Pacific Lamprey

are you passing them?

Joe Skalicky

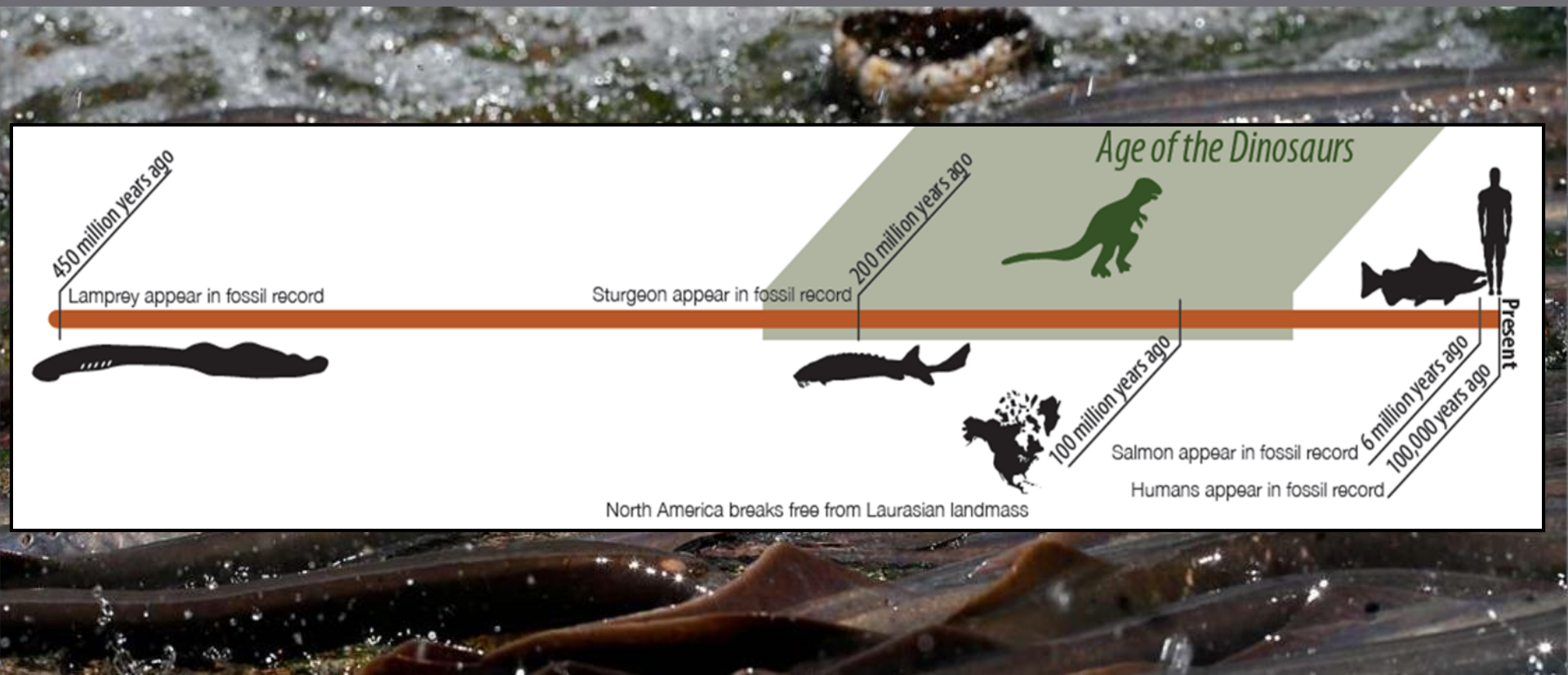
US Fish and Wildlife Service

2019 PACIFIC NORTHWEST FISH SCREENING AND PASSAGE WORKSHOP

Photo Credit: David Herasimtschuk

Why Lamprey Matter

- Integral and founding part of the ecosystem
- We all want to do no harm
- Opportunity to facilitate passage
- Opportunity to learn – Lamprey science is still emerging!



Objectives

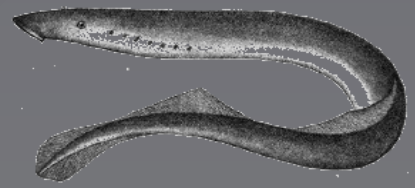
1) Raise Awareness

2) Review Passage Science

Swimming Abilities

- Pacific Lamprey
  - Free-swimming abilities: 3.9 fps
  - Sustained swimming abilities: 3.0 fps
  - Burst swimming abilities: 7.0 fps

- Typical velocities in salmonid fishways
  - Entrance: 7.0 -10.0 fps



Pacific Lamprey Life Cycle

Adults live in ocean 1-3 years and feed on host fish

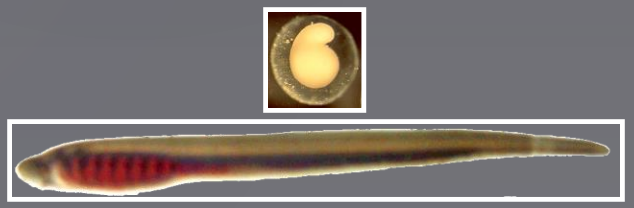
Adults migrate to freshwater and reside there about a year

Adults develop teeth on sucking disk for parasitic feeding

Adults spawn in gravel nest then die

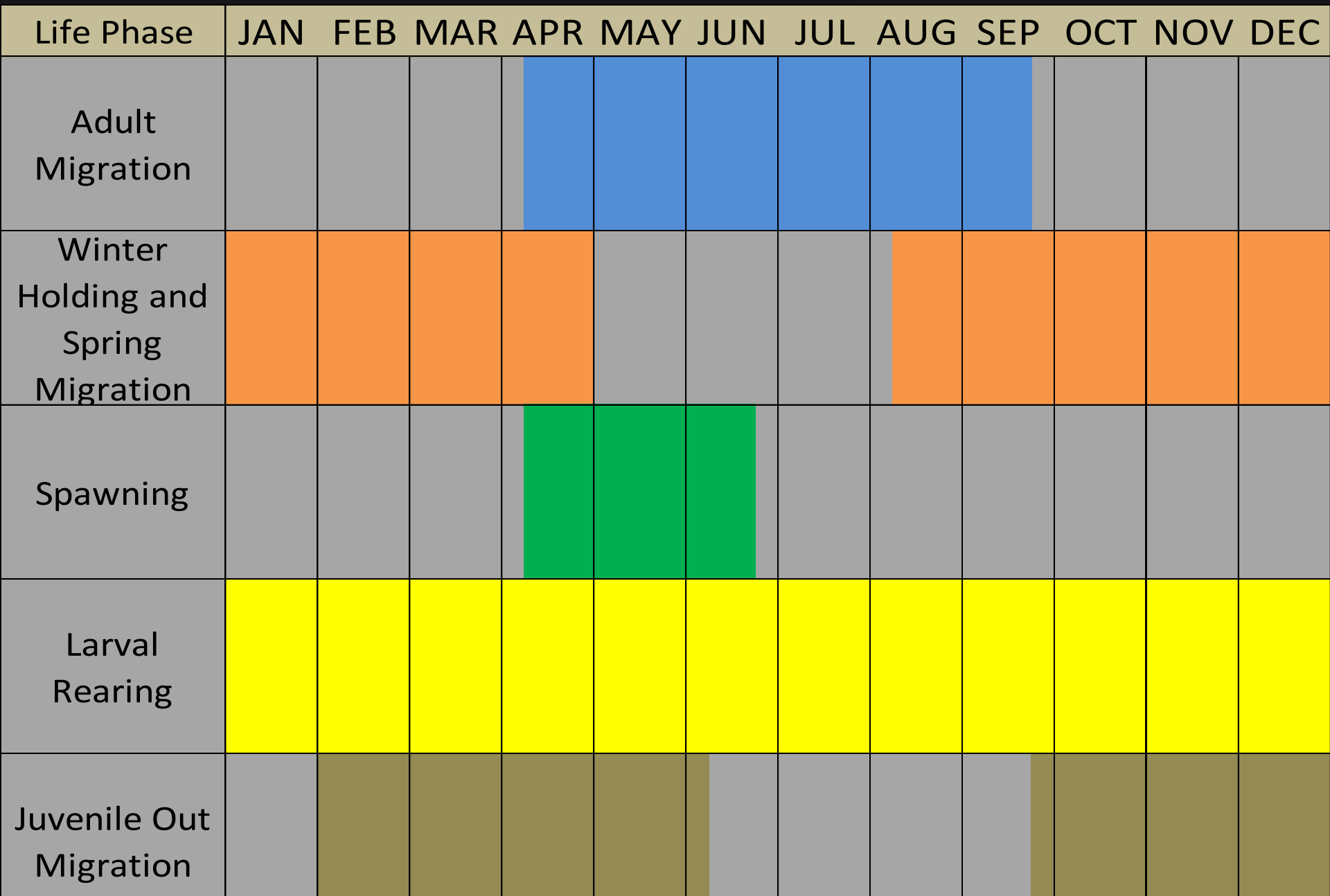
Larvae transform to juveniles (macropthalmia) and migrate to the ocean

Ammocoetes live in silt/sand substrates and filter feed for 3 - 7 years



Eggs hatch into larvae (ammocoetes) and drift downstream to slow velocity area

Pacific Lamprey Life History



Passage guideline Papers

- Design Guidelines for Pacific Lamprey Passage Structures: Zobott et al. 2015 (UI, NMFS, USACE)
  - LPS system design, incl. “digital parts library”

- Practical Guidelines for Incorporating Adult Pacific Lamprey Passage at Fishways

Technical Report 2015-5

DESIGN GUIDELINES FOR PACIFIC LAMPREY PASSAGE STRUCTURES

Study Code LMP-P-13-1

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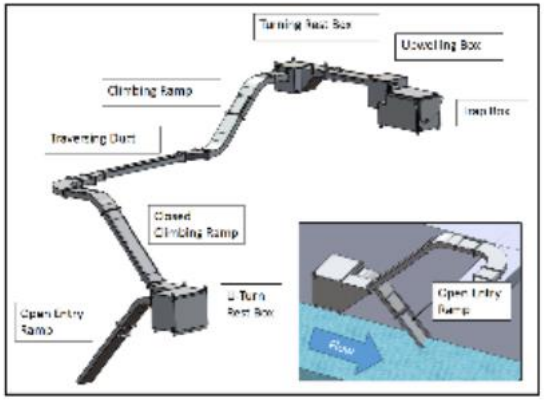


For

U.S. Army Corps of Engineers
Portland District

2015

Restoring Passage: "Lamp Ramps"

Design Guidelines for Pacific Lamprey Passage Structures

"online digital parts library"

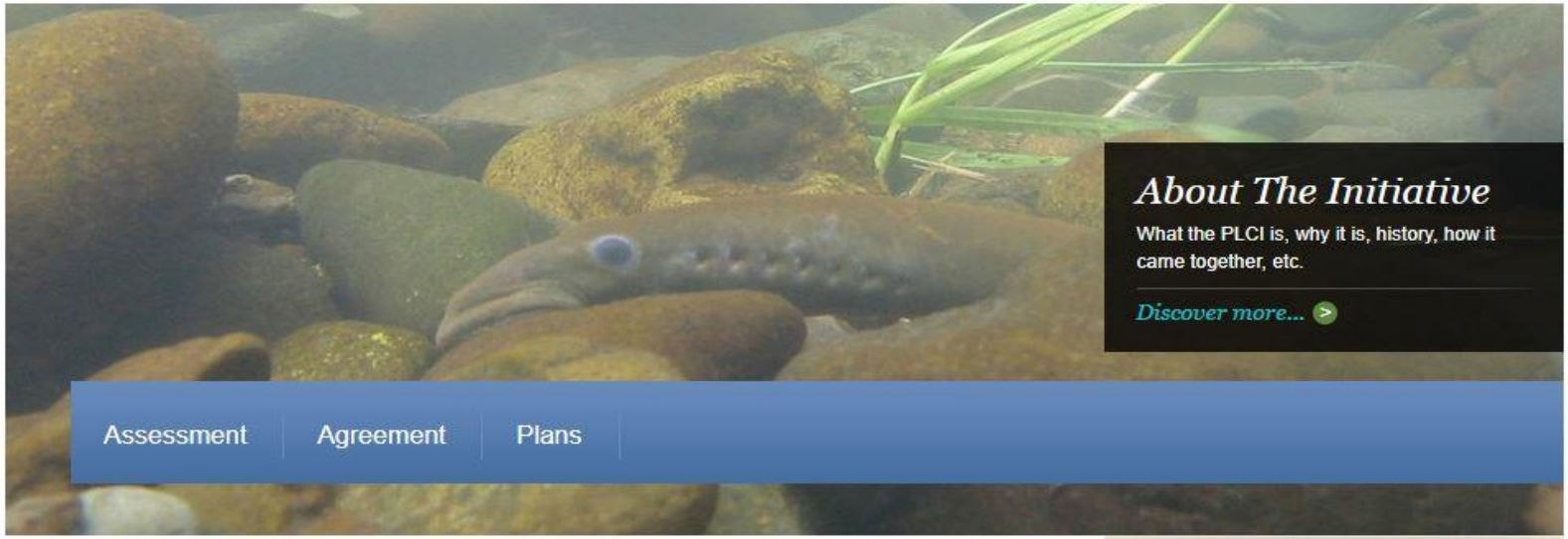
U.S. Fish & Wildlife Service

Search

Pacific Lamprey Conservation Initiative

Alaska, California, Idaho, Oregon, Washington and Native American Tribes

FOLLOW THE FWS ONLINE



FEATURES

Best Management Practices to Minimize Adverse Effects to Pacific Lamprey

This document provides Best Practices that can be incorporated into any stream disturbing activity on lands managed by the Forest Service and Bureau of Land Management throughout the range of Pacific lamprey.

View the full document

INITIATIVE UPDATES

RECENT INITIATIVE-RELATED MEETINGS

PACIFIC LAMPREY MAPS

DATA CLEARINGHOUSE

LAMPREY TECHNICAL WORKGROUP

LAMPREY FACT SHEETS

Featured Topics

Pacific Lamprey Fish Habitat Partnership

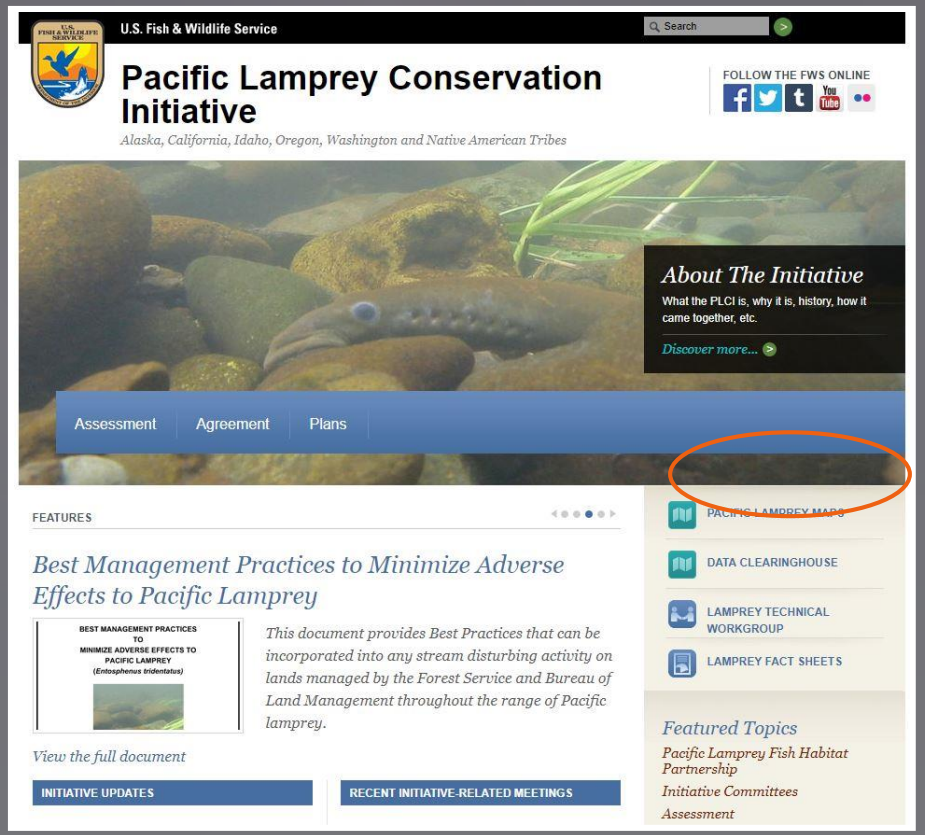
Initiative Committees

Assessment

Pacific Lamprey Technical Workgroup

- **GREAT RESOURCE MANY SUBGROUPS:**

- Subgroup -Other Lamprey – Anadromous & Resident
- Juvenile entrainment & dredging investigations
- Tagging
- Genetics & eDNA
- Adult passage
- Restoration
- Contaminants
- Ocean Phase
- Passage metrics



Simple Ramps

Built a wetted wall or two…

Restoring Passage: Recent Experiments

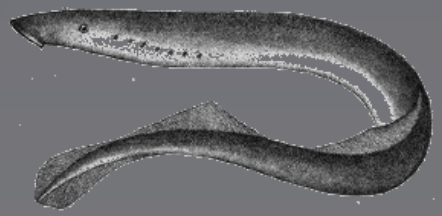
Van Arsdale Dam- lamprey passage tube
Damon Goodman and Stewart Reid
Photo : M. Macor- The Chronicle

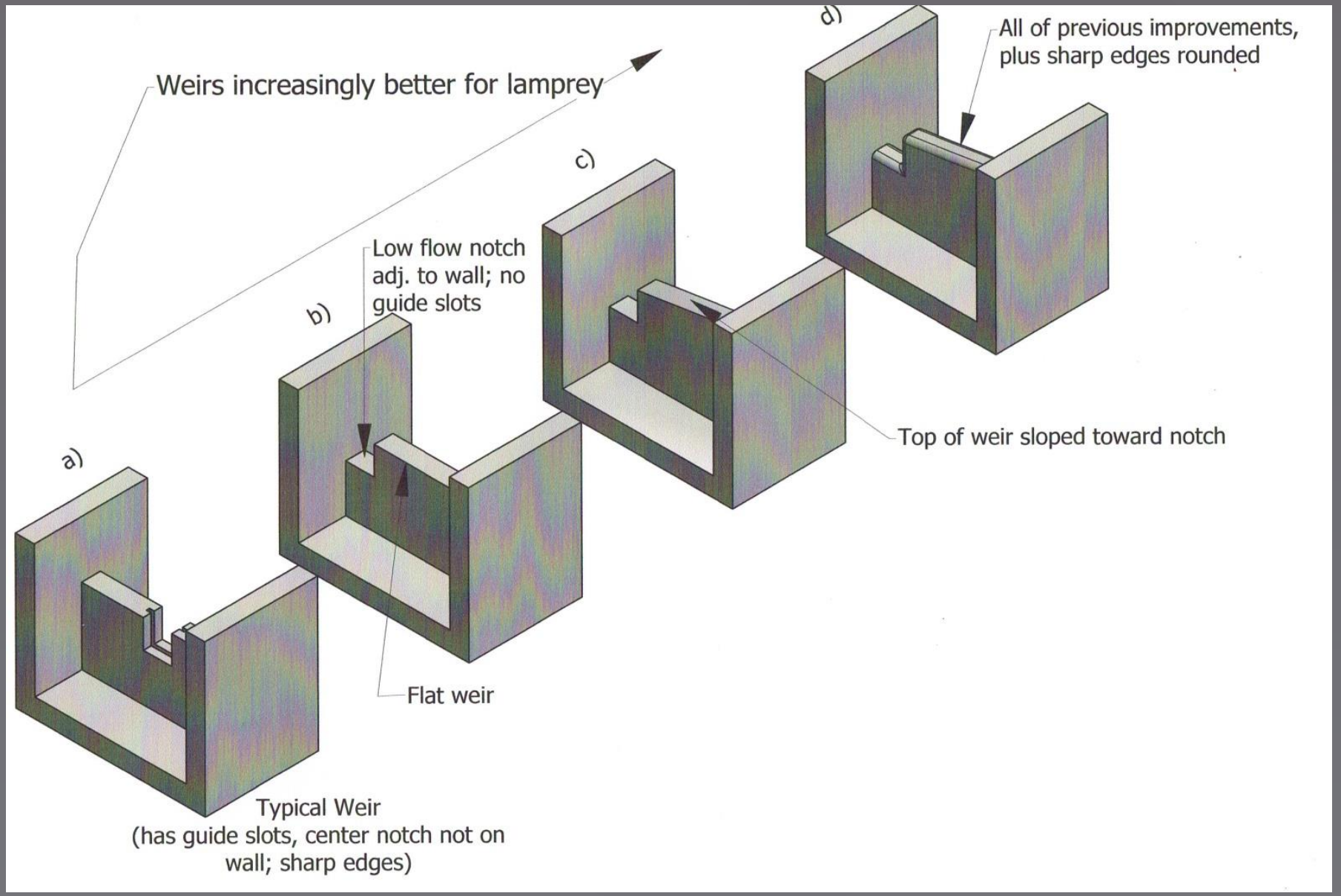
Eel at Willamette Falls. 7-15-13

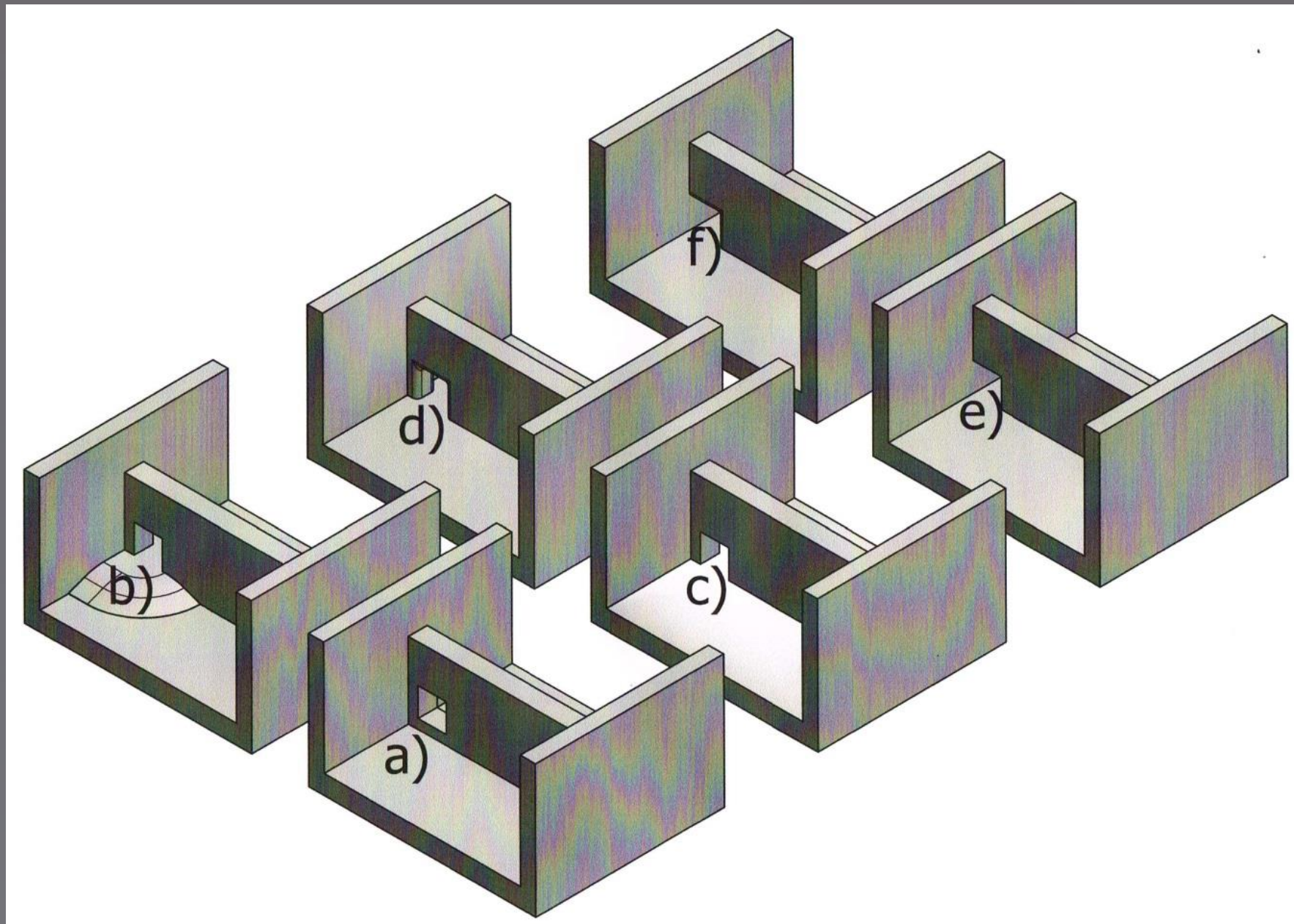
add a retaining wall

Traditional Fishways Considerations for Lamprey

- Type of ladder
- False attraction flows
- Limited or no continuous attachment surfaces
- Picket spacing
- Counting stations & lighting
- Transition areas/ confusing flow patterns
- Limited resting area/ refuges




Weirs increasingly better for lamprey
a)
b)
c)
d)
Low flow notch adj. to wall; no guide slots
All of previous improvements, plus sharp edges rounded
Top of weir sloped toward notch
Flat weir
Typical Weir
(has guide slots, center notch not on wall; sharp edges)


f)
d)
e)
b)
c)
a)

Restoring Passage: Traditional Fishways

In traditional fishways, providing continuous attachment surfaces by rounding corners, eliminating gaps, and reducing floor grating can improve lamprey passage.


Restoring Passage: Road Crossings

Restoring Passage: Road Crossings

- Stream Simulation Design
- Culvert Assessment: CA Fish Passage Forum website
- White paper in late 2019!
  - In progress now!

Summary

- Lamprey are poor swimmers compared to salmonids
- 90 degree corners alone can preclude passage
- Many options to provide passage at existing structures are available
- We are here to help

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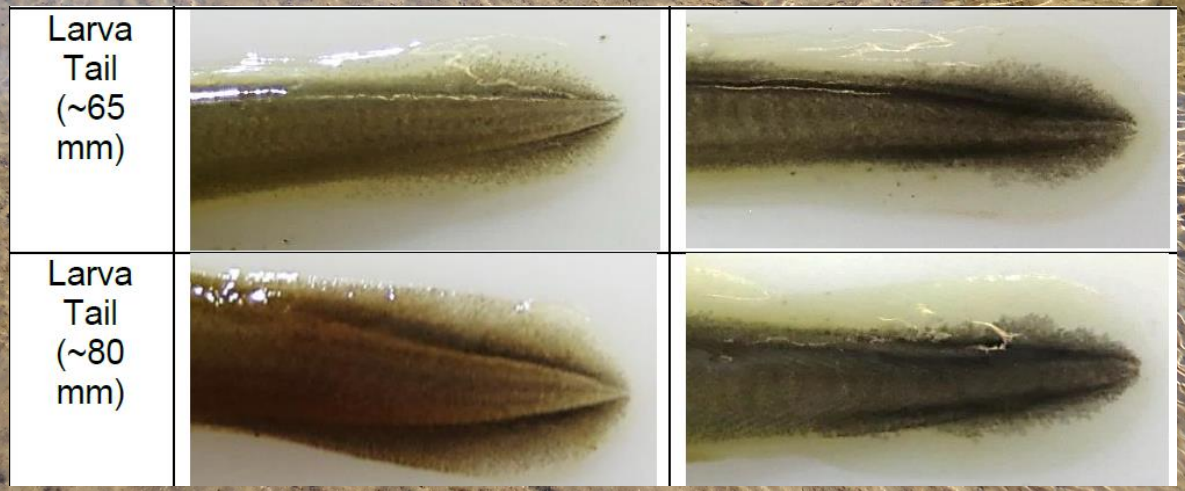
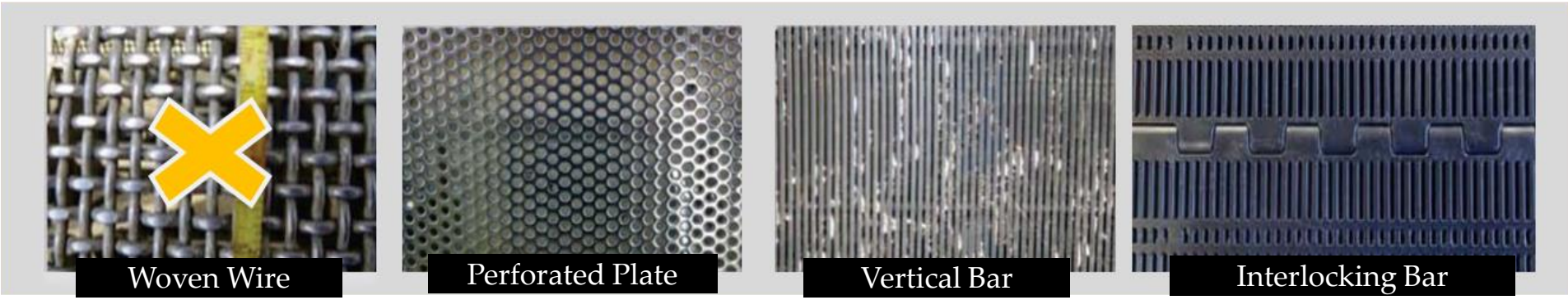
Larvae- Habitats and Salvage

- Depositional areas of fine/sandy sediments
- Densities over 100 larval lamprey/m^2
- Larvae – from eyelash to pencil size
- Multiple species and year classes in same area



“Dry” electrofishing

Restoring Passage: Screening



Rose and Mesa, 2012

NMFS criteria -- 1.75 mm maximum opening

Good for large larvae (90+ mm)

Avoid woven wire screens for smaller larvae

Orientation matters!