




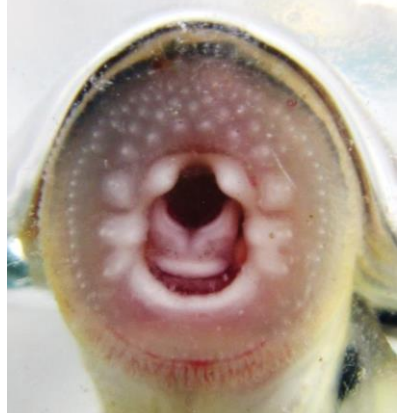
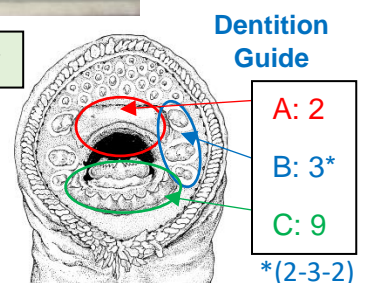
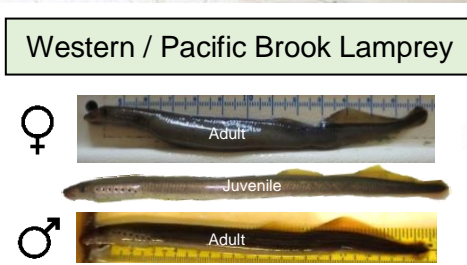
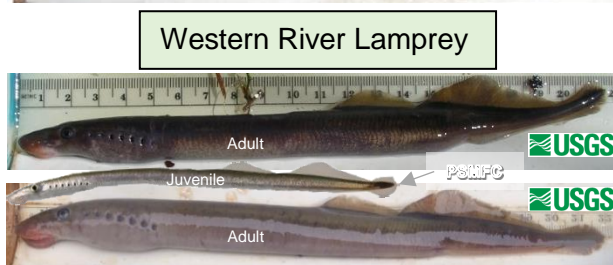
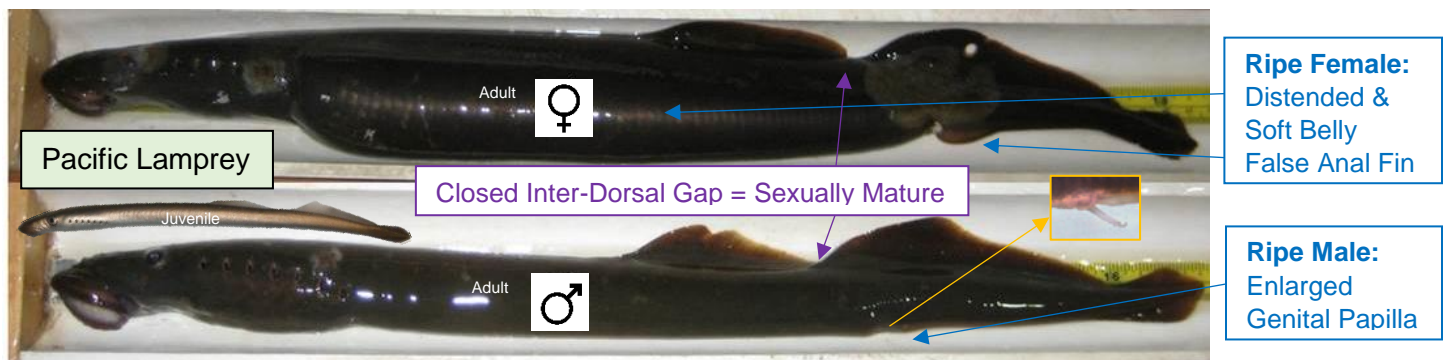


Columbia Basin Lamprey Identification Guide (Adults / Juvenile)

*last updated 11/22/2017

Prepared by Ralph Lampman (lamr@yakamafish-nsn.gov), Yakama Nation Fisheries



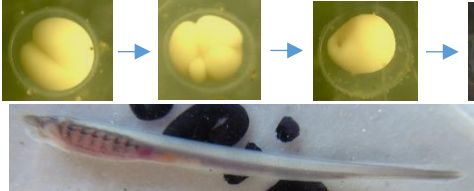
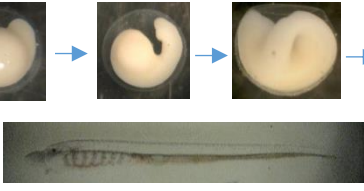
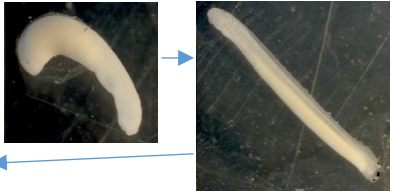



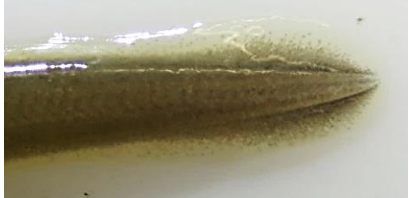
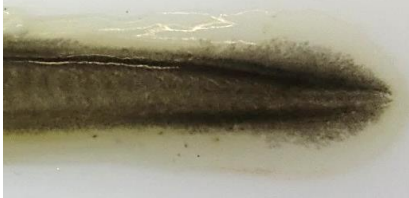










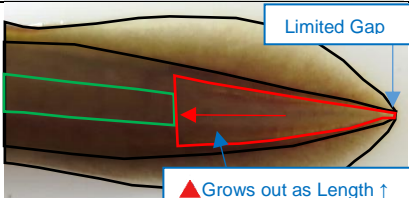
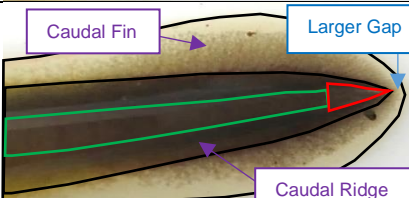
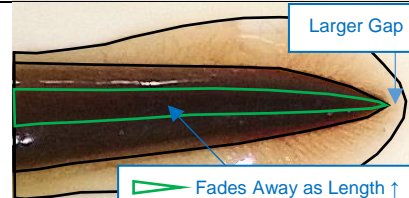
Species Name	Pacific Lamprey (<i>Entosphenus tridentatus</i>)	Western River Lamprey (<i>Lampetra ayresii</i>); anadromous <i>Lampetra</i>	Western & Pacific Brook Lamprey (<i>Lampetra richardsoni</i> & <i>pacifica</i>); resident <i>Lampetra</i>
Adult Length	330-840 mm (13-33 inch) (coastal dwarf type 200-330mm)	200-330 mm (8-13 inch)	90-200 mm (3.5-8 inch)
Juvenile Length	Typically 90-200 mm (3.5-8 inch)	Typically 90-200 mm (3.5-8 inch)	Typically 90-200 mm (3.5-8 inch)
Dentition Pattern	A: 3 (juvenile initially 2), B: 4 (typically 2-3-3-2), C: 5-6	A: 2, B: 3 (typically 2-3-2 or 2-2-2), C: 7-10	A: 2, B: 3 (typically 1-2-1, 2-2-1, or 2-2-2), C: 7-10
Adult Dentition *see Dentition Pattern & Dentition Guide (bottom right)			
Juvenile (Trans- former) Dentition *see Dentition Pattern & Dentition Guide (bottom right)			



Columbia Basin Lamprey Identification Guide (Larvae)

*last updated 11/22/2017

Prepared by Ralph Lampman (lamr@yakamafish-nsn.gov), Yakama Nation Fisheries

Species Name	Pacific Lamprey (<i>Entosphenus tridentatus</i>)	<i>Lampetra</i> Spp. (Class B) *not synonymous with anadromous	<i>Lampetra</i> Spp. (Class A) *not synonymous with resident
Fertilized Eggs	 Creamy Yellow (~1.2 mm diam.)		Creamy Green (~1.0 mm diam.)
Embryo / Early Larva (All Spp.)	  		
Larva Tail (~50 mm)			
Larva Tail (~65 mm)			
Larva Tail (~80 mm)			
Larva Tail (~100 mm)			
Larva Tail (~130 mm)			
Guide Diagram (High-lighting Trans-lucent Area)	 <p>Limited Gap</p> <p>▲ Grows out as Length ↑</p>	 <p>Caudal Fin</p> <p>Larger Gap</p> <p>Caudal Ridge</p>	 <p>Larger Gap</p> <p>◀ Fades Away as Length ↑</p>
Caudal Ridge (Center)	"wide" translucent ▲ (red); same as L. spp. Class A for green area	"wide" translucent ▲ (red) only at tip (if present); same as L. spp. Class A for green area	▲ (red) absent; narrow translucent area (green) exists for ≈ <100mm larvae
Caudal Fin	pigmented (light to dark speckles as they grow larger)	pigmented or mottled (can be similar to <i>E. tridentatus</i>)	no pigment (mostly clear or red vein)

Description for Columbia Basin Lamprey Identification Guide (Adults / Juvenile)

Entosphenus and *Lampetra* species are diverse in some regions of the Pacific Northwest (in particular, Klamath River Basin) with many unique endemic species of lamprey. This guide will not provide enough detail to identify all those species, but it was drafted with the intention to help those that work primarily with Pacific Lamprey (*Entosphenus tridentatus*), Western River Lamprey (*Lampetra ayresii*), Western Brook Lamprey (*L. richardsoni*) and/or Pacific Brook Lamprey (*L. pacifica*) within the Columbia River Basin or other basins with primarily those target species present.

The dentition guide on the lower right highlights three areas: supraoral lamina (A), lateral circumorals or endolaterals (B), and infraoral lamina (C) and the number of teeth within. The (2-3-2) represents the number of cusps within each teeth (from top to bottom).

The secondary sexual characteristics highlighted and displayed in the guide typically only show up immediately prior to the spawning season (a few months to a few days prior to spawning, depending on the trait), and sexing of adults prior to this period is very difficult.

Description for Columbia Basin Lamprey Identification Guide (Larvae)

The larvae guide focuses primarily on distinguishing Pacific Lamprey from *Lampetra* species (primarily *Lampetra ayresii*, *L. richardsoni*, and *L. pacifica*). However, the morphological difference between *L. richardsoni* and *L. pacifica* is limited (primary difference is myomere counts, which includes some overlap). Also, no obvious genetic difference between *L. ayresii* and *L. richardsoni* has been identified at a local scale, suggesting that these two species may actually be one species with two life history (similar to steelhead and rainbow trout).

As a result, it is difficult to accurately distinguish the various species of *Lampetra* larvae using a guide based on morphology, but through genetic analyses conducted by Columbia River Intertribal Fish Commission, we have identified two distinct groups of *Lampetra* species (Class A and B). All larvae shown here in photos were genetically analyzed and confirmed. Class A has a clear caudal fin and no “wide” triangle-shaped translucent (technically, not completely translucent, but lighter-colored) area in the caudal ridge (usually pigmented or only has narrow translucent area). Class B has a speckled and/or mottled caudal fin (in some ways similar to Pacific Lamprey) and usually no or only a small “wide” triangle-shaped translucent area in the caudal ridge. Pacific Lamprey has a pigmented and/or speckled caudal fin and a “wide” triangle-shaped translucent area (red highlighted area; this triangle gradually gets larger and extends further as larvae grow larger). All three groups of lamprey may have a “narrow” translucent area (green highlighted area) especially when they are smaller (<100 mm), which needs to be distinguished from the “wide” translucent area. The guide makes an attempt to show these differences among the three groups of lamprey and by size (not to forget individual variation).

Although there is some color and size based differences at the egg stage, there is very little difference among the three groups of lamprey until they reach 45-60 mm. Experienced biologist can ID Pacific Lamprey features as early as 40-50mm (but identifying *Lampetra* at 40-50mm is not recommended as it may be simply be a Pacific Lamprey that has not manifested its species specific features quite yet). Biologists with intermediate experience can identify lamprey down to 50-70 mm sizes. We recommend beginners (with limited experience) to start identification with larger larvae (>70 mm). These tail differences can also be used for transformer and to some extent adult life stages (in addition to other features such as dentition).

Other Sources:

Goodman, D. H., A. P. Kinziger, S. B. Reid, and M. F. Docker. 2009. Morphological diagnosis of *Entosphenus* and *Lampetra* ammocoetes (Petromyzontidae) in Washington, Oregon, and California. In L. R. Brown, S. D. Chase, M. G. Mesa, R. J. Beamish and P. B. Moyle (editors), *Biology, Management, and Conservation of Lampreys in North America*, American Fisheries Society, Bethesda, MD. Pp. 223–232.

Renaud, 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., Rome, FAO. 109 pp.