



Lampreys

Lampreys (*Petromyzontidae*) belong to a group of fish called Agnatha, which, according to the fossil record, are thought to be the oldest fishlike animal. There are about 40 species of lamprey that exist in the world, five of which can be found in Alaska. Lampreys are eel-like fish that have elongate, cylindrical bodies that become slender towards the tail. The dorsal fins begin at mid-body and are long and notched creating two sections of the fin, which connect with the caudal or tail fin. They have jawless, cylindrical to oval shaped mouths that are used for sucking, and they have seven gill openings on both sides of the head. Lampreys are lacking paired fins and vertebrae. Lamprey species are distinguished most easily by their teeth.



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In Alaska, lamprey can exhibit two life histories. Anadromous lampreys, one type, spend most of their adult lives in salt water and move to fresh water to spawn. The second is a freshwater species that completes its life cycle entirely in fresh water. It is thought that freshwater species evolved from anadromous forms. Adult lampreys in Alaska can measure from about four to 28 inches.

Life history: Lampreys spawn in the spring after spending several months (if anadromous) moving to the cool, clear headwaters of streams to make their nests or redds. Both males and females create these pits in stream riffles by removing small rocks with their mouths and fanning smaller particles with their tails. A male and female deposit sperm and eggs, simultaneously while intertwined, into the nest. A female (size dependent) can release several thousands of eggs, even up to 100,000 for some species. Shortly after the eggs are fertilized, the adults die.

It takes one to two weeks for the eggs to hatch into larval forms called ammocoetes. Ammocoetes are blind, lack sucking mouthparts, and can grow to about four inches. They burrow into the silt, sand or mud of shallow pools and eddies of clear streams and feed by filtering microorganisms, algae, and detritus from the water. Lampreys remain at this stage for three to seven years and then during the fall they metamorphose into adults, which involve morphological and physiological changes, such as the development of a sucking mouth, eyes, and teeth.

As an adult, a lamprey is either parasitic or nonparasitic. Parasitic lampreys feed on other fish and sometimes marine mammals, using their sucking mouthparts to attach themselves to the body of their host. They use their teeth to cut through the scales and skin to get to the blood and body fluid. Parasitic lampreys are usually anadromous and spend about one to four years at sea before returning to fresh water to spawn. Anadromous lampreys return to fresh water in the fall and over-winter until spring when they spawn. Once they begin their migration to streams, lampreys do not feed.

Migrating lampreys tend to move in large groups. They sometimes rest on the way by attaching themselves with their sucking mouth to rocks and boulders along the stream bottom.

Nonparasitic lampreys are usually freshwater species and do not feed as adults. They live off the reserves acquired as ammocoetes. Non-anadromous lampreys spawn in the spring following metamorphosis into the adult form.

Ecology: Lampreys are an important contributor to the food chain. Besides the adults' reputation for attaching itself to a host body to feed on its blood and body fluid, the immature lamprey is an important nutrient processor. The ammocoetes are able to feed on particles that are too small for some organisms and process them into larger forms due to their reduced ability to digest these materials. Filter feeding organisms, such as invertebrates, can then utilize the nutrients.

Like salmon, lampreys also return nutrients to freshwater systems after they die following spawning. The decomposing body provides food to scavenging organisms and releases nutrients into the water.

Lampreys are also a source of food for many animals. Ammocoetes are eaten by fish, like sheefish, northern pike, and burbot, and mammals, like otters, when they are disturbed from the silt or mud. Adults are eaten by marine mammals and larger fish and birds, especially when they begin migration upriver in large groups.

Human Use: People have been utilizing lampreys for food and bait for a long time. The ammocoetes are sometimes used for burbot bait and are harvested by digging in the silt and mud of streams during summer. Native Americans from Washington and Oregon have subsisted on lampreys. There are also some accounts of Alaskan natives around the Yukon River basin catching lampreys for food. Lampreys have rich, fatty flesh like salmon (but have a higher percentage of fat content than salmon) that is usually dried, smoked, or canned. Recently, a new fishery has developed for lampreys. Some people along the Yukon River harvested Arctic lampreys in a short, trial commercial fishing season. Along with selling the lampreys to a small market in Asia, the fishers agreed to provide information and specimens to help further understand the distribution, abundance and general biology of lampreys.

Arctic Lamprey: Arctic lampreys (*Lampetra camtschatica*) are the most common lamprey in Alaska. They range from the Arctic coast to the Kenai Peninsula, up the Yukon River into the Yukon Territory in Canada, in the Kuskokwim and Tanana river drainages, and other similar latitudes around the world. They are most commonly anadromous and parasitic, but it is believed there are subspecies that are nonparasitic and remain in fresh water. They remain as ammocoetes for one to two years before they metamorphose into the adult form. The adult's upper body appears blue-black to dark brown, their lower body yellow to light brown, and have light tan to gray fins. A dark blotch is also found on the posterior dorsal fin (the lobe closest to the tail) and the tail. Adult Arctic lampreys are typically five to 15 inches long.

Pacific Lamprey: Pacific lampreys (*L. tridentata*) are found along coastal areas from around Nome down to California. They are an anadromous, parasitic species that are blue-black to dark brown on the upper body and a pale or silver lower body, while the fins are a dusky color. During spawning, they can appear to be reddish brown. Pacific lampreys are typically five to 28 inches long as adults, which are much larger than the other species of lamprey in Alaska. They remain as ammocoetes for four to five years at which time they metamorphose and move to sea. They feed at sea for about a year, then return to fresh water in the fall before spawning in the spring.

Alaskan Brook Lamprey: With some debate, the Alaskan brook lamprey (*L. alaskense*) is a separate species from the American brook lamprey (*L. appendix*). It is located in a few areas of Alaska, including on the Alaska and Kenai peninsulas, in the Chatanika and Chena rivers, and in a few river basins in the Northwest Territories. They are a nonparasitic, freshwater species that are gray-brown on the back and white underneath with a dark blotch on the second dorsal fin and a dark tail. They have blunt teeth and measure five to seven inches as adults. They spawn in spring and summer in shallow areas of streams and sometimes lakes. After spending four years as ammocoetes, these lampreys metamorphose to adults in the fall and spawn the following spring.

American River Lamprey: American river lampreys (*L. ayresii*) (also known simply as river lampreys) are not very common in Alaska. All sightings of this species have been in the southeastern portions of the state just north of Juneau and continue on down to areas in California. They are anadromous and parasitic with dark yellow-brown to silver gray or blue-black upper bodies and silver to white lower bodies. They have yellow fins and the tail has a dark gray blotch. They are typically five to 12 inches long as adults.

Western Brook Lamprey: Western brook lampreys (*L. richardsoni*) are brown, olive or black on the back and pale or silver underneath with olive green translucent fins with a dark patch on the tail. They are a freshwater, nonparasitic species and are typically four to seven inches long. These lampreys are found sparingly around southeast Alaska and south to areas in California.

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