Lake Superior's Native Lampreys

Sharon Moen
Minnesota Sea Grant, University of Minnesota, 2305 East Fifth St., Duluth, MN 55812
smoen@d.umn.edu

For thousands of years, lampreys have been spawning in Lake Superior's tributaries. Not the notoriously destructive sea lamprey, which joined Superior's lamprey community only about 60 years ago, but three more benign native species—the silver, American brook, and northern brook lampreys. You are unlikely to see these secretive creatures, but if you do, consider yourself lucky to have encountered one of the oldest, more mysterious species in the lake.

Lampreys don't charm most people, but "they clearly have a valuable role in biodiversity and the ecosystem," said Peter Sorensen, professor of fisheries, wildlife, and conservation at the University of Minnesota. "These ancient fish aren't well understood but they are incredibly efficient filter feeders, an extremely important link between the benthos and fish communities, and sensitive to environmental degradation."

Of the three native species, only adult silver lamprey act like sea lamprey by parasitizing other fish. Even so, most experts do not consider silvers especially destructive to fish populations. They prefer catfish and sturgeon, but have been known to prey on northern pike, paddlefish, carp, suckers, and white bass.

Lake Superior's two brook lamprey species are about as horrific as the average minnow. They are not parasitic; in fact, their digestive tracts degenerate and they don't eat anything once they transform into adults.

For most of their lives, lampreys (even the sea lamprey) are almost literally "sticks-in-the-mud." Their lives begin in streams, where their mothers and fathers spawn in shallow nests before dying. Upon hatching, the larvae float downstream until they find an appropriate place, often a muddy pool, to plant themselves for the next three to eight years.

As ammocoetes (larval lamprey), they strain microscopic plants, animals, and organic material from the water. Eventually, they morph into adults during late summer or fall. If they are parasitic, they develop rasping teeth and live for a year-and-a-half, feeding on the tissue and body fluids of living fish. The non-parasitic lampreys live off their own body fat and muscle for less than a year once they reach adulthood. They tend to stay within their streams, using their suction-cup mouths to latch onto rocks and rearrange stones during spawning.

Although lampreys are jawless, scaleless, and cartilaginous, they aren't spineless. They are relics of Earth's first vertebrates, the ostracoderms, which swam through the seas beginning about 500 million years ago. Fossil records suggest that the bony-skinned, jawless ostracoderms strained organic matter from water like the larvae of their modern lamprey descendants. Lampreys have persisted in the class Cyclostomata (circular-mouth) virtually unchanged for about 250 million years.

Impact of Lamprey Control Methods on Native Lamprey

Around the Great Lakes, native lampreys suffer for the sins of their infamous trout-killing brethren, but not as much as they once did.

"We're concerned about the native groups of organisms and over the years have refined our control efforts to minimize our impact on native lampreys," said Gavin Christie, Sea Lamprey Program manager for the Great Lakes Fisheries Commission.

Sea lamprey control began in 1958 and relies primarily

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Range of Lake Superior's Native Lampreys

Silver lamprey
Ichthyomyzon unicuspis

- Grows to 15.5 inches (39 cm) long
- Parasitic adult—particularly on catfish and sturgeon
- Ammocoete for 4-7 years
- Widely distributed in Lake Superior drainage but not taken in large numbers at barriers

Northern brook lamprey
Ichthyomyzon fossor

- Grows to 6.75 inches (17 cm) long
- Not parasitic—adults do not feed!
- Ammocoete for 4-7 years
- Found in Lake Superior drainage basin
- Species of concern in Minnesota

American brook lamprey
Lampetra appendix

- Grows to 13.75 inches (35 cm) long
- Not parasitic—adults do not feed!
- Ammocoete for about 5 years
- Known from upper Michigan drainage into Lake Superior but not from Wisconsin waters

on chemicals (lampricides) to kill larval lampreys. "Our doses of lampricide don't affect most fish but the more primitive fish, like lampreys, don't have the ability to metabolize the chemicals," Christie said. The commission is studying the distribution and biology of native lampreys. This information will help them protect native lampreys while they continue to battle populations of the exotic sea lamprey.

In the Lake Superior Basin, the silver lamprey is most affected by lampricide treatments. It "has more in common with the sea lamprey than the smaller non-parasitic brook lampreys," said John Weisser, a fisheries biologist with the U.S. Fish and Wildlife Service, which applies lampricide in U.S. waters.

"Silver lamprey and sea lamprey use golf-ball-sized gravel to spawn and often share distributions within streams, whereas the brook lampreys use pea gravel to spawn and are not only distributed with sea lamprey but are also found upstream in waters unsuitable for sea lamprey."

Doug Cuddy of the Canadian Department of Oceans and Fisheries estimated that in some streams, American brook lamprey outnumber sea lamprey by 100 to 1. Although significant mortality of native lampreys is expected in portions of streams treated with lampricide, only about 200 of the Great Lakes' 5,000 tributaries are treated in three- to five-year cycles.

The last lampricide treatment in a Minnesota tributary of Lake Superior was applied to the Nemadji River (MN and WI) in 1990. Aside from the Nemadji, only the St. Louis, Gooseberry, Split Rock, Poplar, and Arrowhead rivers along Minnesota's North Shore were ever treated for sea lamprey, reported Weisser.

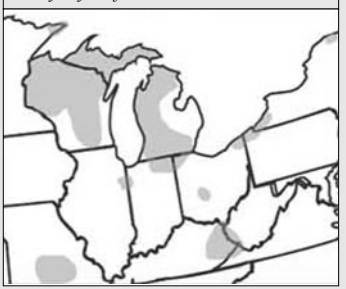
Periodically, lampricide is applied to a small portion of tributaries like the St. Louis River to assess the sea lamprey population there. According to Cuddy's records, native lampreys are only found in two Minnesota tributaries to Lake Superior. Northern brook lamprey are found in the headwaters of the Nemadji River and larval silver or northern brook lampreys are found in the St. Louis River. Although American brook lamprey haven't been found in Minnesota tributaries, they are abundant in other streams in the basin.

Sea lamprey continue to plague Great Lakes fish but our native lampreys, even the parasitic ones, aren't bad, they're just ugly.

Correction

On page 6 of the article "Lake Superior's Native Lampreys" in the Winter 2003 *American Currents*, the same range map was printed three times. The map for the silver lamprey (*Ichthyomyzon unicuspis*) is correct, but the maps for the other two species are not. The correct range maps are as follows:

Northern brook lamprey
Ichthyomyzon fossor



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