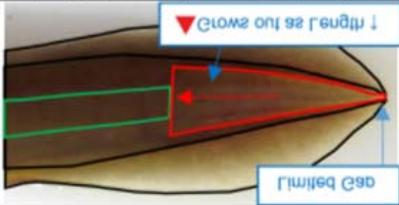
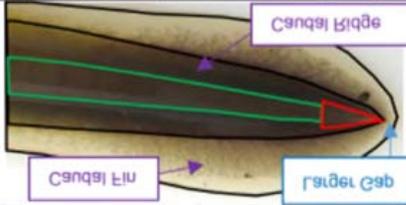
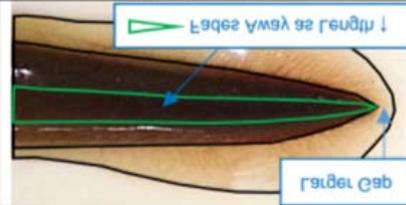


Lamprey ID and Lampetra Genetics Update

Fin Caudal	speckles as they grow larger) pigmented (light to dark	similar to E. tidentatus) pigmented or mottled (can be	leq vein) no pigment (mostly clear or
(Center) Ridge Caudal	green area same as L. spp. Class A for "wide" translucent ▼ (leq):	spp. Class A for green area at tip (if present): same as L. "wide" translucent ▼ (leq) only	for <100mm larvae translucent area (green) exists ▼ (leq) absent: narrow
Area) lucent Trans- lucent (High- Dispersal Guide			
mm) (~130 Tail Larva			

Presenter: Tyler Beals, Fish Biologist I, Yakama Nation Fisheries

Presentation Prepared By:

Lamprey ID – Tyler Beals and Ralph Lampman, Yakama Nation Fisheries

Lampetra Genetics – Steven Micheletti, Geneticist, Columbia Inter-Tribal Fish Commission (CRITFC)

Pacific Lamprey

(*Entosphenus tridentatus*)

- **Anadromous**
 - Freshwater -> Ocean -> Freshwater
- **Juveniles**
 - Macrophthalmia
 - 90-200 mm
- **Adults are large**
 - Up to 840 mm [33 inches]



**Larvae
(Tail Only)**



**Juvenile
(Macrophthalmia)
(~ 150 mm)**



**Adult
(~ 600 mm)**

Western Brook Lamprey (*Lampetra richardsoni*)

- Resident
 - Freshwater Only
- Adults are small
 - Up to 200 mm [8 inch]
- Two Distinct Genetic Groups
 1. “Class A” – caudal pigment is ‘not’ present
 2. “Class B” – caudal pigment is present



Adult
(~ 160 mm)



Class A
No Pigment
(Larvae ~130 mm)



Class B
Yes Pigment
(Larvae ~130 mm)

Western River Lamprey (*Lampetra ayresii*)

- **Anadromous**

- Freshwater -> Ocean -> Freshwater

- **Not Genetically Distinct**

- from Western Brook Lamprey
- Anadromous life-history of a Western Brook Lamprey

- **Anadromous and Resident Larval Western Brook Lamprey Morphologically indistinct.**

- **Anadromy is not linked to “Class A” or “Class B” (could be either)**



**Adult
(~ 300 mm)**



**Adult
(~ 300 mm)**

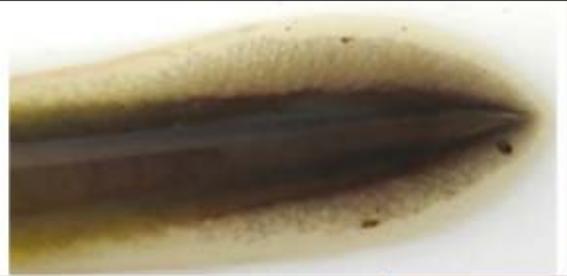
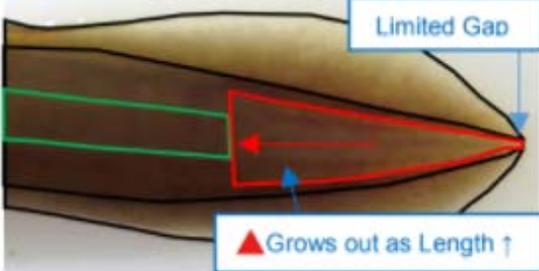
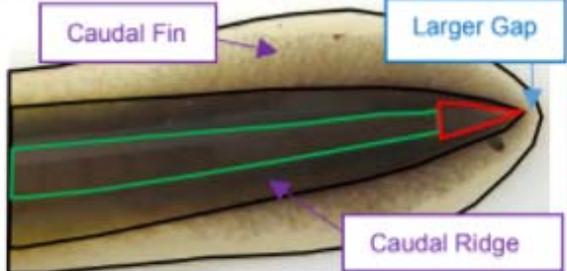
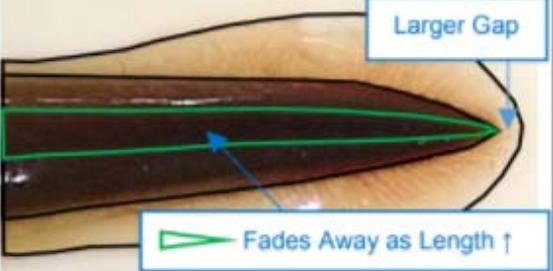


**Transformed
Juvenile
(~ 150 mm)**

Columbia Basin Lamprey ID Guide -> Ralph Lampman, Yakama Nation Fisheries

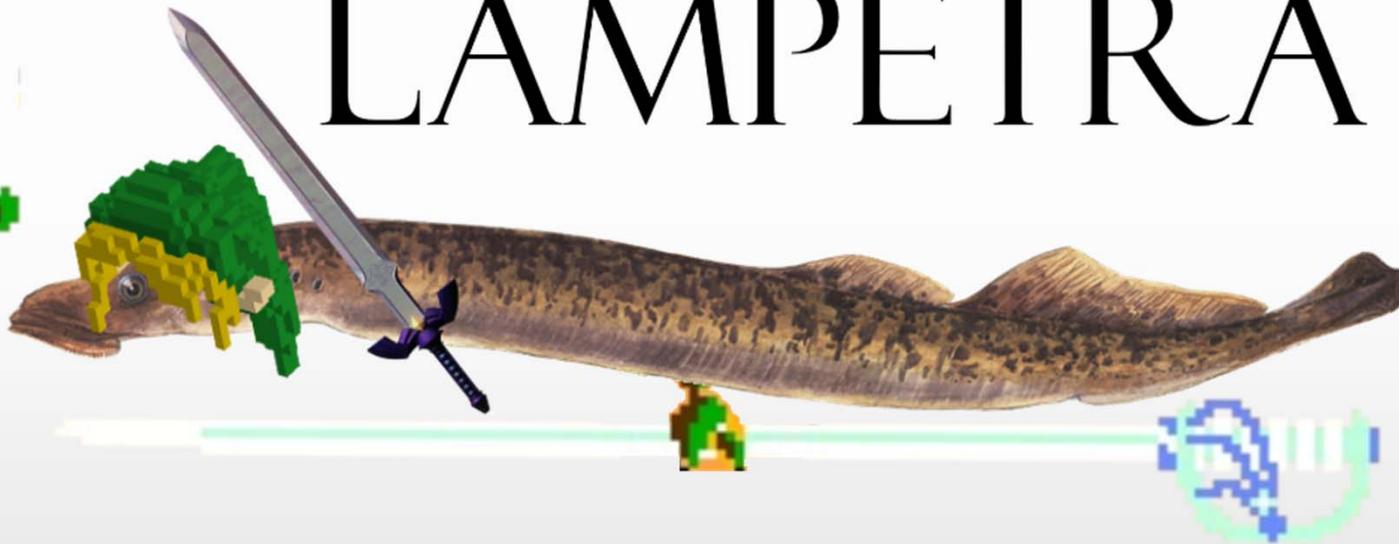
Larval Lamprey ID ->

- Difficult but anyone can do it!
- Start with Larger Lamprey (>100 mm) and work to smaller fish.

Species Name	Pacific Lamprey (<i>Entosphenus tridentatus</i>)	<i>Lampetra</i> Spp. (Class B) * <u>not</u> synonymous with anadromous	<i>Lampetra</i> Spp. (Class A) * <u>not</u> synonymous with resident
Larva Tail (~130 mm)			
Guide Diagram (Highlighting Translucent Area)			
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)

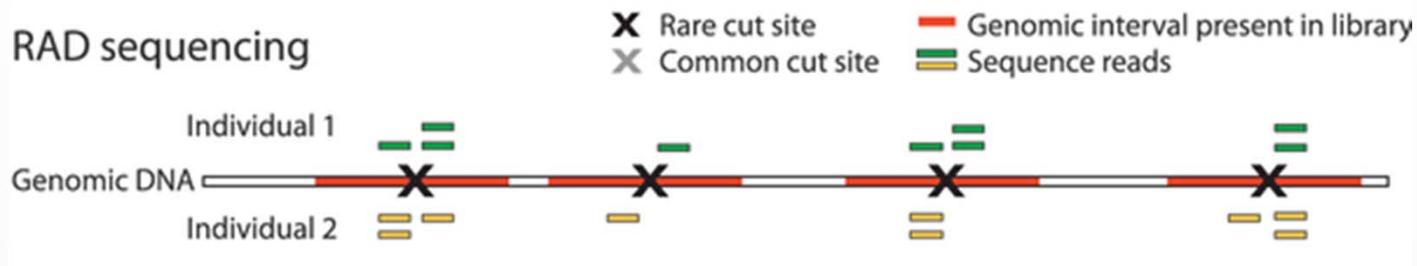
THE LEGEND OF

LAMPETRA

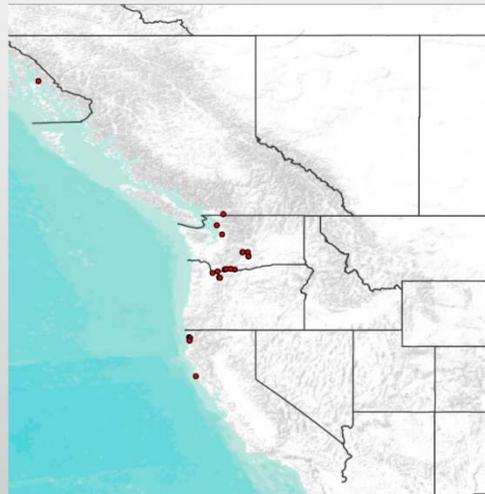


Genetic Work

- Restriction site-associated DNA sequencing (RAD-seq); Chop up and sequence fragments dispersed across the lamprey genome

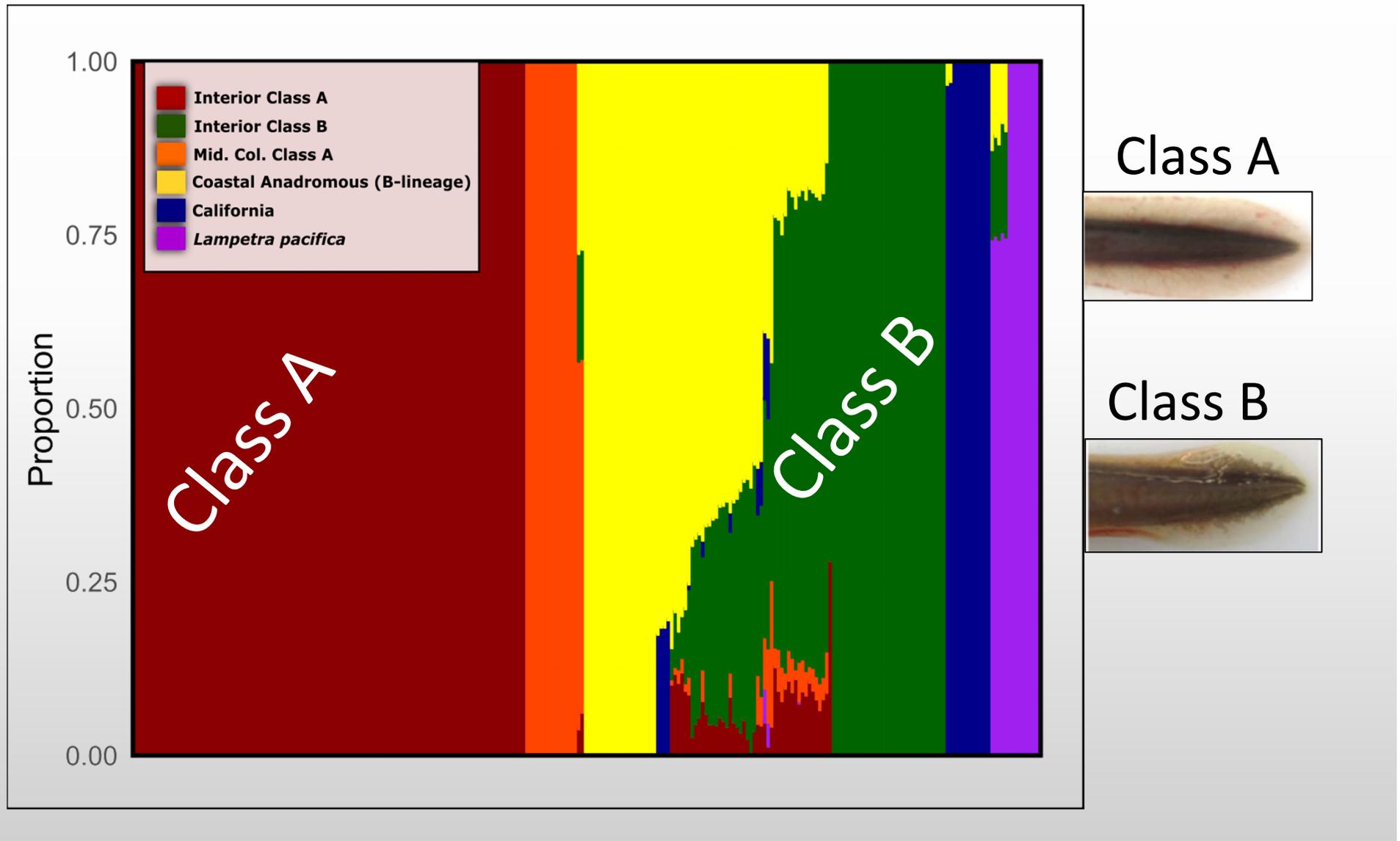


- After quality filters ~ 11,000 loci across the genome
- 265 *Lampetra* individuals across the Northwest

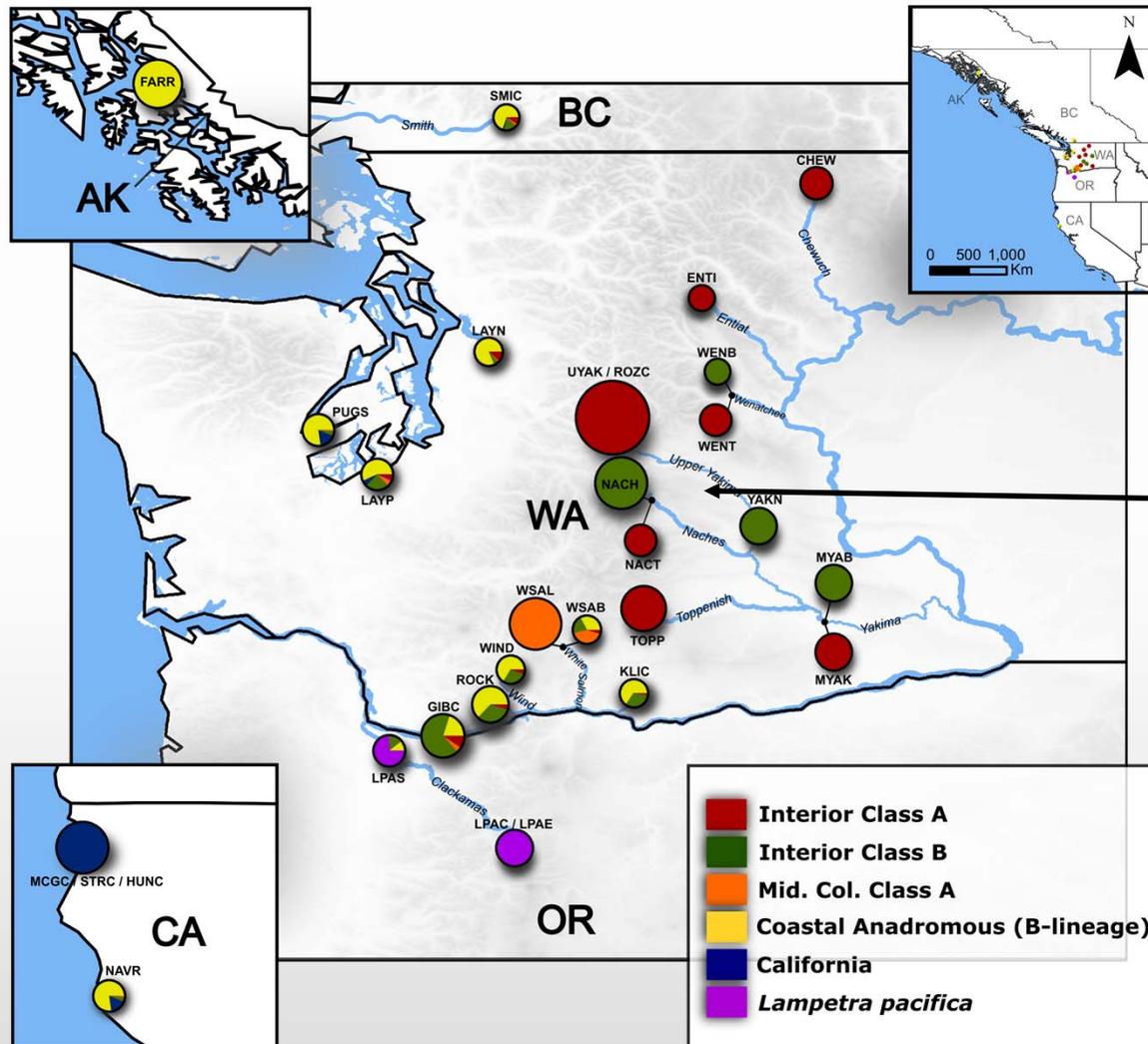


• Genetic similarity of individuals

6 genetic groups across samples



How the groups are spatially structured



Class A and B *Lampetra* are genetically distinct but found in the same tributaries!



Western Brook Lamprey have been genetically confirmed (CRITFC) in the Columbia Basin upstream of the Yakima River Subbasin (previously unknown prior to Yakama Nation discoveries starting in 2016).

Summary / Discussion

- Lamprey ID Guide – Ralph Lampman, Yakama Nation Fisheries
- 3 Dominant species of lampreys in Columbia River Basin
 - Pacific Lamprey – Large, anadromous
 - Western Brook Lamprey – Small, Resident, Class A and Class B
 - Western River Lamprey – Anadromous Life History of Western Brook Lamprey
- Six Distinct Genetic groupings of Lampetra found in Columbia River Basin.
- “Class A” and “Class B” Lampetra are genetically distinct
- Lampetra found in tributary subbasin watersheds upstream of the Yakima Subbasin (previous unknown prior to 2016)
- “Class A” and “Class B” reside in the same tributary watersheds, suggesting they do not interbreed.