

WORKING TOGETHER

to protect our Great Lakes Fishery

The Great Lakes are managed collectively by eight states, one province and several tribal governments within two countries--the United States and Canada. Fishery management agencies work in consultation with nongovernment organizations and the fishing public. In 1955, the governments of the United States and Canada created the Great Lakes Fishery Commission to control sea lampreys, coordinate research and improve the fishery.

This cooperative approach has succeeded for over 40 years.

For More Information

If you would like to learn more about sea lampreys and available learning resources, contact the **Great Lakes Fishery Commission** or the agent nearest you or visit the commission's website at www.glfc.org

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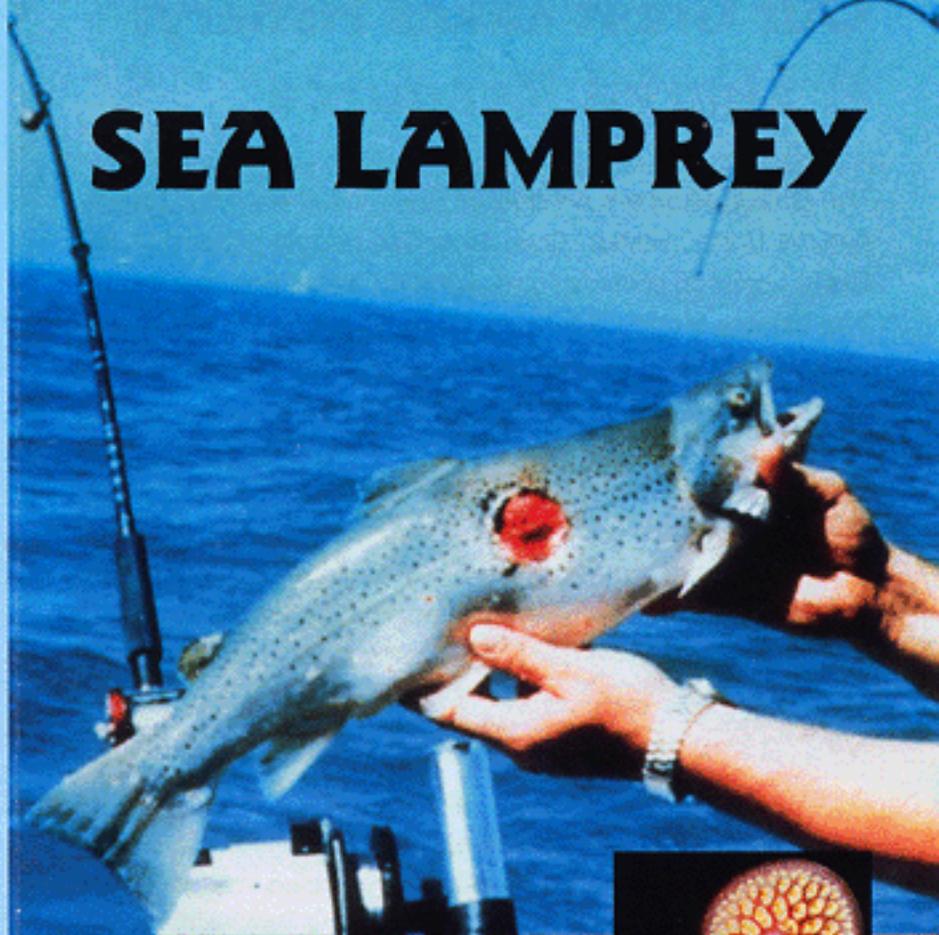
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SEA LAMPREY



The Battle Continues

Working Together
to Protect Our Great Lakes Fishery



Great Lakes Fishery Commission



Our Great Lakes Fishery: A Shared Resource

The Great Lakes are a valuable resource shared by Canada and the United States. Over 40 million people depend on the Great Lakes to provide food, drinking water and recreation. The fishery alone generates up to \$4 billion for the region annually, offering recreational angling opportunities for five million people and providing 75,000 jobs.

The health of the Great Lakes fishery is under constant threat from habitat loss, pollution and invasive species including sea lampreys. Through stewardship and cooperation, we are tackling some of our biggest challenges. Sea lamprey control is one area where we have achieved substantial success.

What are Sea Lampreys?

Sea lampreys are primitive fish native to the Atlantic Ocean. In the Great Lakes they have no commercial value and fish do not normally feed on them.



Adult sea lamprey, average size: 18" or 46 cms.

Lacking jaws, their round mouths form a sucking disc filled with sharp, horn-shaped teeth that surround a rasping tongue. Unlike most fish, a lamprey's body has cartilage but no bones, scaleless skin, no paired fins, no lateral line, and no swim bladder.

Where are Sea Lampreys Found?

Sea lampreys entered the Great Lakes from the Atlantic Ocean through man-made shipping canals and were first observed in Lake Ontario in the 1830's. Niagara Falls acted as a natural barrier preventing sea lamprey movement to Lakes Erie, Huron, Michigan, and Superior.



and Superior. However, when the Welland Canal, constructed to bypass the falls, was deepened in 1919, sea lampreys gained access to the rest of the Great Lakes. By 1938, they had invaded all of the Great Lakes.



Sea lamprey attached to lake trout

What Damage Do Sea Lampreys Inflict on the Fishery?



Sea lamprey mouth

Sea lampreys are parasitic pests. They attach to fish with their suction mouth and teeth, and use their tongue to rasp through a fish's scales and skin so they can feed on its blood and body fluids. A single sea lamprey will destroy up to 40 lbs. (18 kgs.) of fish during its adult lifetime. Sea lampreys are so destructive that, under some conditions, only one out of seven fish attacked will survive.

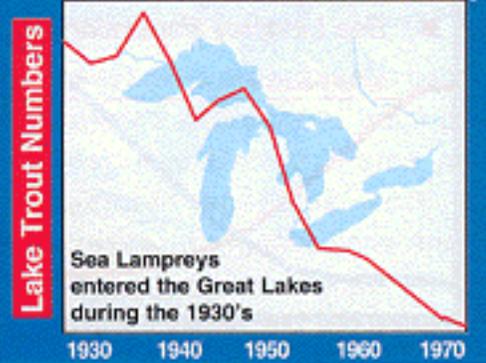
Sea lampreys prey on all types of large fish, such as lake trout, salmon, rainbow trout (steelhead), brown trout, whitefish, yellow perch, burbot, walleye, and catfish.

In the 1940's and 1950's, sea lamprey populations exploded as there were no effective control methods. This contributed significantly to the collapse of fish species



Wounds on lake trout

The Sea Lamprey's Effect on Great Lakes Fishery

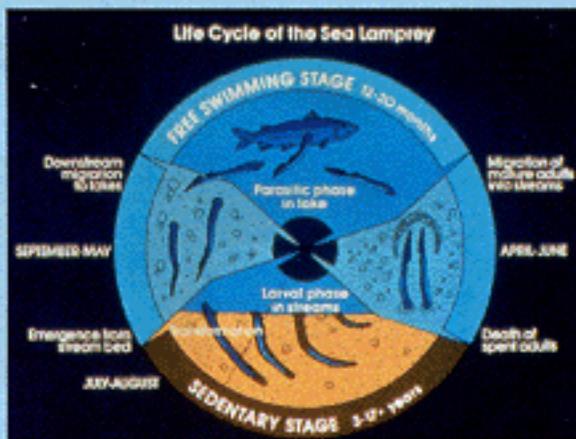


Source: Great Lakes Fishery Commission, Lake Superior data

that were the economic mainstay of a vibrant Great Lakes fishery. For example, before sea lampreys entered the Great Lakes, Canada and the United States harvested about 15 million lbs. (6.8 million kgs.) of lake trout in Lakes Huron and Superior annually. By the early 1960's the catch was only about 300,000 lbs. (136,077 kgs.). The fishery was devastated.

What is the Sea Lamprey's Life Cycle?

Understanding the sea lamprey's life cycle helps scientists deliver an effective control program.



Adult sea lampreys swim upstream to spawn and then die. Fertilized eggs hatch into small, wormlike larvae which burrow into stream bottoms and feed on debris and small plant life (algae) for an average 3 to 6 years before they transform into the parasitic adult. The adults migrate into the Great Lakes where they spend 12 to 20 months feeding on fish. The complete life cycle, from egg to adult, can take an average of 5 to 8 years to complete.

How are Sea Lampreys Controlled in the Great Lakes?

The Great Lakes Fishery Commission, in cooperation with Fisheries and Oceans Canada and the U.S. Fish & Wildlife Service, undertake sea lamprey control on the Great Lakes. The control program uses several techniques to attack sea lampreys during different stages of the life cycle.

Lampricide



In-stream TFM application

Currently, the primary method to control sea lampreys utilizes a lampricide, called TFM, that kills sea lamprey larvae in streams with little or no impact on other fish. After extensive testing--which began in the 1950's--scientists determined that TFM is nontoxic or has minimal effects on aquatic plants, invertebrates, fish, and wildlife. It is not harmful to humans or other mammals at the concentration applied. TFM is registered as a lampricide with the U.S. Environmental Protection Agency and with Health Canada.

About 175 Great Lakes streams are treated at regular intervals with lampricide to kill larval sea lampreys. Despite the success of TFM, it is a costly control method and the Great Lakes Fishery Commission prefers to reduce its use by relying more heavily on the following alternative methods.

Barriers

Barriers have been constructed to block the upstream migration of spawning sea lampreys; most barriers allow other fish to pass with minimal disruption. Barriers have eliminated lampricide treatment on some streams and reduced the stream distance requiring treatment on others.

Low-head barrier



Barriers, cont'd.

Newer barrier designs include velocity barriers that take advantage of the lampreys' poor swimming ability; electrical barriers that repel sea lampreys during the spawning run without risk to other fish or animals; and adjustable-crest barriers which can be inflated during the spawning run and then deflated to allow other fish to pass during the rest of the year.

The Sterile-Male-Release-Technique

The sterile-male-release-technique aims to reduce the success of sea lamprey spawning. Each year male sea lampreys are collected and sterilized. When they are released back into streams the sterile males compete with normal males for spawning females. Spawning sea lampreys and sterile males die after the spawning run.



Spawning sea lamprey

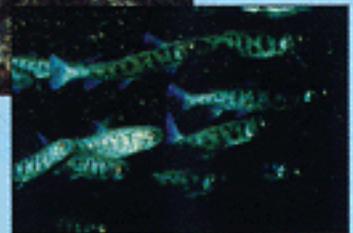
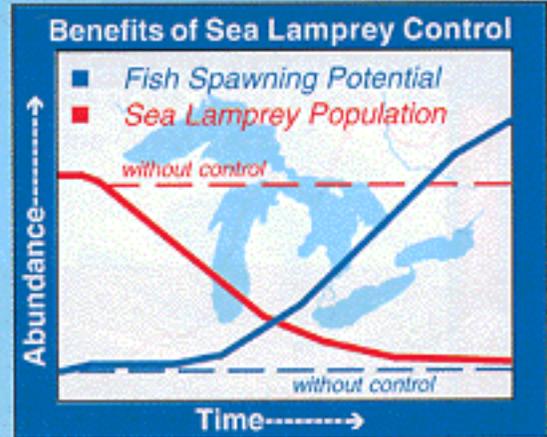
Assessment has indicated that fewer sea lamprey eggs hatch in streams where the sterile-male-release-technique is used. This technique is a major component in the sea lamprey battle, particularly in the integrated sea lamprey control program in the St. Mary's River.

Trapping

Sea lamprey traps are operated at various locations throughout the Great Lakes, often in association with barriers. Traps are designed to catch lampreys as they travel upstream to spawn. Male lampreys caught in the traps are used for the sterile-male-release-technique; most females are used for research.

Measuring Success... How Well is it Working?

Sea lamprey control in the Great Lakes has been tremendously successful. Ongoing control efforts have resulted in a 90% reduction of sea lamprey populations in most areas, creating a healthy environment for fish survival and spawning. Although it is impossible to completely rid the Great Lakes of sea lampreys, through continued cooperation and support, we can keep their populations at levels that lessen the impact to our fishery.



Sea lamprey control is an investment in our fishery and our future. It means more quality fish and fishing opportunities for ourselves and for future generations!