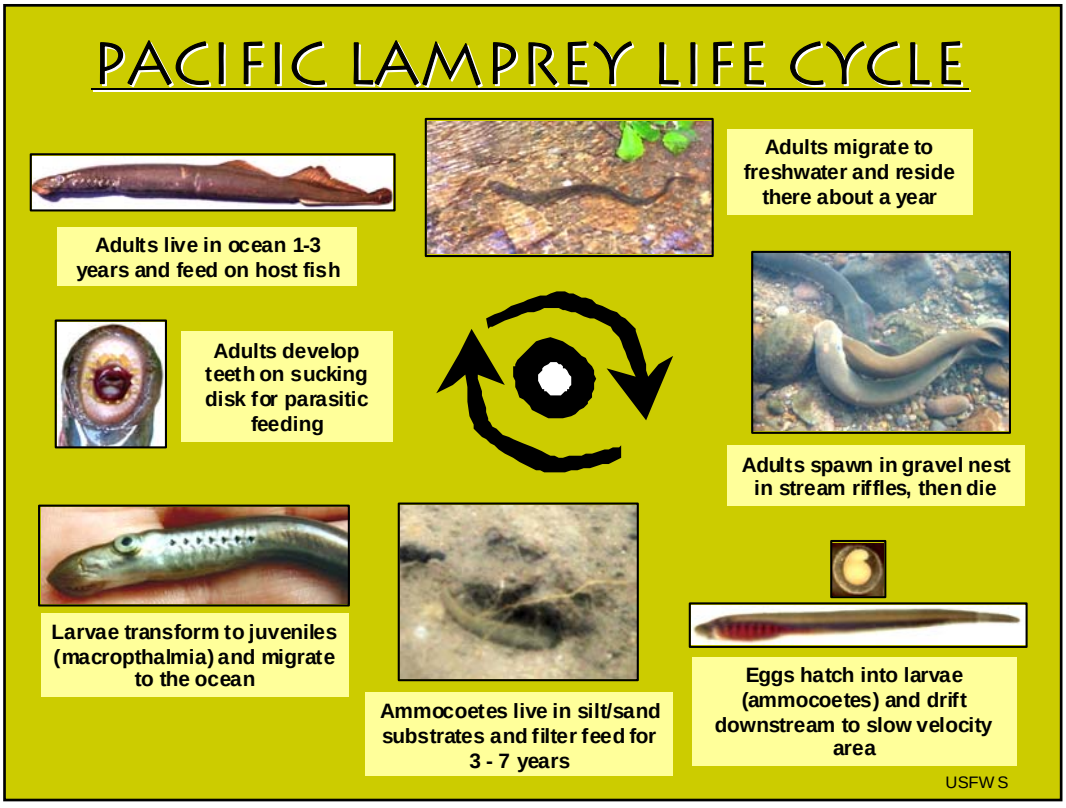
FACT SHEET
PACIFIC LAMPREY
(*Lampetra tridentata*)

General Species Description: Lampreys belong to a primitive group of fishes that are eel-like in form but lack the jaws and paired fins of true fishes. Pacific lampreys have a round sucker-like mouth, no scales, and gill openings. Identification of lampreys depends largely on the number, structure, and position of teeth found in adult lamprey; adult Pacific lampreys are characterized by the presence of 3 large anterior teeth and many smaller posterior teeth on the oral disc. As larvae (ammocoetes), they are difficult to distinguish from other lampreys.

Life History: As adults in the marine environment, Pacific lampreys are parasitic and feed on a variety of marine and anadromous fish including Pacific salmon, flatfish, rockfish, and pollock, and are preyed upon by sharks, sea lions, and other marine animals. They have been caught in depths ranging from 300 to 2,600 feet, and as far off the west coast as 62 miles in ocean haul nets.

After spending 1 to 3 years in the marine environment, Pacific lampreys cease feeding and migrate to freshwater between February and June. They are thought to overwinter and remain in freshwater habitat for approximately one year before spawning where they may shrink in size up to 20 percent. Most upstream migration takes place at night. Adult size at the time of migration ranges from about 15 to 25 inches.

Pacific lampreys spawn in similar habitats to salmon; in gravel bottomed streams, at the upstream end of riffle habitat, typically above suitable ammocoete habitat. Spawning occurs between March and July depending upon location within their range. The degree of homing is unknown, but adult lampreys cue in on ammocoete areas which release pheromones that are thought to aid adult migration and spawning location. Both sexes construct the nests, often moving stones with their mouth. After the eggs are deposited and fertilized, the adults typically die within 3 to 36 days after spawning.



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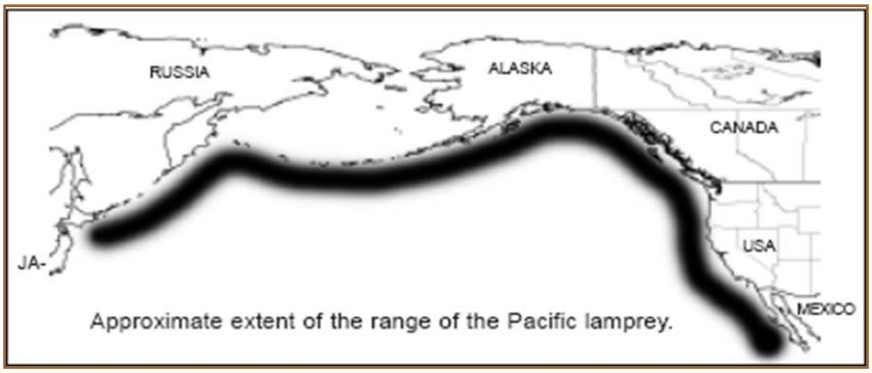
Embryos hatch in approximately 19 days at 59° Fahrenheit (F) and the ammocoetes drift downstream to areas of low velocity and fine substrates where they burrow, grow and live as filter feeders for 3 to 7 years and feed primarily on diatoms and algae. Several generations and age classes of ammocoetes may occur in high densities. Ammocoetes move downstream as they age and during high flow events. We know little about movement and locations of ammocoetes within the substrates. Anecdotal information suggests that they may occur within the hyporheic zone and may move laterally through stream substrates.

Metamorphosis to macropthalmia (juvenile phase) occurs gradually over several months as developmental changes occur, including the appearance of eyes and teeth, and they leave the substrate to enter the water column. Transformation from ammocoetes to macropthalmia typically begins in the summer and is complete by winter. They move downstream as they emigrate to the ocean between late fall and spring where they mature into adults.

Range: Pacific lampreys are the most widely distributed lamprey species on the west coast of the United States. They have been found in streams from Hokkaido Island, Japan, and around the Pacific Rim including Alaska, Canada, Washington, Oregon, Idaho, and California to Punta Canoas, Baja California, Mexico. Their distribution includes major river systems such as the Fraser, Columbia, Klamath-Trinity, Eel, and Sacramento-San Joaquin Rivers. Pacific lamprey distribution patterns are similar to that of anadromous salmonids.



Approximate extent of the range of the Pacific lamprey.

Status: Historically, Pacific lampreys are thought to be distributed wherever salmon and steelhead occurred. However, recent data indicate that distribution of the Pacific lamprey has been reduced in many river drainages. They no longer exist above dams and other impassable barriers in west coast streams, including many larger rivers throughout coastal Washington, Oregon, and California, and above dams in the upper Snake and Columbia Rivers. Available data also indicates that Pacific lampreys have declined in abundance throughout the Columbia River basin and southern California. Thus, the need for immediate conservation of lampreys is evident.

THREATS: Pacific lampreys face a variety of threats to its various life history stages. Taking into account the potential for lamprey utilization of an area is essential to their conservation. This is especially critical for lamprey ammocoetes because they are unable to move from areas of disturbance and a single dewatering event, physical disturbance, or contamination may have a significant effect on a local lamprey population.

- Passage (dams, culverts, water diversions, tide gates, other barriers) both upstream & downstream. Artificial barriers can impede upstream migrations by adult lampreys and downstream movement of ammocoetes and macropthalmia. During downstream migrations juvenile lampreys may be entrained in

water diversions or turbine intakes. In many cases, water diversions and hydroelectric projects have been screened to bypass juvenile salmonids. However, due to their size and weak swimming ability, juvenile lampreys are frequently impinged on the screens resulting in injury or death. There is evidence that many dams with fish ladders designed to pass salmonids do not effectively pass lampreys. The excessive use of swimming energy required by adult Pacific lampreys to negotiate fish ladders or culverts combined with sharp angles and high water velocities, effectively block or restrict passage. A hanging culvert, even a couple of inches, is a barrier to lampreys. Lampreys travel deeper in the water column (no air bladder) compared to salmonids, therefore, traditional spill gates may block passage. Pacific lampreys persist for only a few years above impassable barriers before dying out.

- Dewatering and flows (reservoir management, water diversions, construction projects). Alterations in reservoir levels may dewater areas where ammocoetes occur. Water diversions and instream construction projects (i.e., culvert replacements) may also dry up stream reaches where ammocoetes reside. One dewatering event can have a significant effect on a local lamprey population.

- Poisoning (accidental spills, chemical treatments). Ammocoetes are prone to effects from chemical poisoning. This has been documented in many areas where vehicle or railroad spills have occurred.

- Poor water quality. Elevated water temperature has been documented as a mortality factor for eggs and early stage ammocoetes under laboratory conditions. Water temperatures of 72°F may cause significant death or deformation of eggs or ammocoetes. This may be a common occurrence in degraded streams during the early to mid-summer period of lamprey spawning and ammocoete development. Also, ammocoetes tend to concentrate in the lower portions of streams and rivers where gradients are low and toxins, if present, accumulate.

- Dredging (channel maintenance and mining). Ammocoetes can be impacted by mining or dredging activities. As an example, suction-dredge mining is thought to be one of the reasons for the loss of lamprey in the upper John Day River basin in Oregon.

- Stream and floodplain degradation (i.e., channelization, loss of side channel habitat, scouring). Ammocoetes are prone to effects from channel alterations. The loss of riffle and side channel habitats may reduce areas for spawning and for ammocoete rearing.

- Ocean conditions (loss of prey, increase in predators). Changing ocean conditions could be a possible threat to the Pacific lamprey adults. Pacific salmon, Pacific hake, and walleye pollock have declined in numbers; reductions in the availability of these host/food species may be affecting adult lamprey survival and growth.

- Predation by nonnative fish species. Nonnative fishes such as bass, sunfish, walleye, striped bass, and catfish, among others, have become established over the last century in some rivers in the western U.S. In addition, migrations through reservoirs may increase susceptibility to predation.

CONSERVATION OPPORTUNITIES: Primary opportunities to protect and restore Pacific lamprey populations include:

1. **Provide Lamprey Passage**
2. **Protect Ammocoete Habitat**
3. **Restore Stream Channel Complexity**

For more information visit the following website:
http://www.fws.gov/pacific/fisheries/sp_habcon/lamprey/index.html