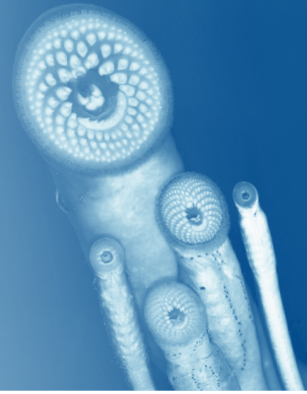




Lampreys of the Great Lakes



Lampreys are a unique group of fish belonging to the family *Petromyzontidae*, a 360 million-year-old lineage stretching back through the fossil record.

Five species of lampreys inhabit the Great Lakes. Unlike most Great Lakes fish, lampreys don't have jaws, scales, or paired fins. After metamorphosis, lampreys develop round mouths, rasping tongues, and horn-shaped teeth.

Are Lampreys Parasites?

Some are, and some aren't. All five lamprey species filter feed on microorganisms during their larval stage and then undergo a metamorphosis. Three species then become parasitic and two do not. The native American brook and northern brook lampreys are not parasitic. After metamorphosing, they use energy from fat stored during their larval stage to swim freely until the next spawning season.

Native lampreys are an important part of our ecosystem. They are found in some of our best fishing waters.

Native silver and chestnut lampreys, and invasive sea lampreys, become parasitic after metamorphosing. A parasitic lamprey uses its sucking-disc mouth and hooked teeth to attach to the side of a fish. Using its toothed tongue, it then rasps a hole through the fish's scales and skin, and feeds on the fish's blood and body fluids. Parasitic lampreys use the energy they gain from feeding to swim upstream in rivers and creeks, where they spawn and die.

Why are Lampreys Important?

The four native lamprey species are a natural and important part of the diverse Great Lakes ecosystem. They serve as ecosystem engineers by creating diverse flow patterns through spawning nest construction which improves stream habitat for many aquatic insects and fishes. Lampreys are also prey for other fish species, and when migrating through rivers and streams, they carry nutrients derived from larger rivers and lakes to upstream habitats.

Why are Invasive Sea Lampreys a Problem?

While native silver and chestnut lampreys rarely cause life-threatening damage to their hosts due to their smaller size and years of co-evolution with Great Lakes fish, invasive sea lampreys are a different story. Sea lampreys are native to the Atlantic Ocean and entered the Great Lakes through shipping canals about 100 years ago. Sea lampreys are much larger than native lampreys and haven't evolved in balance with Great Lakes fish. Each individual sea lamprey can kill up to 40 pounds (18 kilograms) of fish over their 12- to 18-month parasitic phase. Before sea lamprey control began in the 1950s, the invaders killed more than 100 million pounds of fish annually, five times the commercial lake trout catch in the upper Great Lakes.

Today, sea lamprey populations are controlled through an extensive binational program coordinated by the Great Lakes Fishery Commission and conducted by the U.S. Fish and Wildlife Service, Fisheries and Oceans Canada, and the U.S. Army Corps of Engineers.

Though native lamprey distributions and abundances have changed due to sea lamprey control, the Great Lakes have not lost — and are not in danger of losing — any native lamprey species due to control efforts.

What Should I Do if I Find a Lamprey?

Start by learning the differences between native and invasive lamprey species. Some anglers accidentally kill native lampreys because they mistake them for invaders.

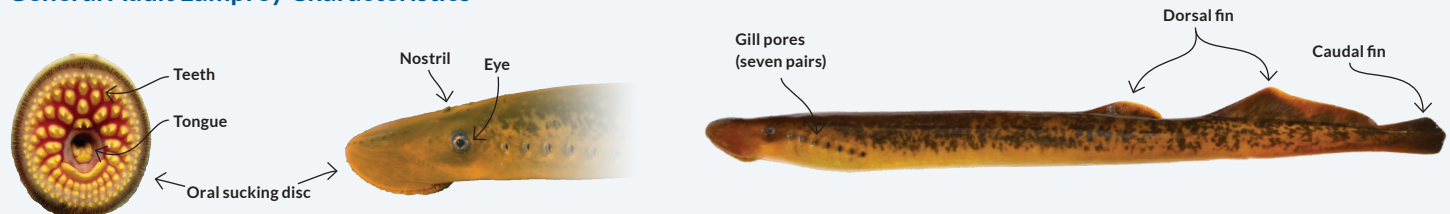
If you want to identify a lamprey, pay attention to:

- Size
- Color
- Where it was found
- Arrangement of teeth
- Presence of deep notch in the back (dorsal) fin
- Connection between back (dorsal) fin and tail (caudal) fin

Consider logging your find into a citizen science website or app, such as iNaturalist.

To learn more about invasive sea lampreys, visit:
www.sealamprey.org

General Adult Lamprey Characteristics



Identifying Great Lakes Lamprey Species: Post-metamorphosis

NON-PARASITIC

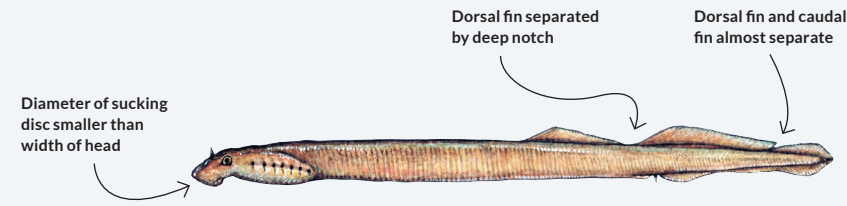
NATIVE

PARASITIC

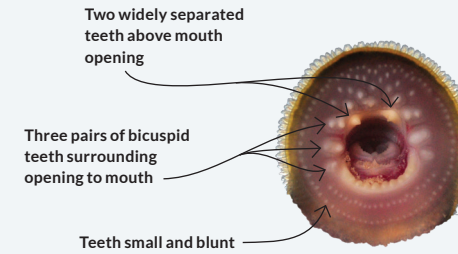
INVASIVE

American Brook Lamprey

Lethenteron appendix



MAX SIZE: 9.4 INCHES (240mm)



FIN CHARACTERISTICS: Two dorsal fins separated by a deep notch. Dorsal and caudal fins are almost separate with a notch. Triangular-shaped caudal fin.

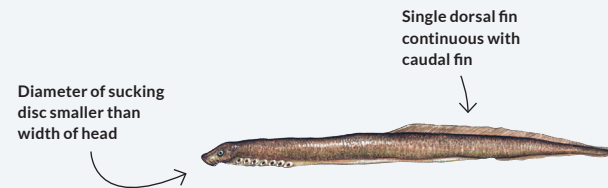
MOUTH CHARACTERISTICS: Mouth contains three pairs of bicuspid (two-point) teeth on the sides of the mouth opening. Teeth on outer portion of disc are small and blunt.

COLOR CHARACTERISTICS: Dark tan or brown on top and paler toward the belly post metamorphosis (pictured). During spawning phase, slate gray to gray brown on back and sides. Dark blotch on posterior portion (tip) of the tail.

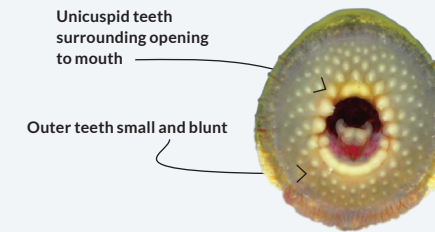
RANGE: The entire Great Lakes basin.

Northern Brook Lamprey

Ichthyomyzon fossor



MAX SIZE: 6.5 INCHES (165mm)



FIN CHARACTERISTICS: One continuous dorsal fin connected to a short, round caudal fin.

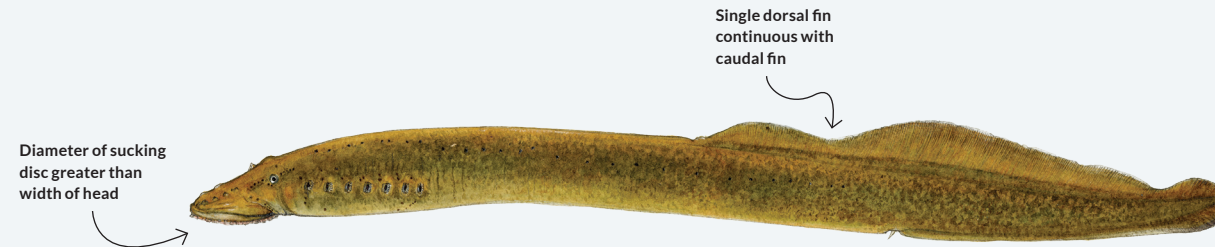
MOUTH CHARACTERISTICS: Unicuspid (one-point) teeth on the sides of the mouth opening. Teeth on outer portion of disc are small and blunt.

COLOR CHARACTERISTICS: Dark grayish brown on top with pale gray/silvery white on belly post metamorphosis (pictured). During spawning phase, grayish blue to black on back and sides. The posterior portion (tip) of the tail is dark, almost black.

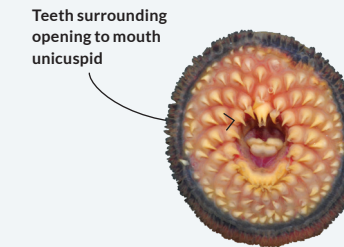
RANGE: Lakes Superior, Michigan, Huron, and Erie basins.

Silver Lamprey

Ichthyomyzon unicuspis



MAX SIZE: 16.3 INCHES (415mm)



FIN CHARACTERISTICS: One continuous dorsal fin with a shallow notch connected to a short, round caudal fin.

MOUTH CHARACTERISTICS: Unicuspid (one-point) teeth on the sides of the mouth opening.

COLOR CHARACTERISTICS: Light yellow-tan on top, sides sometimes mottled, with lighter yellow belly post metamorphosis (pictured). During spawning phase, bluish-gray on back with darker sides and may have bluish/silver coloring on belly.

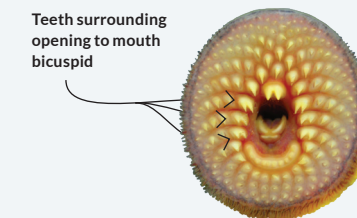
RANGE: The entire Great Lakes basin.

Chestnut Lamprey

Ichthyomyzon castaneus



MAX ADULT SIZE: 14.3 INCHES (363mm)



FIN CHARACTERISTICS: One continuous dorsal fin with a shallow notch connected to a short, round caudal fin.

MOUTH CHARACTERISTICS: Teeth on the sides of the mouth opening are bicuspid (two-point teeth). Number of bicuspids can vary among individuals.

COLOR CHARACTERISTICS: Dark brown, gray, or olive on top, with slight grading to lighter coloration on belly post metamorphosis (pictured). During spawning phase, blue-black on back and sides.

RANGE: Lakes Michigan and Huron basins.

Sea Lamprey

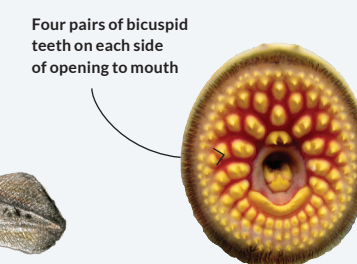
Petromyzon marinus

Diameter of sucking disc greater than width of head



MAX SIZE: 25.4 INCHES (645mm)

The sea lamprey is the largest lamprey in the Great Lakes



FIN CHARACTERISTICS: Two dorsal fins, generally well separated. Dorsal and caudal fins are separated by a deep notch; caudal fin is rounded, angular, or spade-shaped.

MOUTH CHARACTERISTICS: Four pairs of bicuspid (two-point) teeth on each side of the mouth opening.

COLOR CHARACTERISTICS: Blue or black mottled on top with a silver belly after metamorphosis (pictured). During spawning phase, brown/gold mottled on top with a lighter yellow belly.

RANGE: Invasive in the entire Great Lakes basin, native to the Atlantic Ocean.

PHOTO AND IMAGE CREDITS

All images pg. 1: A. Miehl, GLFC.
Silver lamprey, p. 2-3: New York State Department of Environmental Conservation.
Chestnut Lamprey, p. 2-3: L. Merry, courtesy of Missouri Department of Conservation.
American Brook and Northern Brook Lampreys, p. 2-3: T. Walke, PA Fish & Boat Commission.
Sea Lamprey, p. 2-3: P. Vecsei.
Mouths, p. 2-3: A. Miehl, GLFC.
Image editing, p. 2-3: T. Marsee, MISG.

CITATIONS

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Renard, C.B. 2011. *Lampreys of the world. An annotated and illustrated catalogue of lamprey species known to date*. FAO Species Catalogue for Fishery Purposes, No. 5. FAO, Rome, Italy.
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Renard, C.B., Cochran, P.A. 2019. *Post-metamorphic feeding in lampreys*. In Docker, M.F. (Ed.), *Lampreys: biology, conservation and control*, Vol. 2. Fish and Fisheries Series, Vol. 38. Springer, Dordrecht, The Netherlands, pp. 247-286.

Life Cycle of Great Lakes Lampreys

For parasitic and non-parasitic spawning lampreys, mating occurs during spring in rivers and streams throughout the Great Lakes.

Spawning

- 1a Lampreys use their mouths to suction onto rocks and make horseshoe-shaped nests for spawning. Males and females build nests together.
- 1a 1b Eggs are deposited in the nests by females while being fertilized by males.
- 1c About two weeks after fertilization, larvae hatch from the eggs. Larvae lack eyes and the sucker mouths. They drift downstream and settle into a silt or sand stream bottom.

Larval

- 2 Larvae feed by filtering organic particles, algae, microscopic organisms, and other food particles from the sediment and water. Larvae live in stream bottoms for 3-10 years depending on stream conditions and species.

Metamorphosis

- 3 Once large enough, larvae metamorphose, growing disc mouths, teeth, and eyes.
- 4 After metamorphosis, lampreys emerge from the stream bottom.

Post-Metamorphosis

- 5a Non-parasitic lampreys will swim freely, staying in streams or rivers. They no longer feed, surviving on energy stored during the larval stage while they wait for the next spawning season. They die soon after spawning.
- 5b After metamorphosis, parasitic lampreys migrate downstream into large rivers and lakes where they feed on fish until it is time to spawn.
- 6 After feeding for one to one-and-a-half years, parasitic lampreys migrate into streams to spawn and then die, completing the life cycle.

