Bayfield Institute

Sea Lamprey Control

The Great Lakes are a valuable resource shared by Canada and the United States. The Great Lakes fishery 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 non-native nuisance species, including the sea lamprey. Based at the Sea Lamprey Control Centre in Sault Ste. Marie, Ontario, Fisheries and Oceans Canada (DFO) plays a critical role in minimizing sea lamprey population levels in the Great Lakes.

Sea lampreys are primitive fish native to the Atlantic Ocean. Sea lampreys were first observed in the Great Lakes in the 1830s. It is widely believed that they entered and spread throughout the Great Lakes via man-made shipping canals. In the Great Lakes, they have no commercial value and other fish do not normally feed on them.

GREAT LAKES FISHERY COMMISSION

Sea lampreys are parasitic pests. They attach to fish with their suction cup 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 18 kilograms of fish during its adult lifetime. Sea lampreys are so destructive that, under some conditions, only one out of every seven fish attacked will survive.

In the 1940s and 50s, sea lamprey populations exploded in the upper Great Lakes as there were no effective control methods. This contributed significantly to the collapse of valuable fish populations, such as lake trout and whitefish, which were the economic mainstay of a vibrant Great Lakes fishery.

To facilitate coordinated, binational fisheries management, the governments of Canada and the United States signed the 1954 *Convention on Great Lakes Fisheries*, which created the Great Lakes Fishery Commission. This bilateral agreement affirms the need for the two nations to collaborate on the protection and perpetuation of the Great Lakes fisheries resources. In Canada, DFO is the primary agent of the Great Lakes Fishery Commission. In the United States, the U.S. Fish and Wildlife Service is the primary agent of the Commission, with significant support from the U.S. Geological Survey and the U.S. Department of State. Scientists and fisheries managers from both countries meet regularly to discuss new developments in research and up-to-date stock estimates.

Understanding the sea lamprey's life cycle helps scientists develop effective control measures. Adult sea lampreys swim upstream to spawn and then die. Fertilized eggs hatch into small worm-like larvae that burrow into stream bottoms and feed on debris and algae for an average of three to six 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, takes an average of five to eight years to complete.

Fisheries and Oceans Canada undertakes sea lamprey control on Canadian streams and rivers in the Great Lakes. In cooperation with the U.S. Fish and Wildlife Service, extensive work is also carried out in U.S. waterways leading to the Great Lakes. Currently, the primary method to control sea lampreys is the application of selective ***lampricides*** that kill sea lamprey larvae in their nursery streams with little or no impact on other fish or wildlife. Despite the success of lampricide treatments, it is a costly control method and DFO would prefer to reduce its use by relying more heavily on alternate control methods.

The ***sterile-male-release technique*** aims to reduce the success of sea lamprey spawning. Each year, male sea lampreys are collected and sterilized during their spawning runs. When they are released back into streams, the sterile males compete with normal males for spawning females, resulting in reduced fertilization of eggs. Since they are caught during spawning runs rather than during the parasitic phase, sterilized males do not prey on fish when they are released back into the spawning streams.