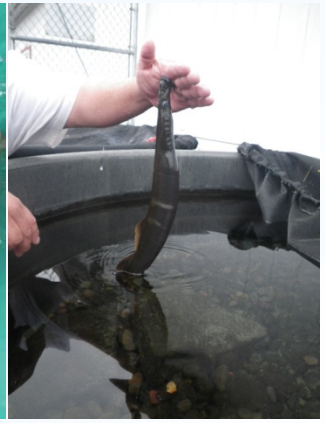
Supplementation Research for Pacific Lamprey Recovery: Dialogue on Benefits & Risks

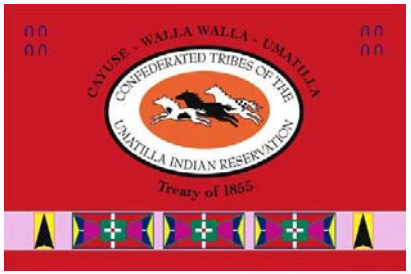





Yakama Nation Fisheries – Pacific Lamprey Project:

Ralph Lampman, Patrick Luke, Bob Rose, Dave'y Lumley, Ed Johnson, and Tyler Beals

Shout-Out for Everyone Helping



Outline

1. Background (What and Why)
2. What have we learned (Past)?
3. What we can learn (Future)?
4. Risks
5. Dialogue

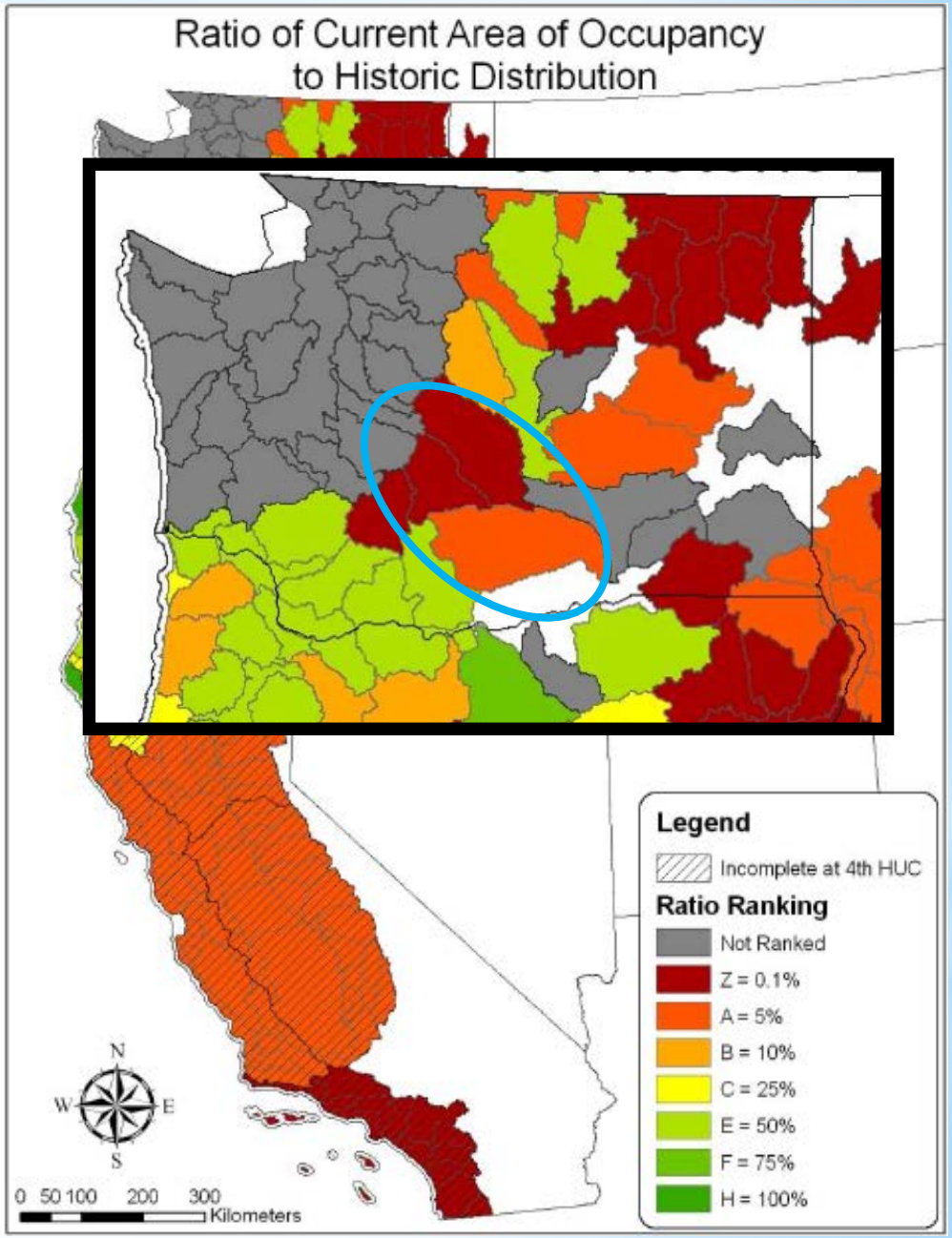
"Supplementation" Research

Salmon Definition = management strategy that uses artificial production for the purpose of attempting to rebuild depressed natural salmon & steelhead populations (ISAB 2003-03)

Lamprey Definition = an interim production facilitation strategy through adult translocation and artificial propagation that supports region-wide efforts to reduce known threats to self-sustaining natural productivity

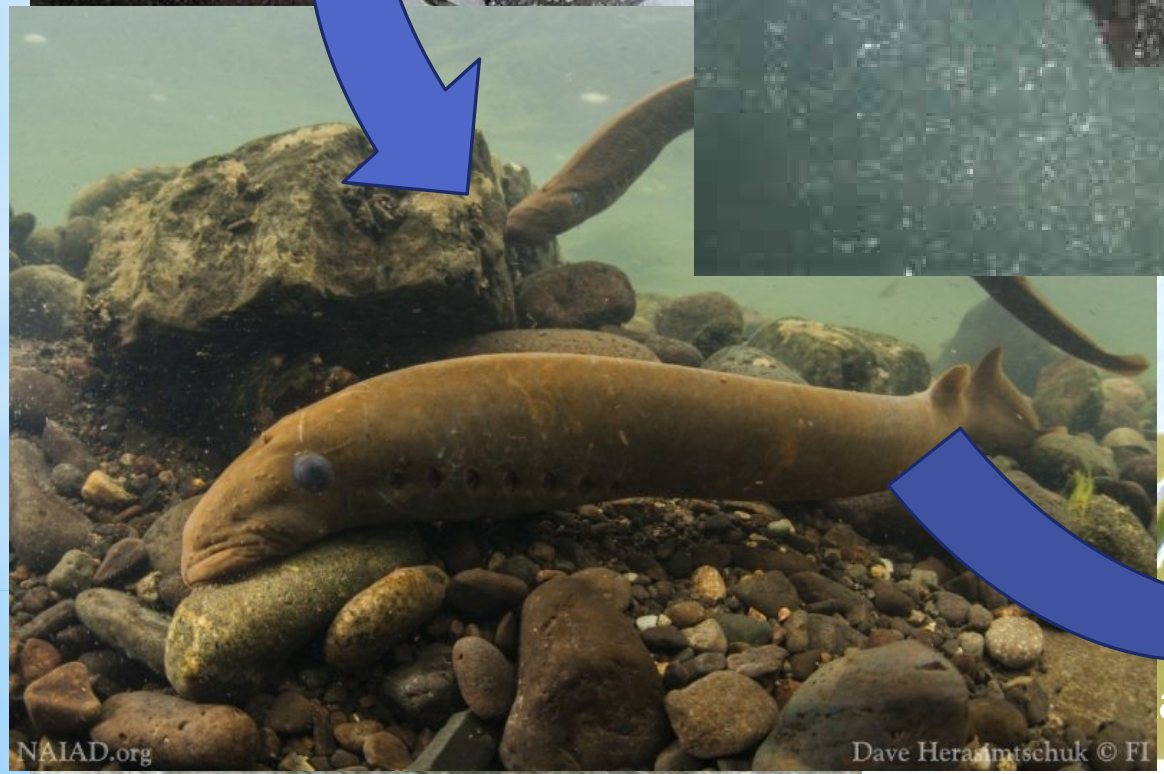
Current Status

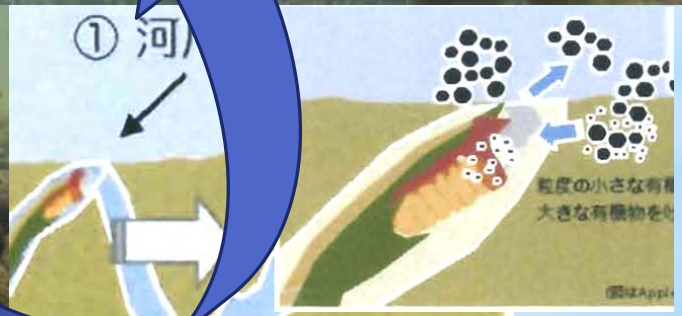
- Reduced populations in Upper Columbia & Southern CA
- Depressed populations in Yakima Subasin and neighboring Subbasins



Why Should We Care?

Tribal Culture & Food Source






Willamette Falls.

Why Supplementation Research?

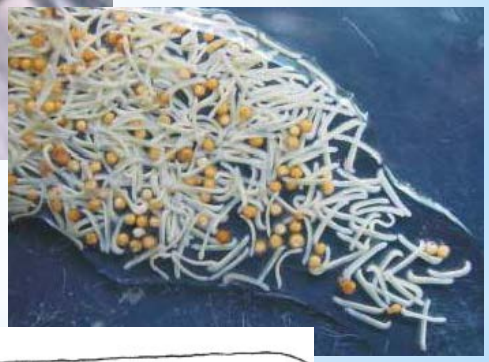
- **Yakima population functionally extinct - cultural & ecological loss**
- **Too many threats exist to expect recovery of natural production in a timely manner**
- **With severely depressed #s of P. lamprey, difficult to assess existing “threats”**
- **Tool to understand biology & limiting factors (vs. mining limited wild population)**
- **Develop techniques in conservation hatchery (in case we need it)**
- **“Experimental” in nature (focus on adaptive mgmt)**

Lessons Learned (Past)

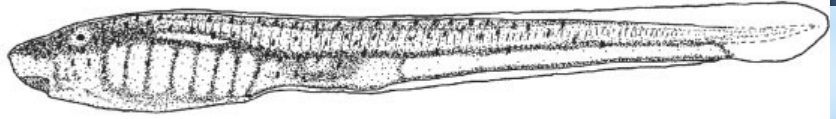
1. **Adult Holding**

2. **Propagation**

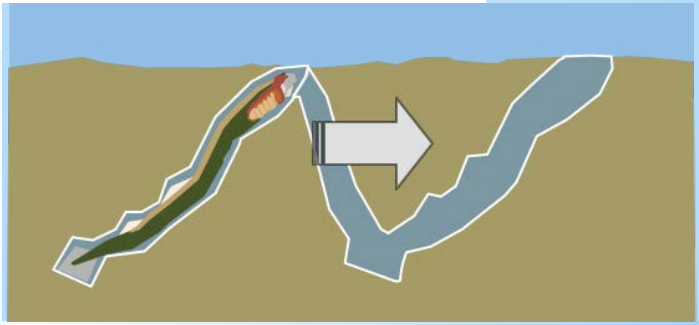
3. **Egg Incubation**



4. **Prolarvae**

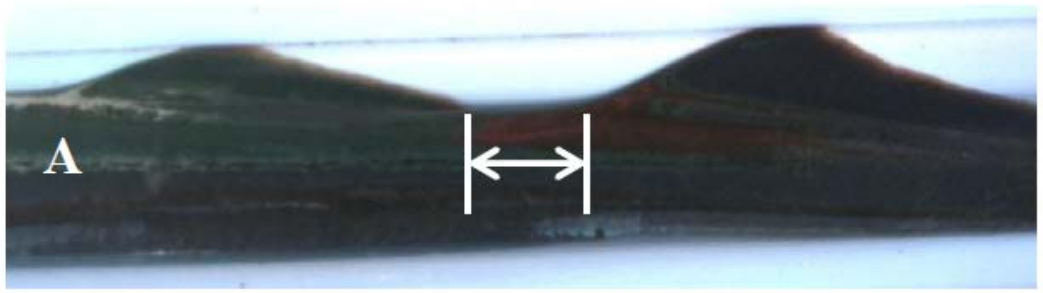


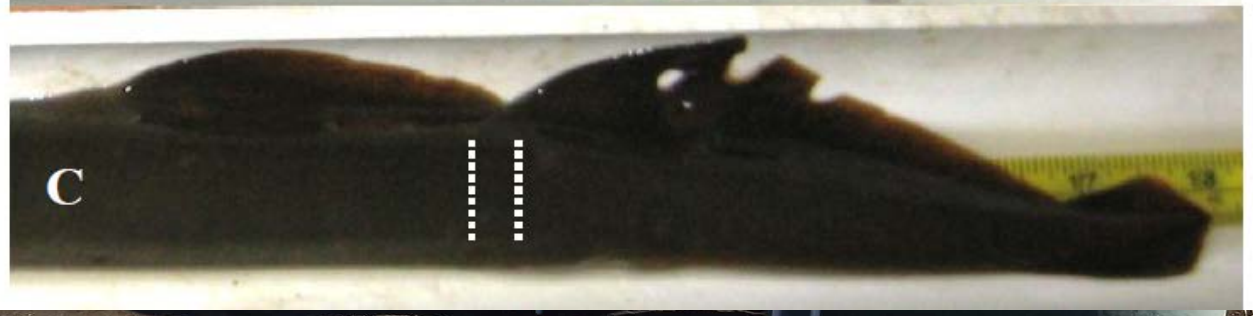
5. **Larvae**



1. Adults

i. Understanding sexual maturation process

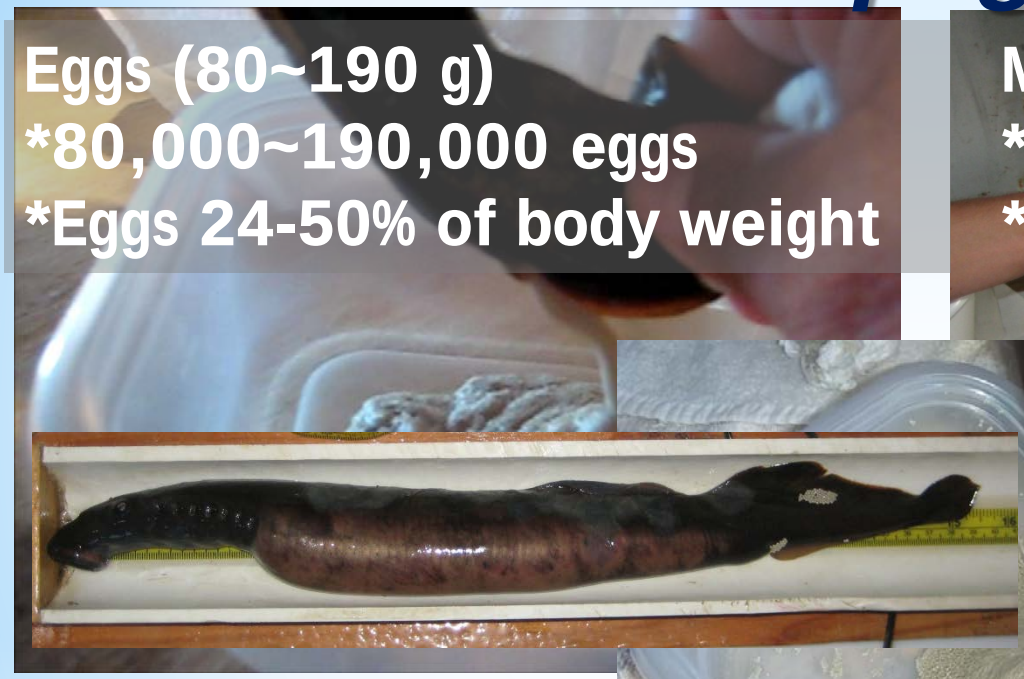




2. Propagation

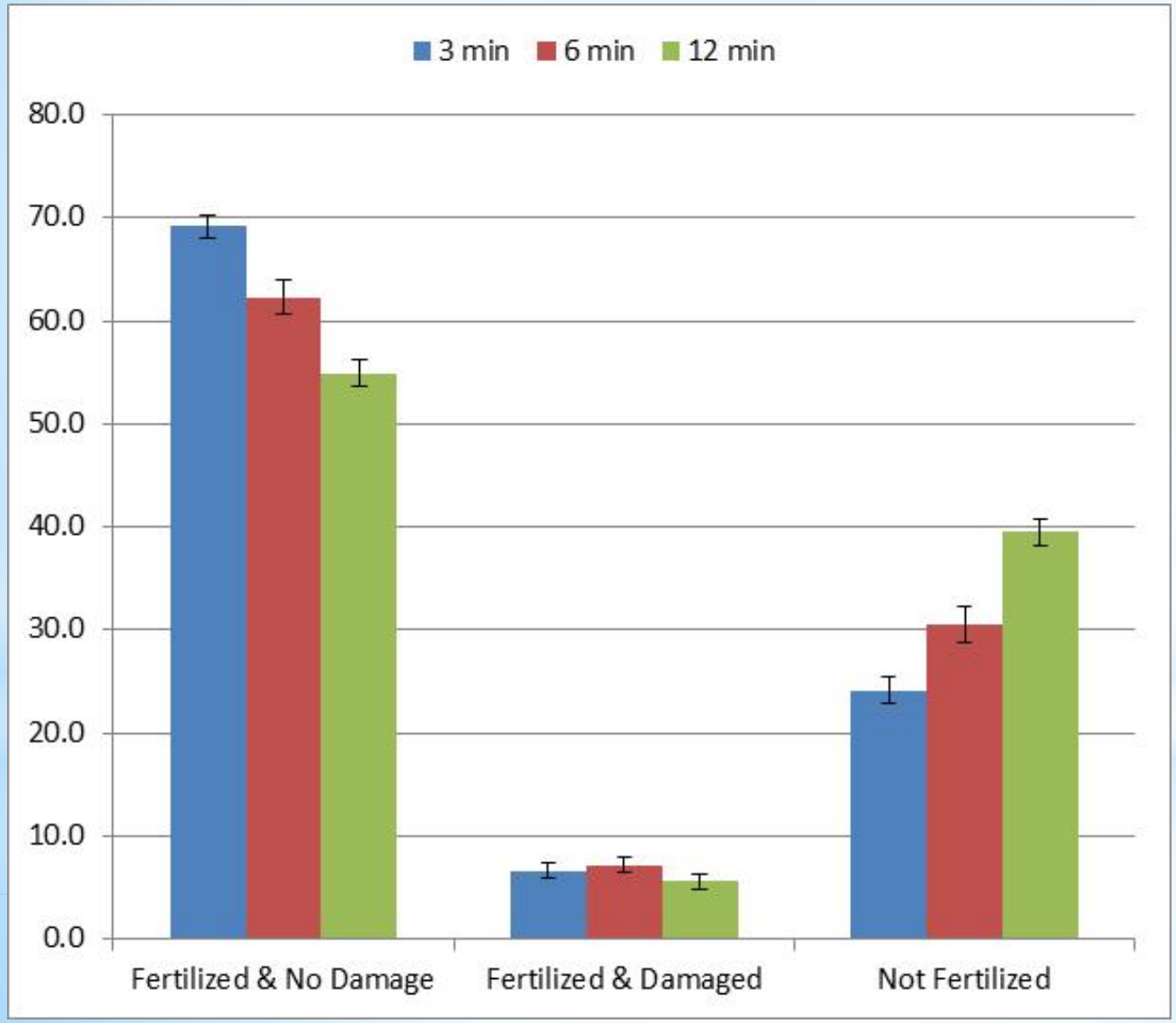
Eggs (80~190 g)
*80,000~190,000 eggs
*Eggs 24-50% of body weight

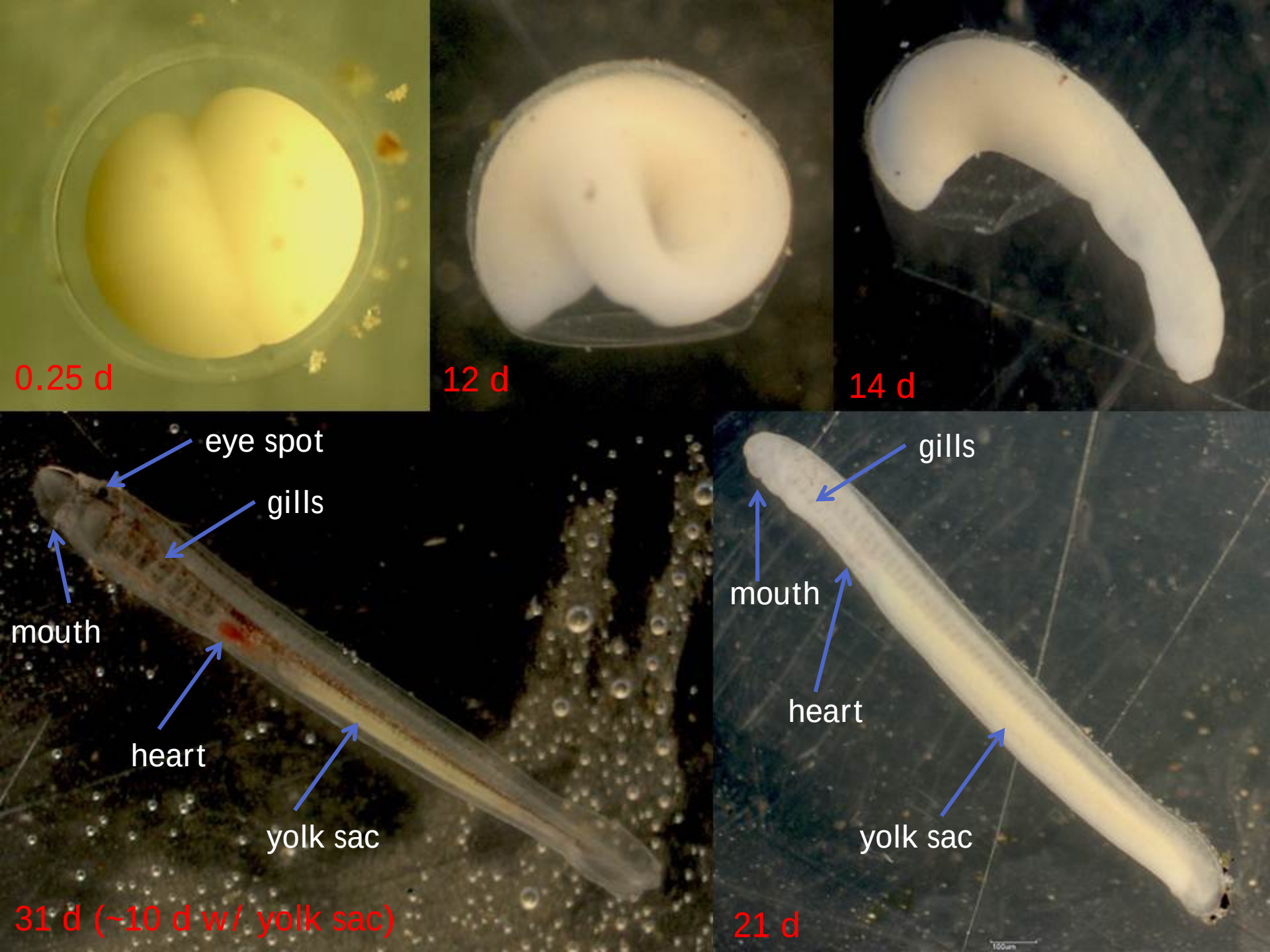
Milt (0.1~7.0 g)
*45% milt in 4 days
*75% milt in 8 days



i. When & how to mix eggs, milt & water
ii. Early vs. late season (i.e. stickiness & buoyancy)
iii. Timing of sexual maturation varies
(collaboration is key! preservation methods?)

Egg Incubation Tests (2013)



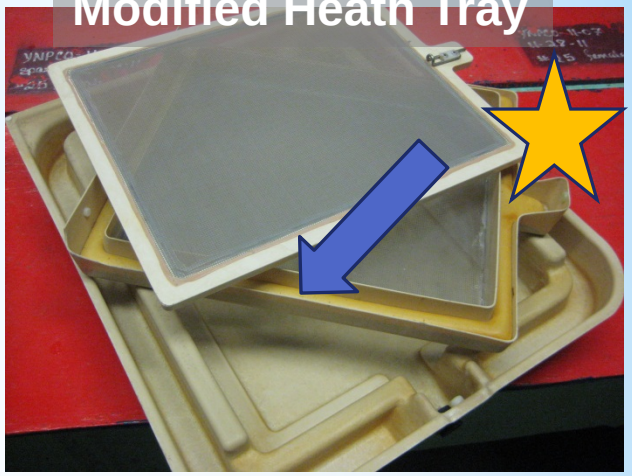

0.25 d
12 d
14 d
eye spot
gills
mouth
heart
yolk sac
31 d (~10 d w/ yolk sac)
gills
mouth
heart
yolk sac
21 d

Egg Incubation Tests (2012-2013)

McDonald Jars

Tuperware Method

Modified Heath Tray

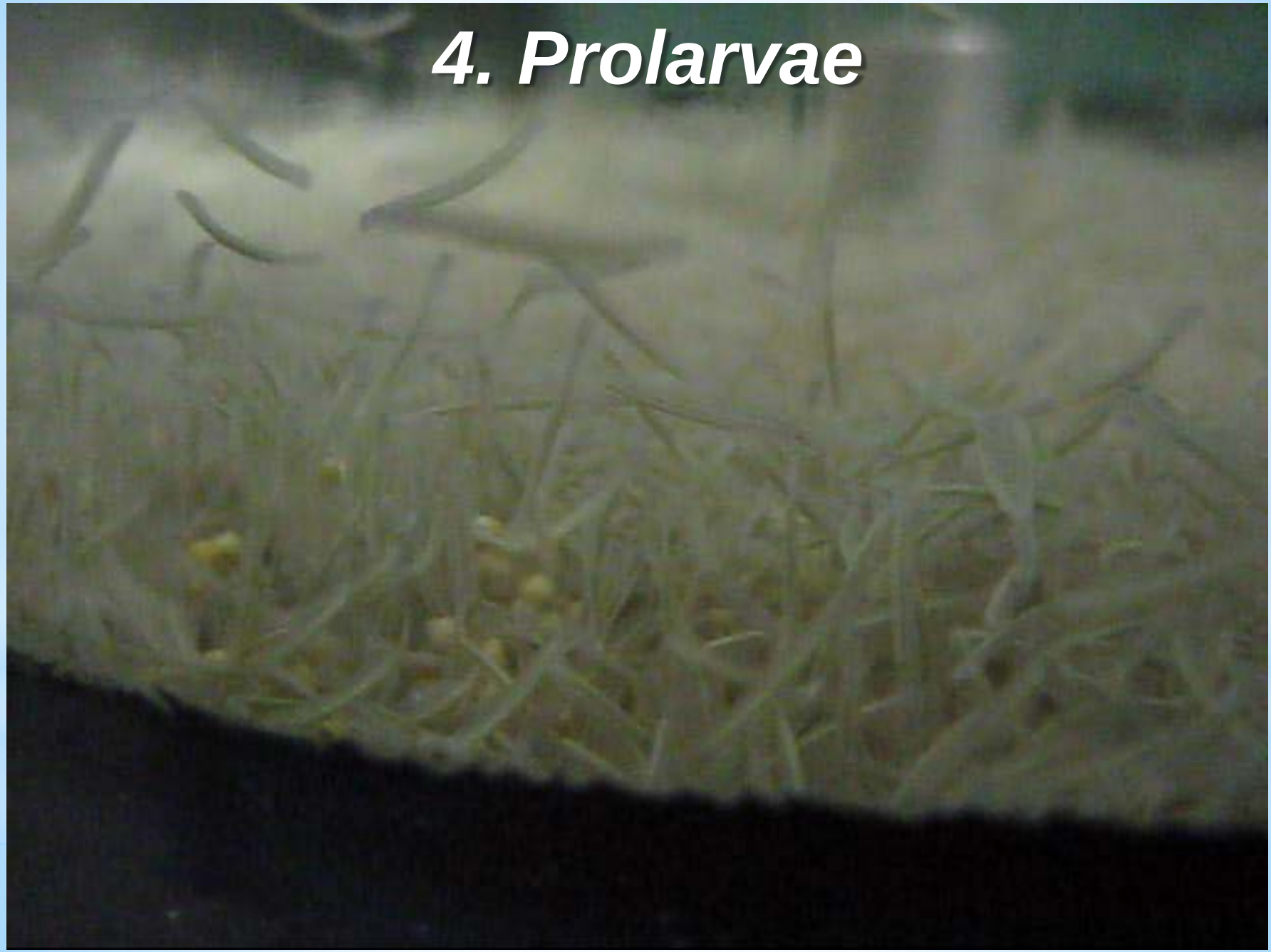


Eager Upwelling Jars

Downwelling Buckets

Flow Through Media

4. Prolarvae



What to Do with Prolarvae?

Simple

1. Add organisms into the bucket

Accurate

2. Press COUNT

Versatile

3. Witness accurate results in seconds

4. Larvae

Types of Feeds

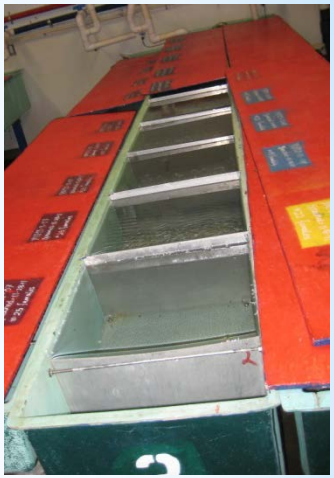
Dry Yeast

Spirulina

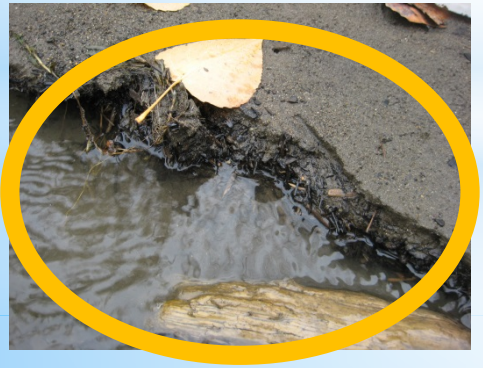
Art. Plankton

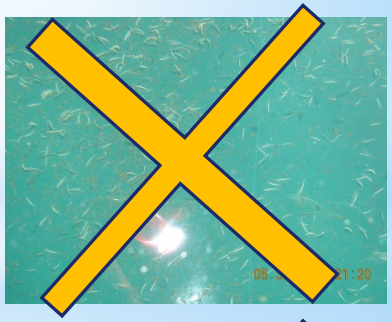
Hatchfry

Types of Tanks

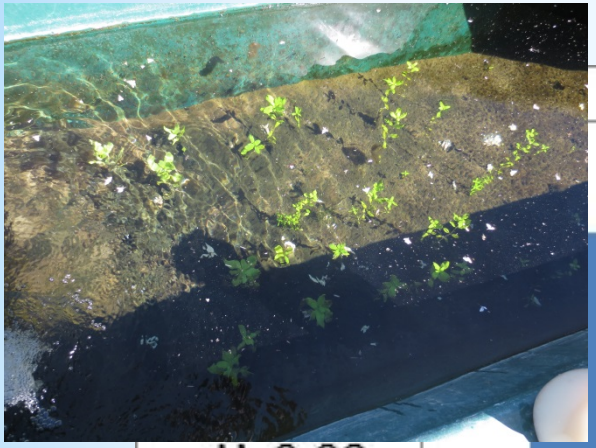


Types of Substrate



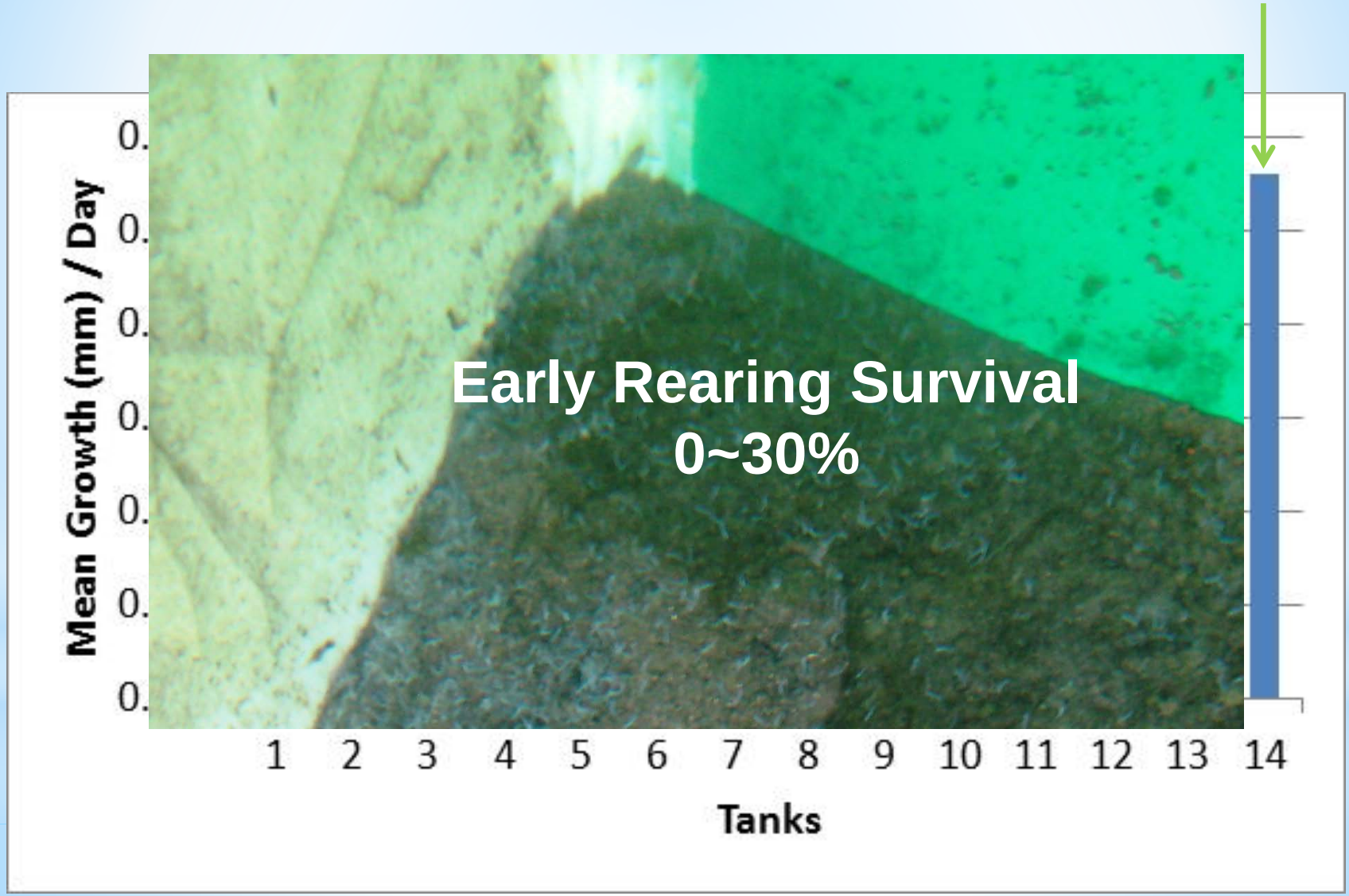


Larval Rearing Results



Larval Rearing Results

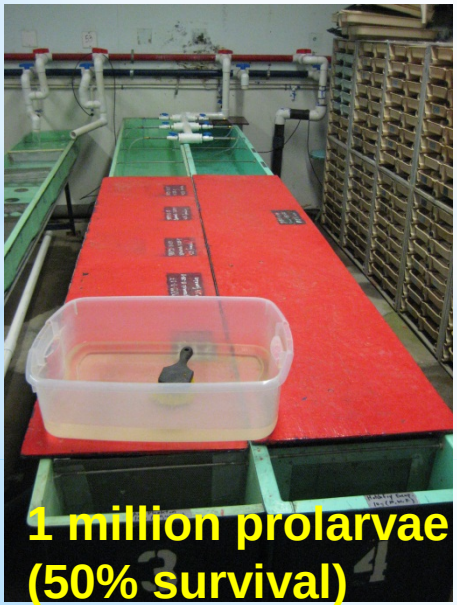
102 mm



Lamprey Production Scenario

20 females

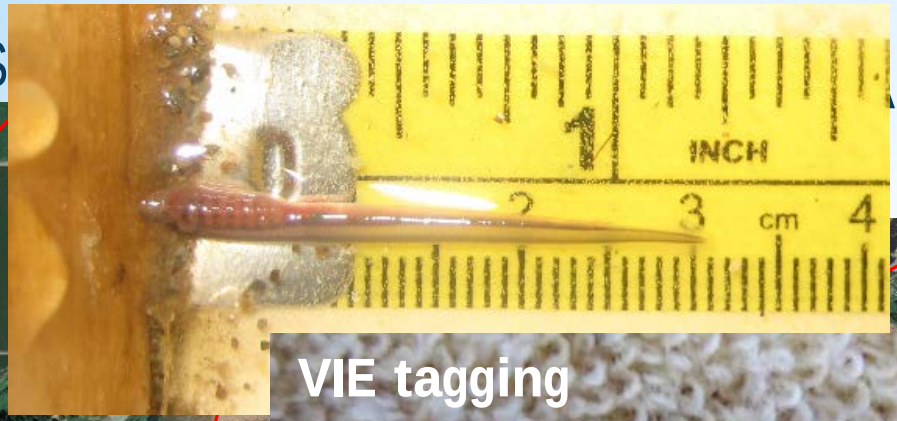
100,000 prolarvae / trough
-> 10 troughs (16’ x 1.5’)



10,000 larvae / tank
-> 50 tanks (9’ circular)

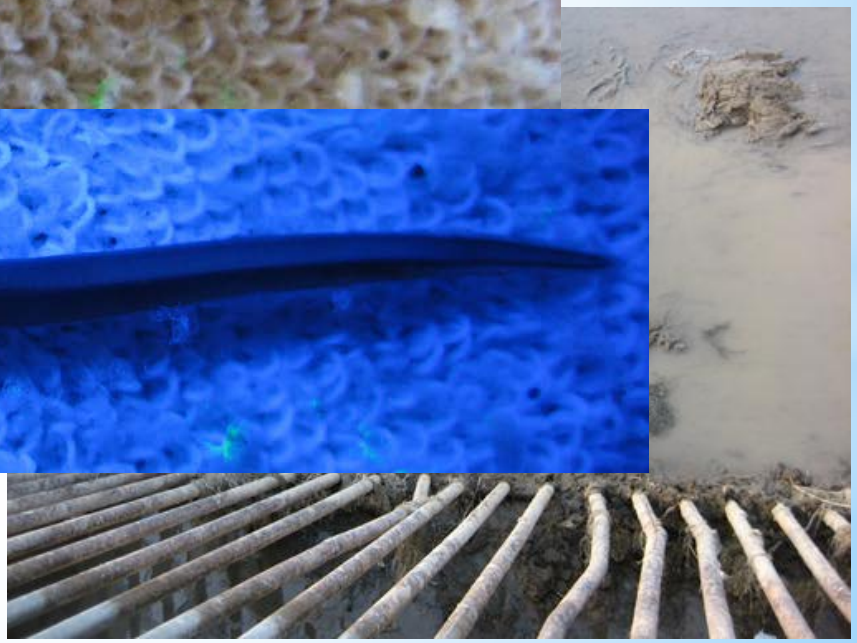
Potential Release Sites

S



cclimation Ponds

Canals



Lessons To Be Learned (Future)

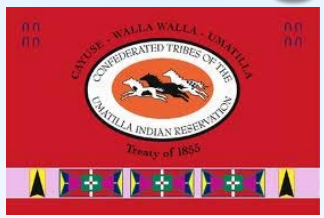
- **Refining propagation, incubation & larval rearing methods (prolarvae survival is key) – conservation hatchery techniques**
- **Use more larvae for entrainment, passage, & other survival studies (BPA 3-Step Process)**
- **Monitor survival, growth, & behavior from small scale outplanting projects (early life history)**
- **In the long term, learn more about life history & survival based on parentage assignment (Hess et al. 2014) & other genetic tools**

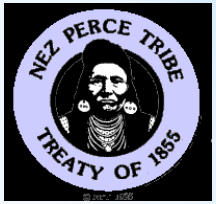
Back to the Wild!

Dialogue / Q&A

- Genetic risks
  - Source population & hatchery protocols
- Reduced fitness from captive-breeding
  - Focus on functionally extinct areas
- Decrease in abundance from donor areas
  - Set limits on degree of extraction (<4%)
- Moving fish to areas w/ substantial limiting factors
  - If it improves understanding of how to resolve these threats, may be worth it
- Introduction of pathogens and diseases
  - Lamprey appear to be naturally resistant to many of the problem pathogens & diseases

Acknowledgement





Partnership is key to our success!