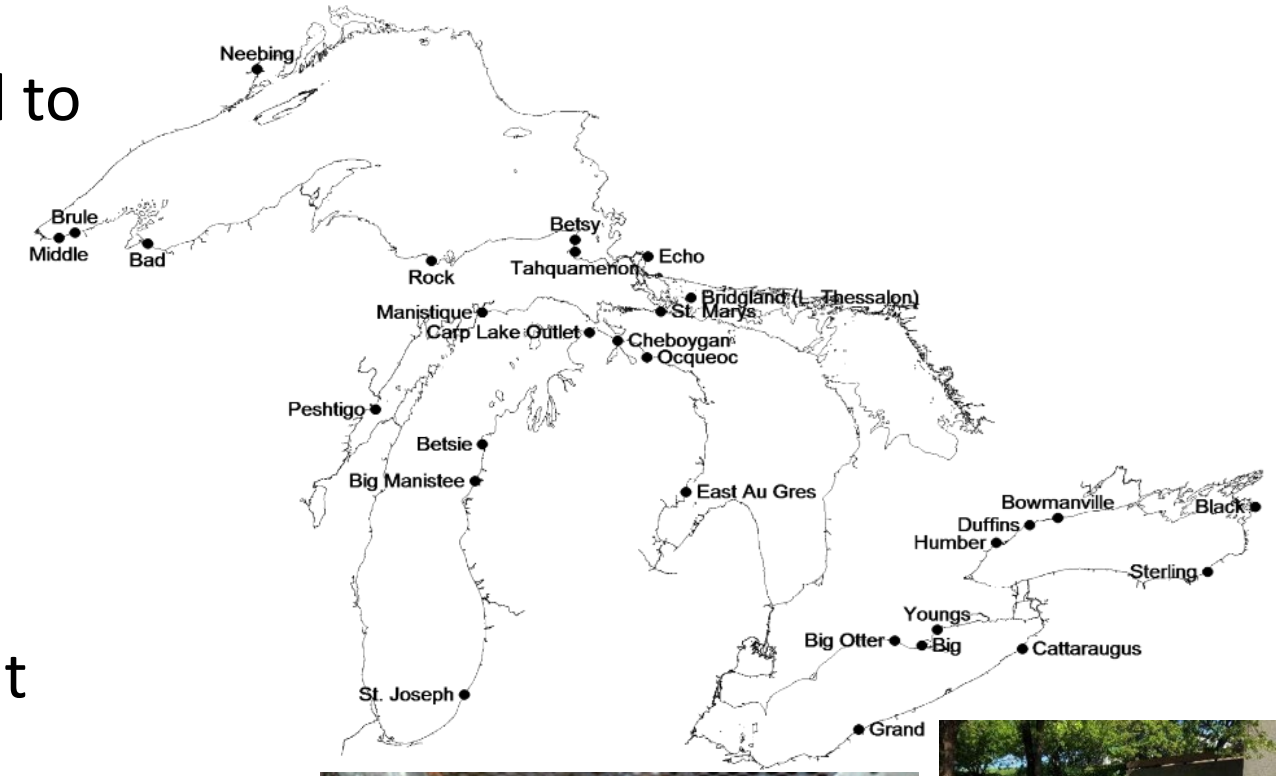


~600 tributaries surveyed annually

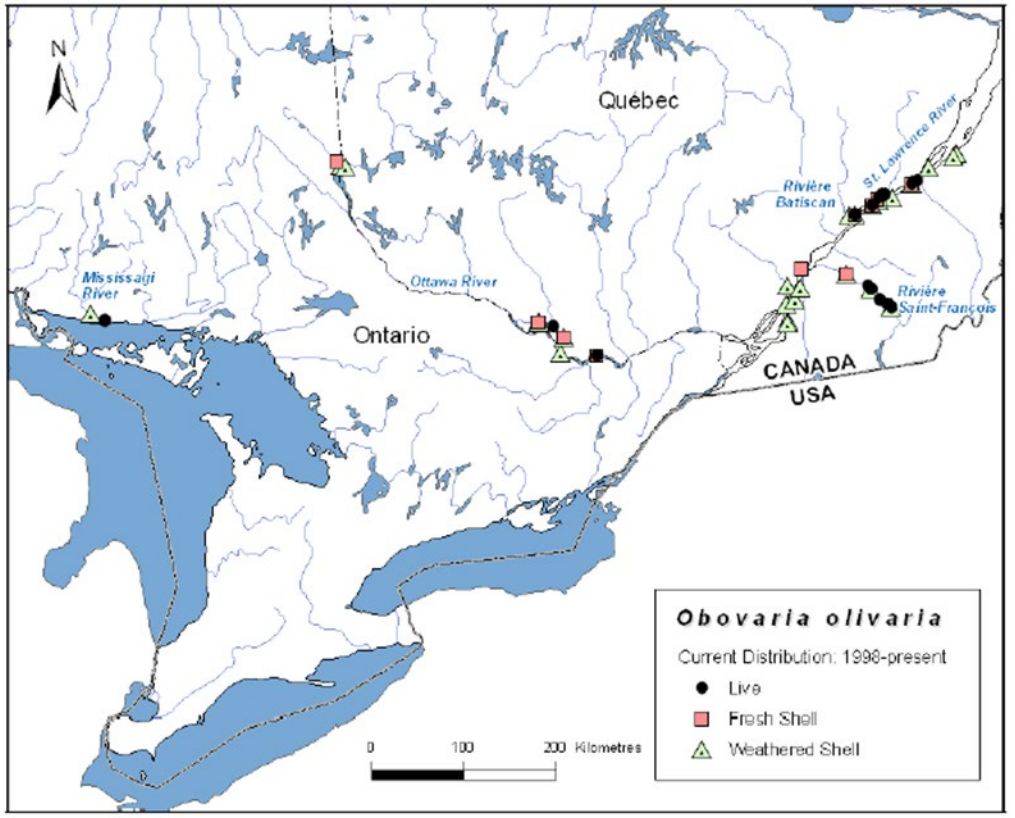
- Which tributaries to treat
- How far upstream to treat
- Whether retreatment is needed
- Whether barriers are effective
- Identify new sea lamprey tributaries
- Collect larvae for research and outreach

Current Sea Lamprey Control – Adult Assessment

- Twenty-nine index streams are used to measure sea lamprey control programs success
- Stream-specific adult sea lamprey population estimates are generated on all index streams using traps and mark/recapture methods
- Population estimates for index streams within a given lake are summed to generate lake-wide adult indices
- ~40,000 adults are capture annually
- Many adults are used for outreach and research purposes



Current Sea Lamprey Control – Environmental & Risk Management



Current Sea Lamprey Control – A Complex Program

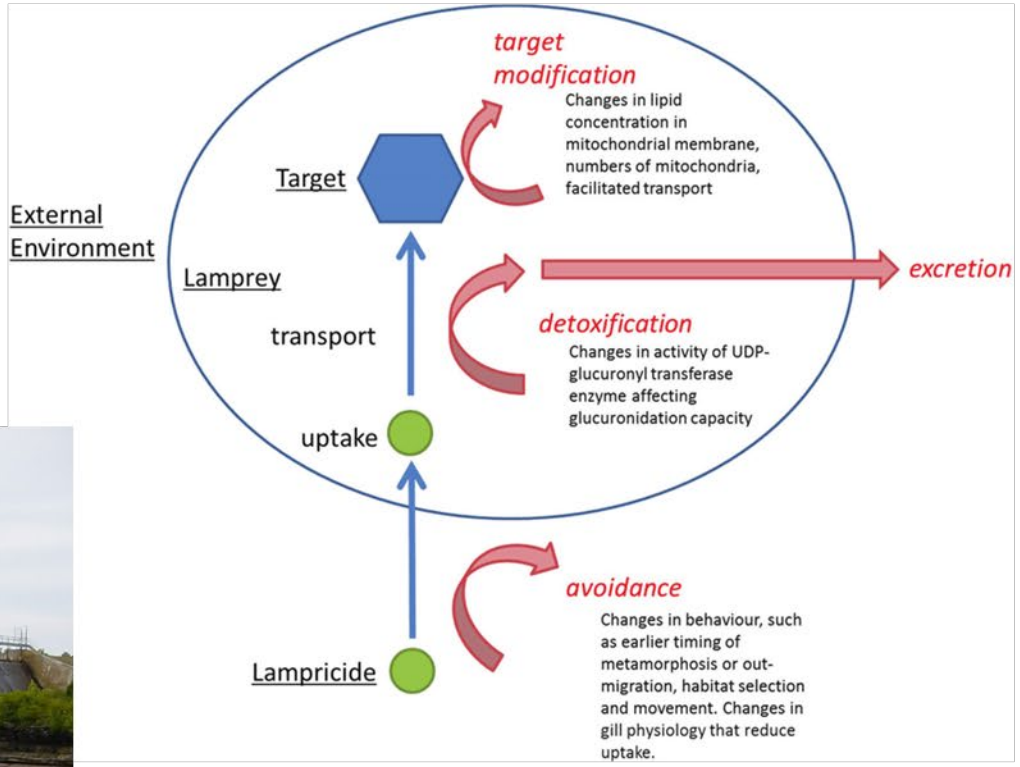
KEY PARTNERSHIPS

- Sea lamprey control agents (DFO & USFWS)
- Federal Partners (USGS, Army Corps)
- Academic Institutions (Michigan State University and University of Guelph – formal agreements)
- Environmental permitting agencies (EPA, Health Canada, States, Ontario)
- State, Provincial, & Indigenous fishery agencies

Outline

- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

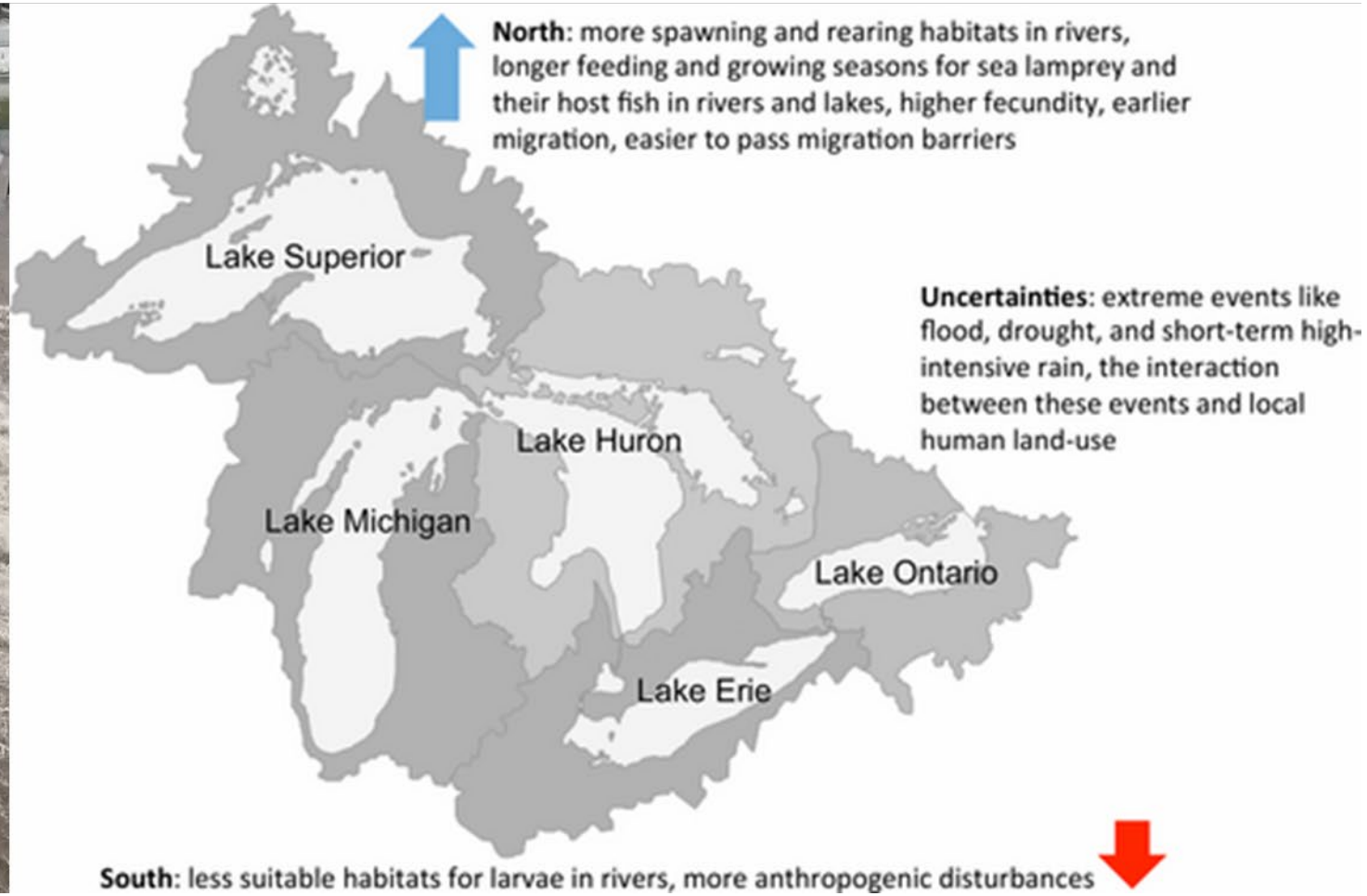
Sea Lamprey Control Threats – Resistance



From Dunlop et al. 2017 – Can J Fish Aquat Sci

Sea Lamprey Control Threats – Climate Change

From Lennox et al. 2020 - Global Change Biology

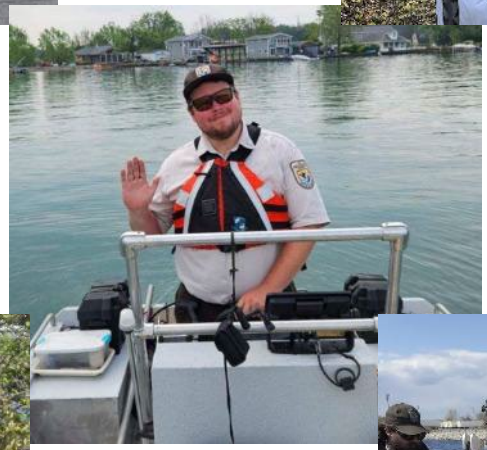


Sea Lamprey Control Threats – Social License

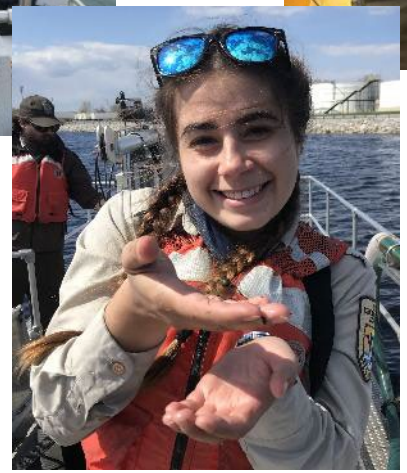










25 vacant permanent positions; Continued uncertainty around federal staffing

Outline

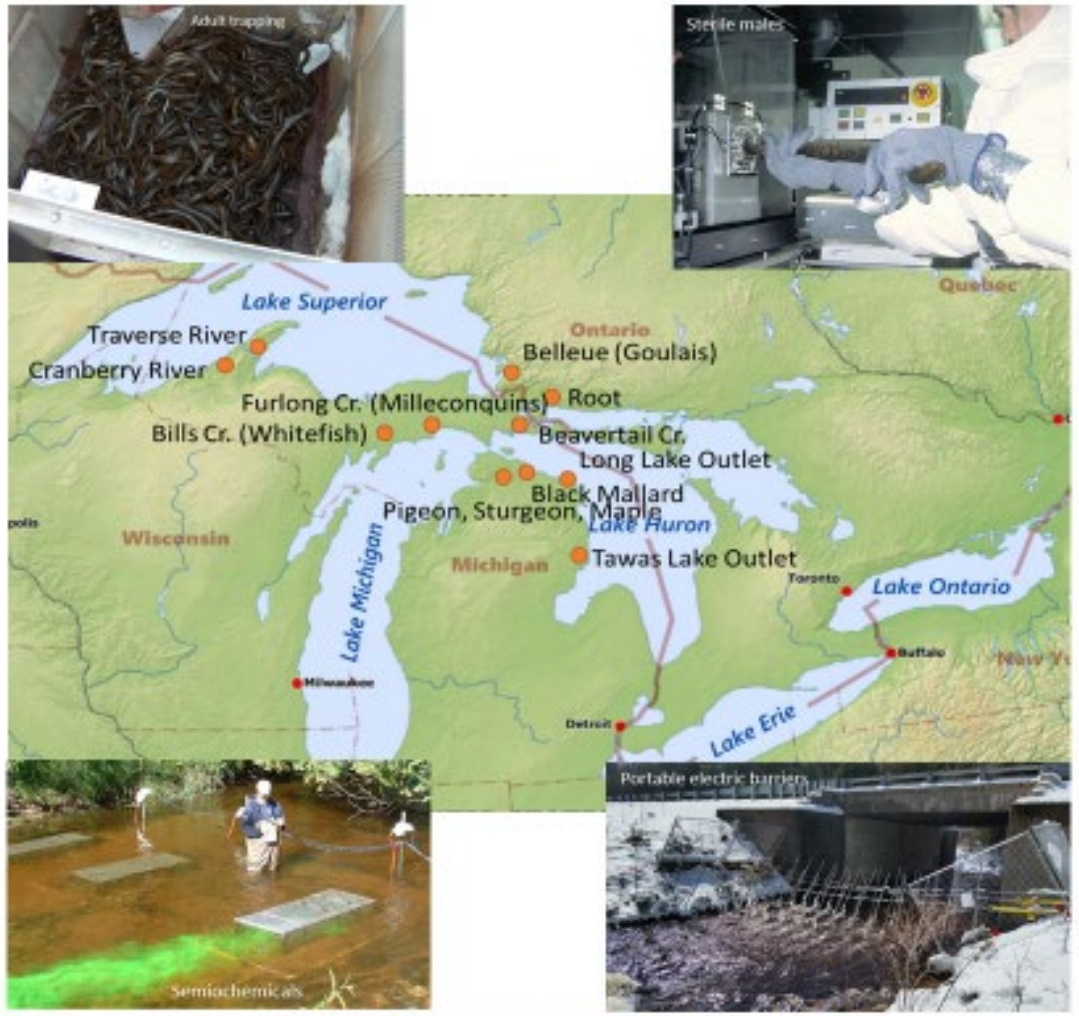
- Great Lakes Fishery History
- The Sea Lamprey Invasion
- Development of Sea Lamprey Control
- Success & the Need for Continued Control
- The Current Sea Lamprey Control Program
- Sea Lamprey Control Threats
- Sea Lamprey Control Opportunities

Sea Lamprey Control Opportunities – Supplemental Controls

USGS science for a changing world

SUPCON

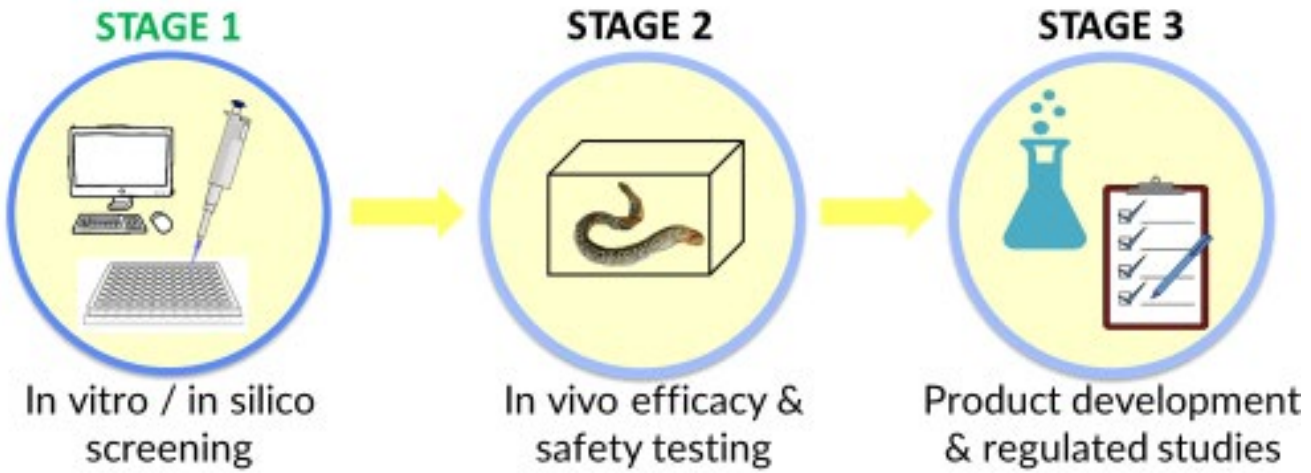
SupCon Field Experiment

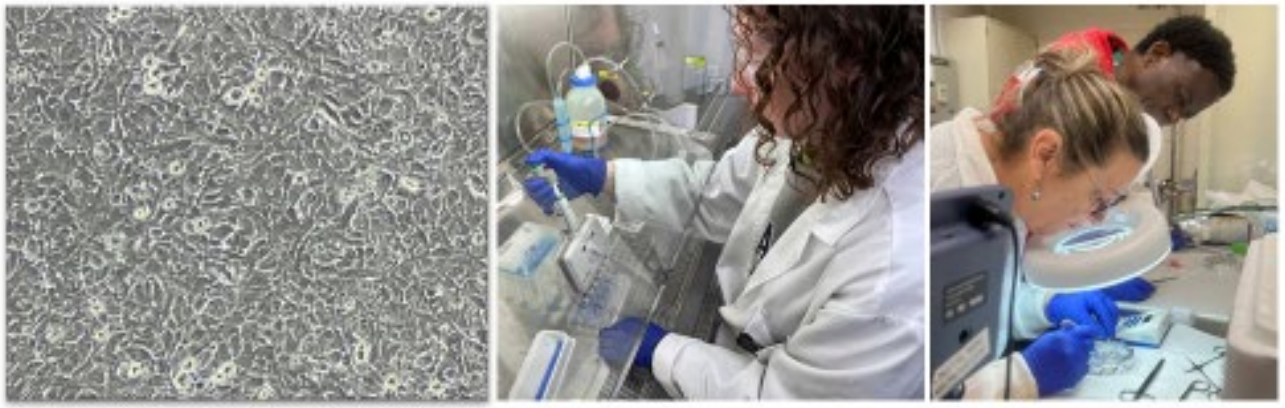


www.glfc.org/supplemental-controls.php

Sea Lamprey Control Opportunities – New Lampricides

New Lampricides





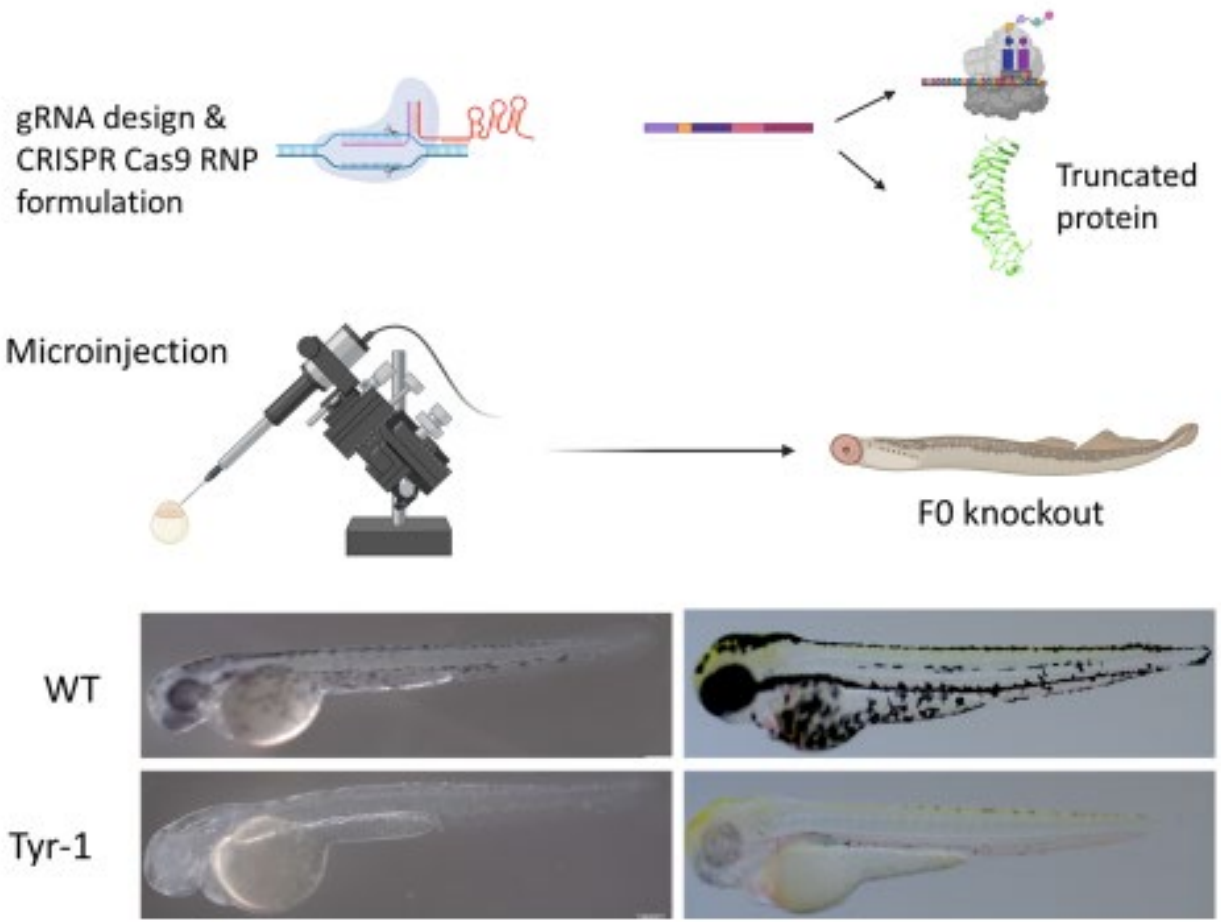
Cell lines for sea lamprey & nontarget fish

Assays to screen chemicals

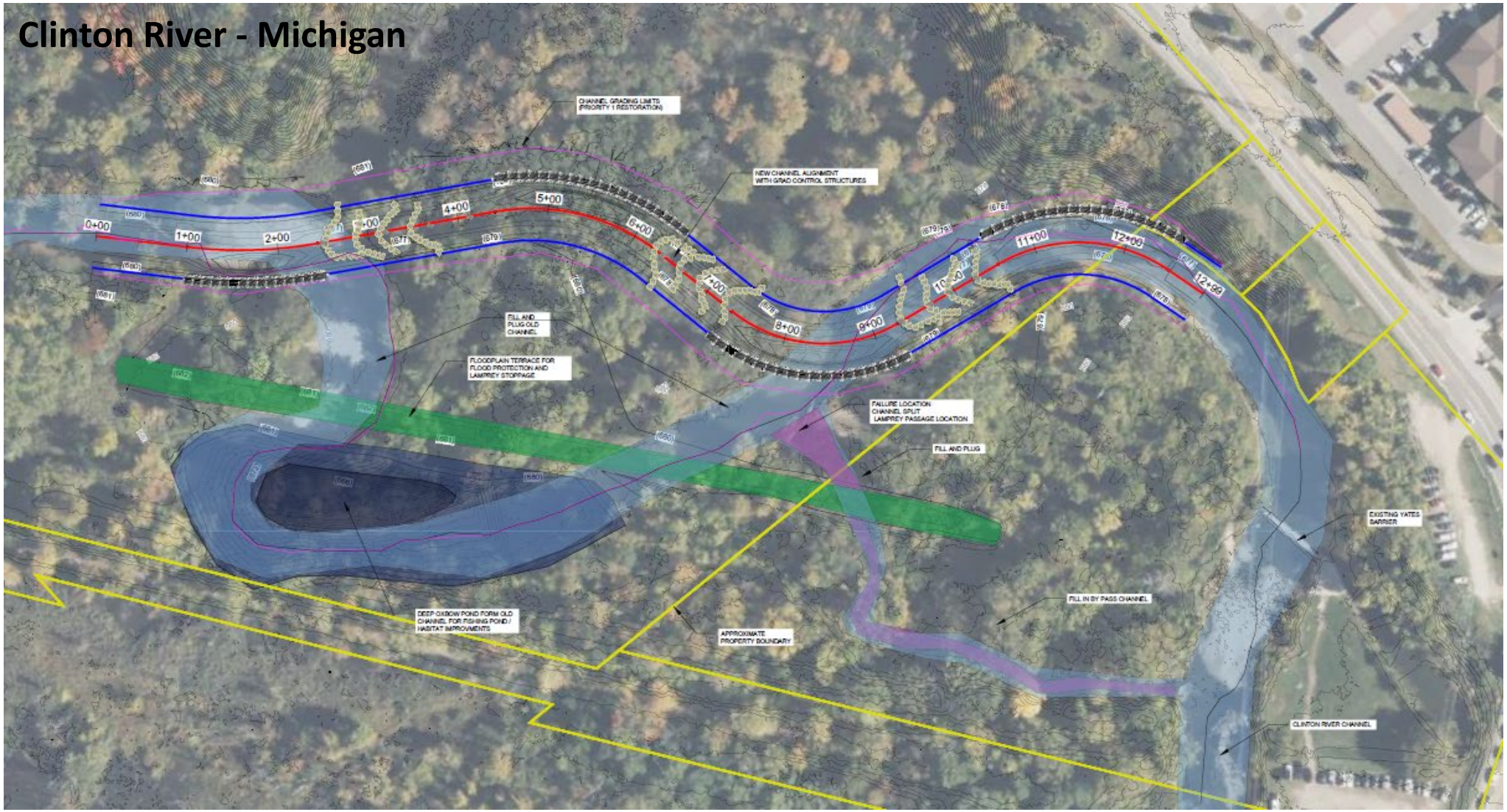
Sea Lamprey Control Opportunities – Genetic Control

MICHIGAN STATE UNIVERSITY

Genetic Controls



Sea Lamprey Control Opportunities – Geomorphology

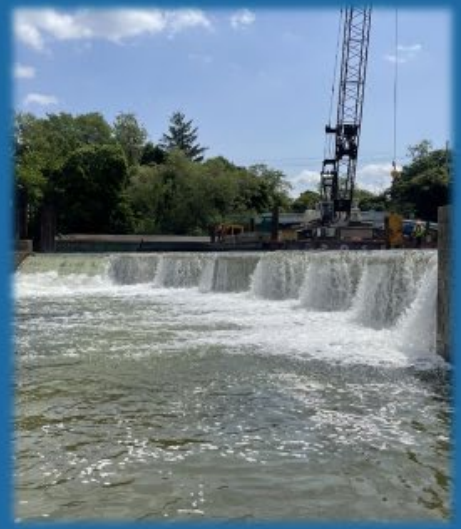


Sea Lamprey Control Opportunities – FishPass

Construction

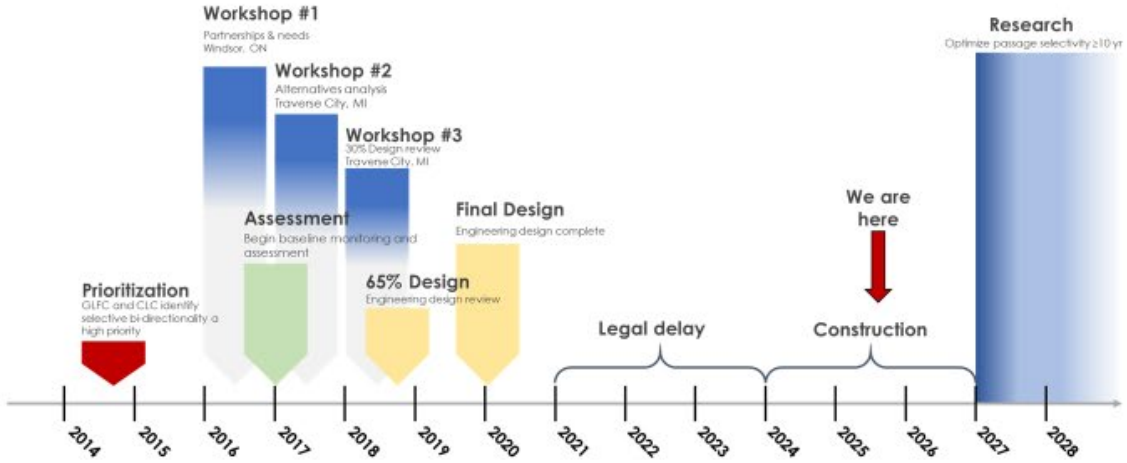
- Phase 1 of construction completed in June 2025
- River now passing entirely over the new spillway
- Cofferdam has been installed on the north side of the river and a dewatering system is in place
- Impacted sediments and remaining portions of the original dam have been removed
- Phase 3 (upland features) are under negotiation.
- Target completion date of spring 2027

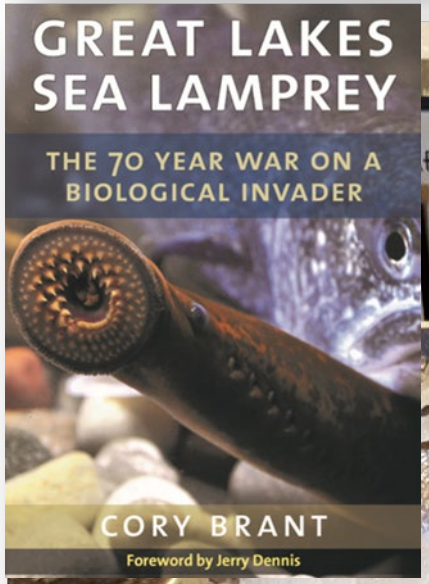
Timelapse camera



FISH PASS
GIIGOOK MAH-JOWAG

FishPass Timeline





GREAT LAKES FISHERY COMMISSION
EST 1955 BY TREATY

www.glfc.org

Special Thanks to Cory Brant, USGS

Fisheries and Oceans Canada

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

USGS

MICHIGAN STATE UNIVERSITY

UNIVERSITY of GUELPH