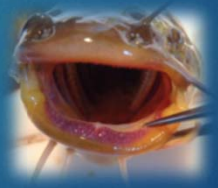
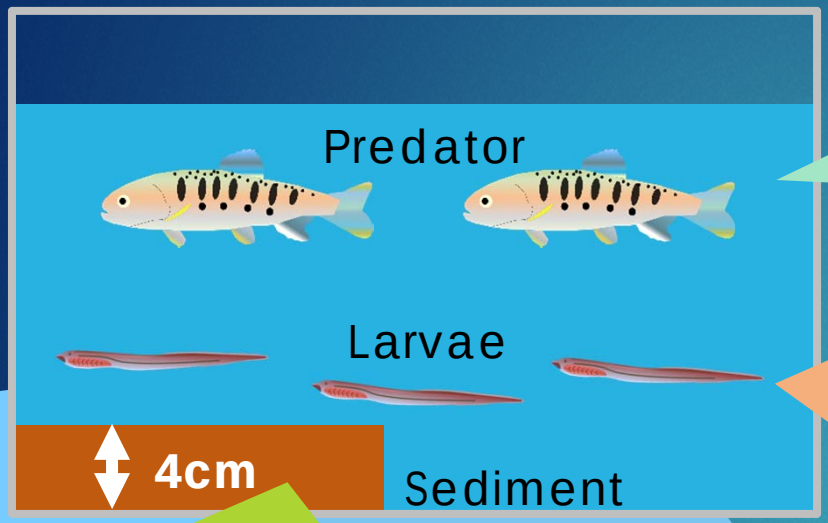
Got Lamprey???

- A study designed to examine "predation potential" to larval lamprey -

Yakama Nation Fisheries Hiroaki Arakawa & Ralph Lampman



Objective: to estimate the predation potential of native and non-native fishes to larval lamprey from experimental feeding study



Native Predators (7 species)
Non-Native Predators (3 species)
2 Size Classes (5 species)

Live Larvae (8/Fish; 64/m²)

YOY : < 30mm
Small : 30~60mm
Medium : 60~90mm
Large : 90~130mm

Dead Larvae (2/Fish)

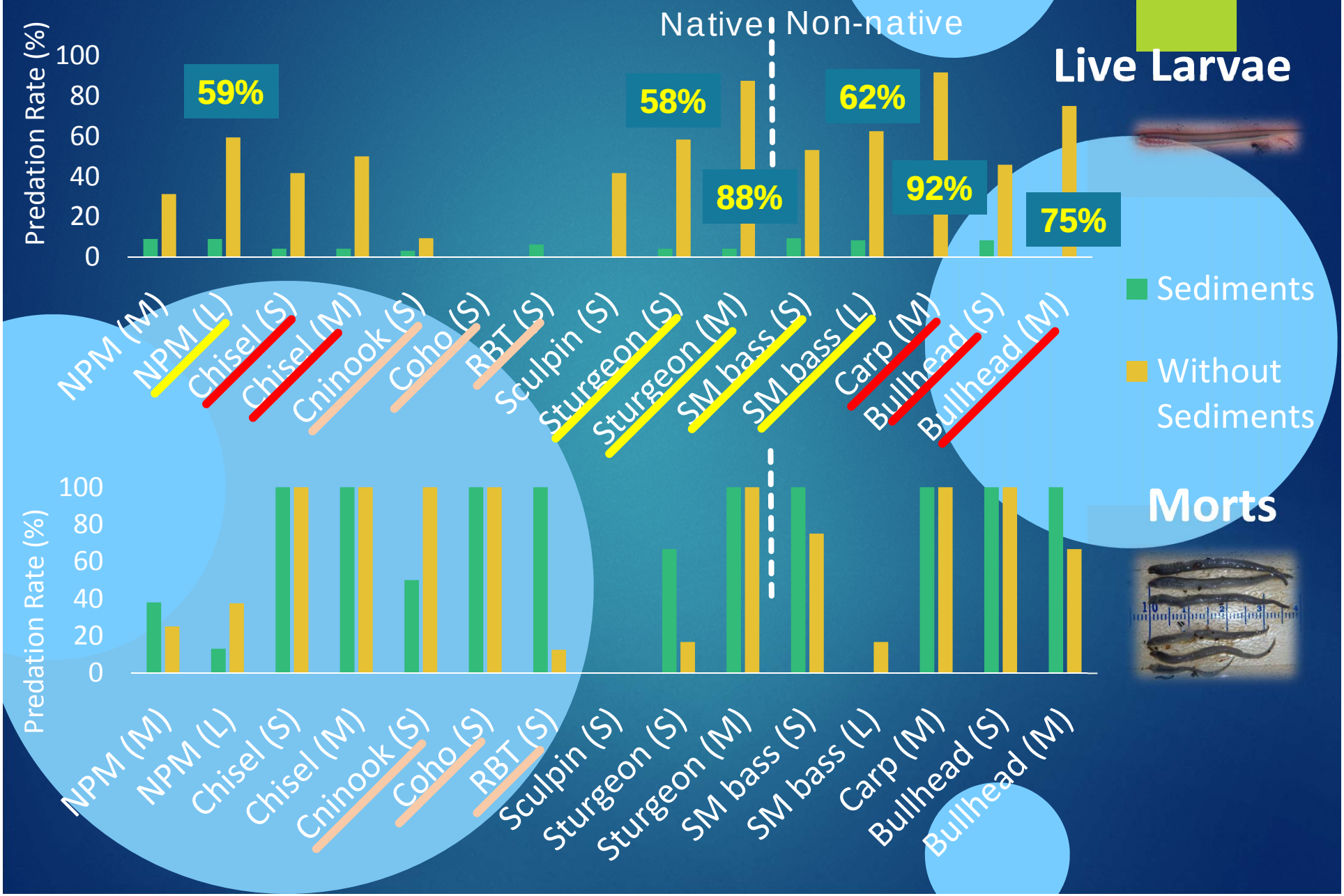
Morts : 20~40mm

Sediment vs **Without Sediment**

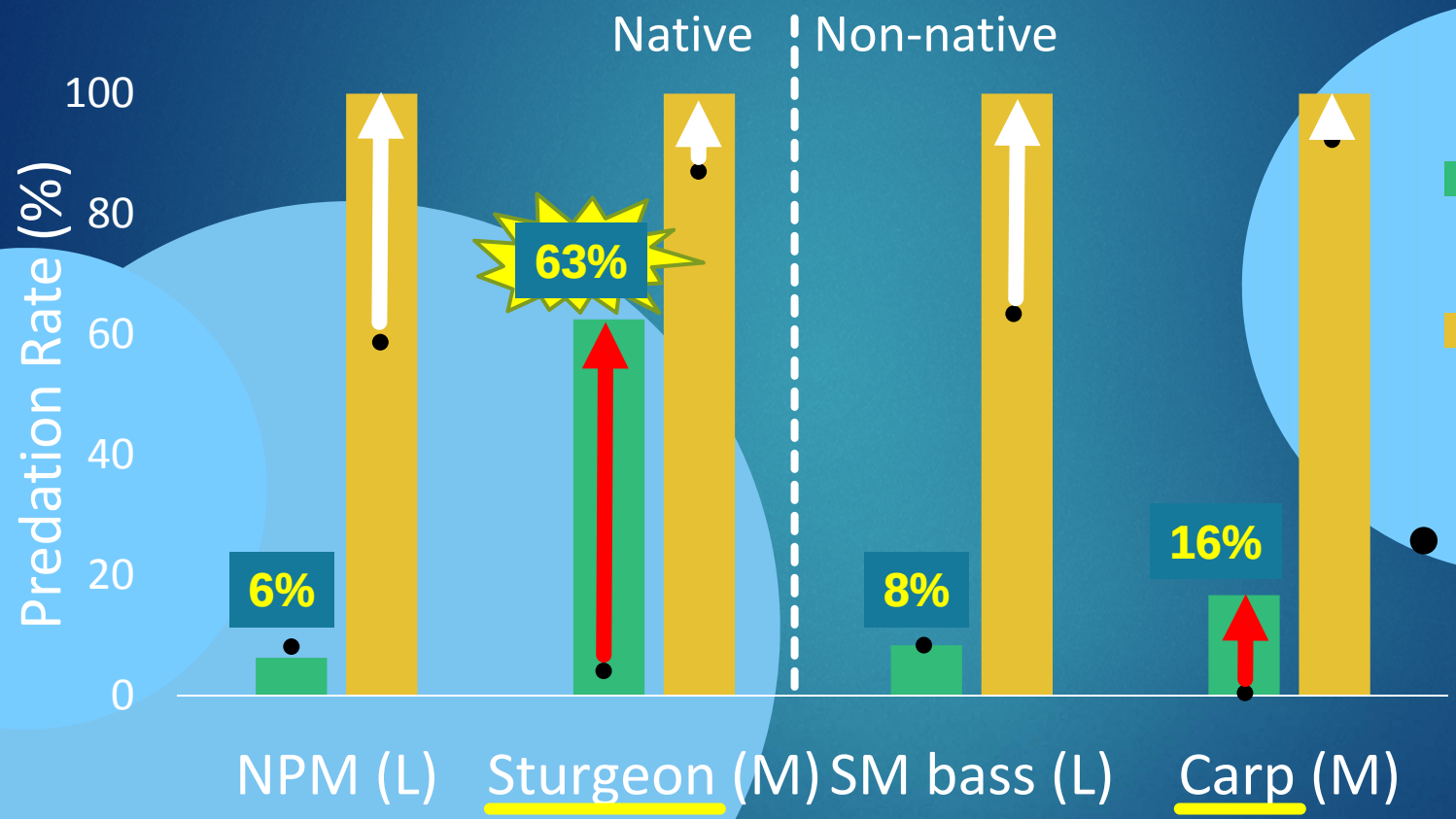
Short term (over 2 nights)

Long term (over 7 nights)

Predation Rates (Live and Morts) in Short Term

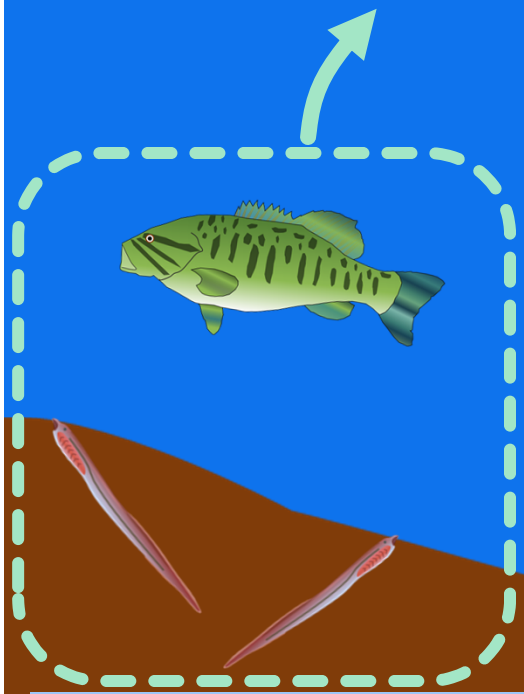


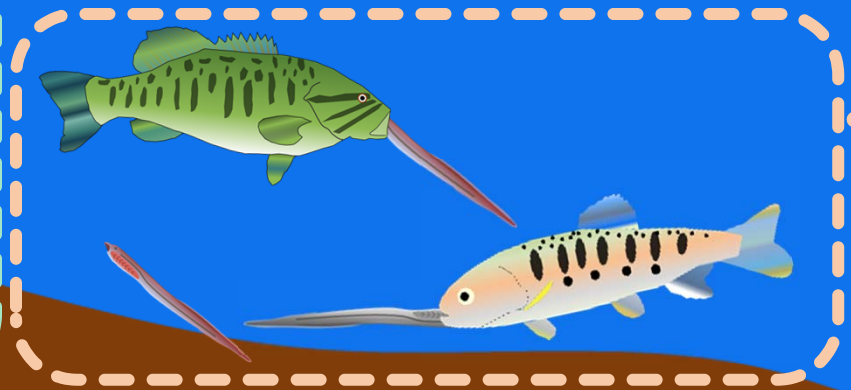
Predation Rates in Long term

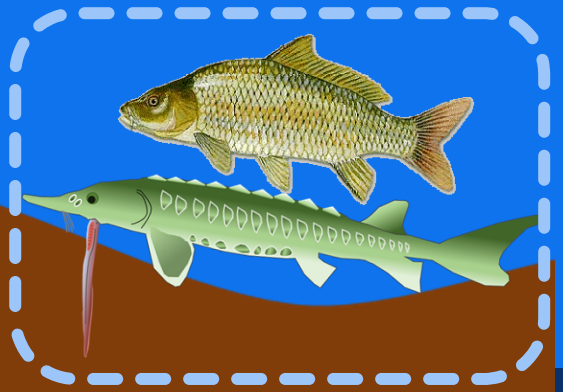


Very few predators preyed heavily on ammocoetes when fine sediment was present, indicating the importance of fine sediment habitat in protecting ammocoetes.

Juvenile salmonids had a preference of preying on dead ammocoetes and ate very few live ammocoetes; may be evidence of the distasteful skin secretion from live ammocoetes & relates to the feeding behavior of predator fish (chew vs. swallow).



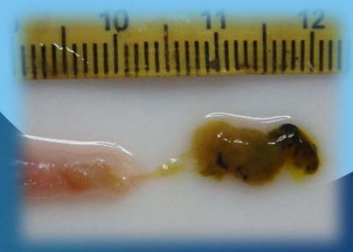




White Sturgeon & Common Carp (benthic feeders) displayed adeptness in preying on ammocoetes even when sediment was available.

Other Take Home Messages

- Without any bones, multiple lamprey can fit inside the gut of a predator fish (they can collapse in whatever shape and form).
- Lamprey predation is hard to accurately estimate due to larval and juvenile lamprey having no bones (less residuals in the gut, and faster break down time, likely resulting in underestimation of predation especially for larval lamprey).
- In addition to the well known salmon predators, even seemingly benign native and non-native fishes can gorge on larval lamprey.



For me…

27% of my weight??

Cheese Burger

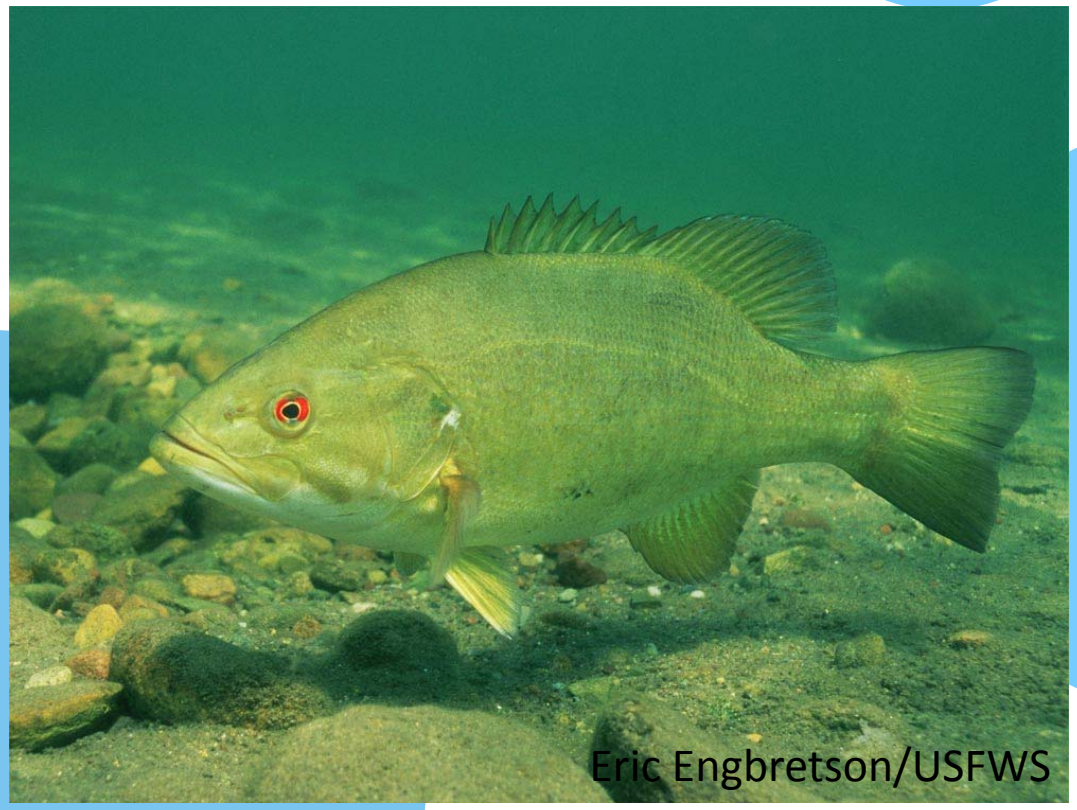
In two days

139 ! ! !

97

Takeru Kobayashi

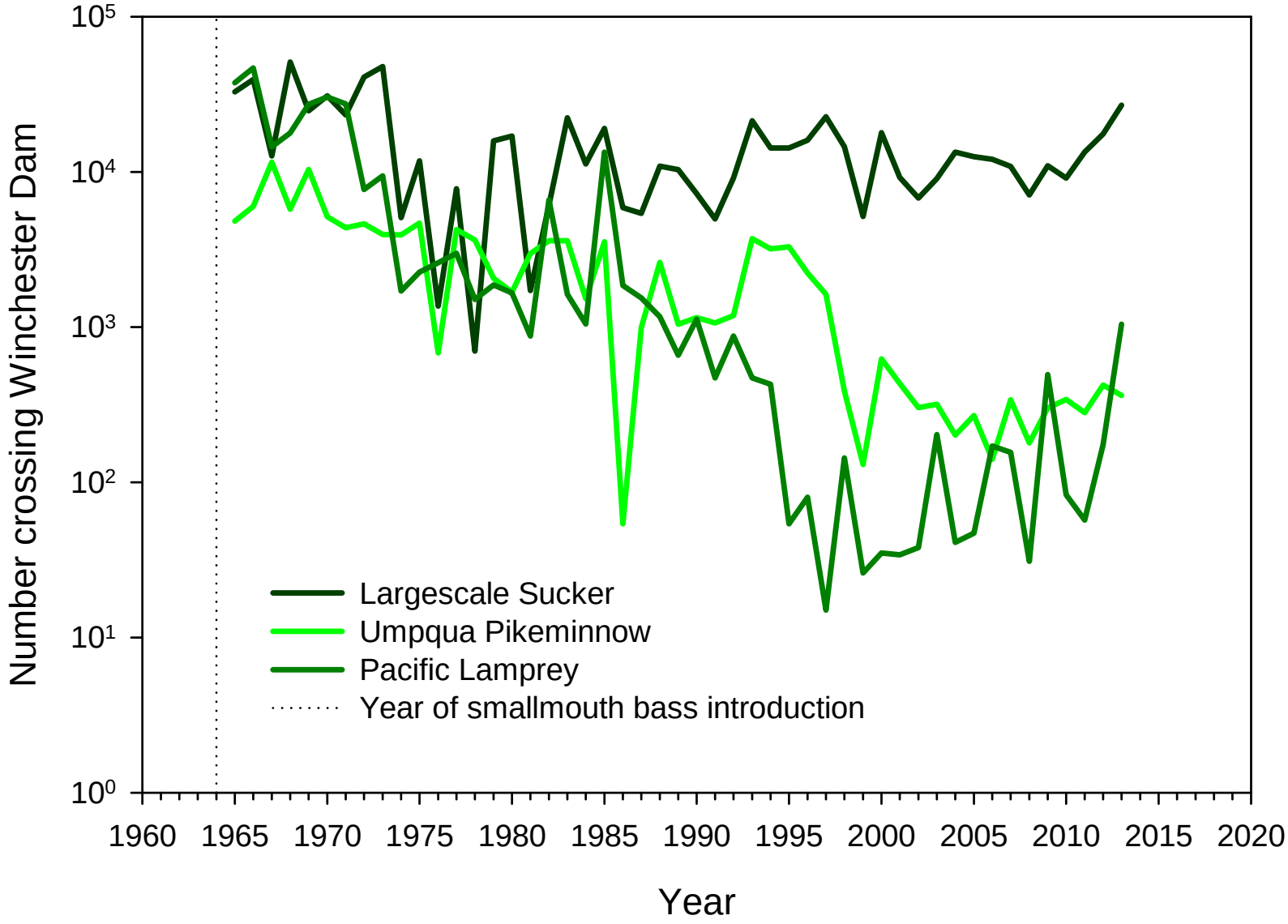
Smallmouth Bass Predation on Lamprey in the Umpqua Basin, Oregon



Kelly Coates- Cow Creek Umpqua Tribe
Jason Dunham, Colin Eagle-Smith, Michael Heck,
Brandon Kowalski, Luke Schultz - U.S. Geological Survey FRESC, Roseburg BLM

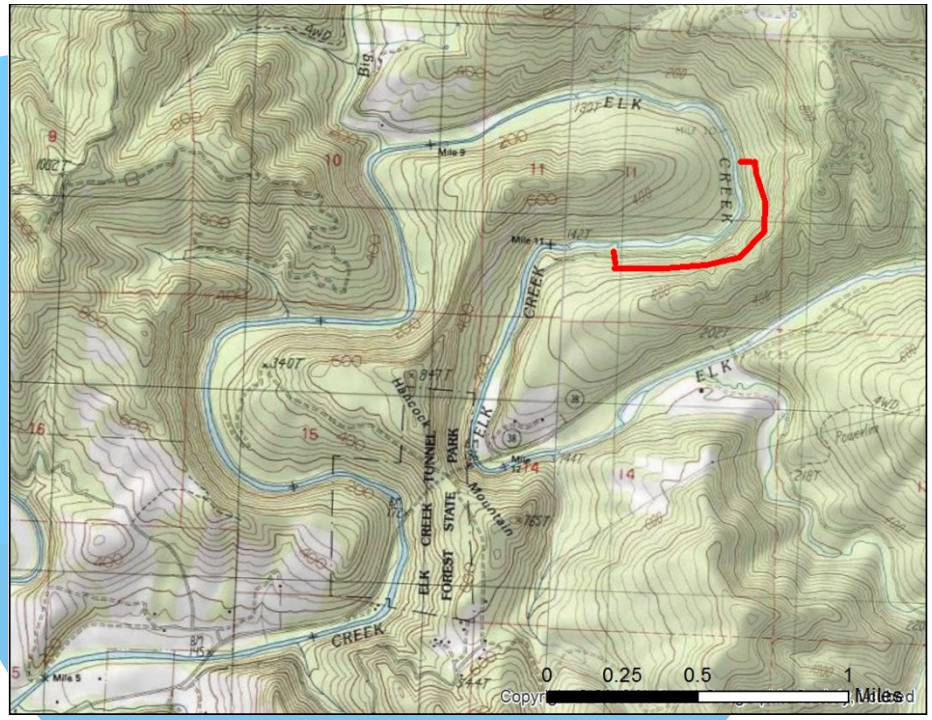
Funding from the U.S. Fish and Wildlife Service

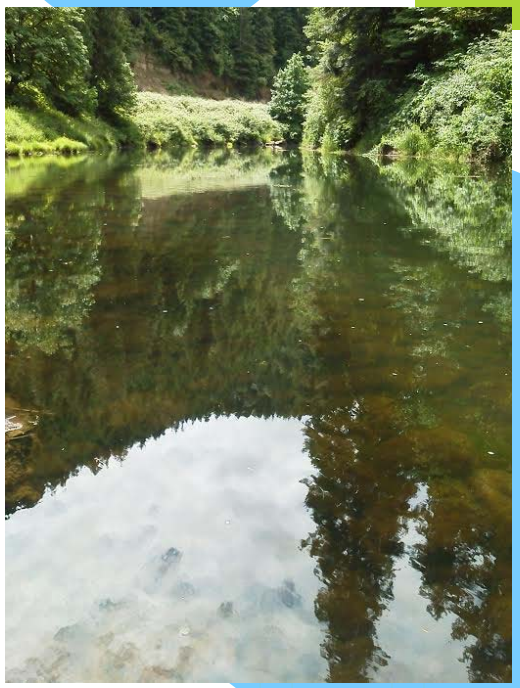
What happened *here*?



Study Site & Methods

- Lower Elk Creek, Oregon
- Large dammed pool (length 0.5 km)
- Lots of smallmouth bass
- Near the border between nonnative and native dominated assemblages





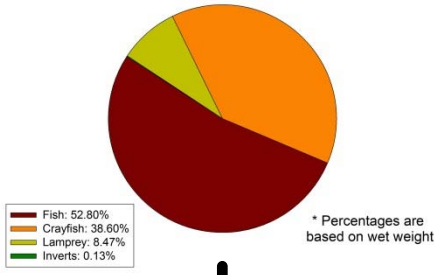
- 2 sampling events (July & Sept, 2013)
- Floy tagged fish in July to quantify growth of individuals
- Conducted mark-recapture in Sept to estimate population
- Took diet samples from 209 bass
- Monitored water temperatures

Bioenergetics

Hansen et al (1997)

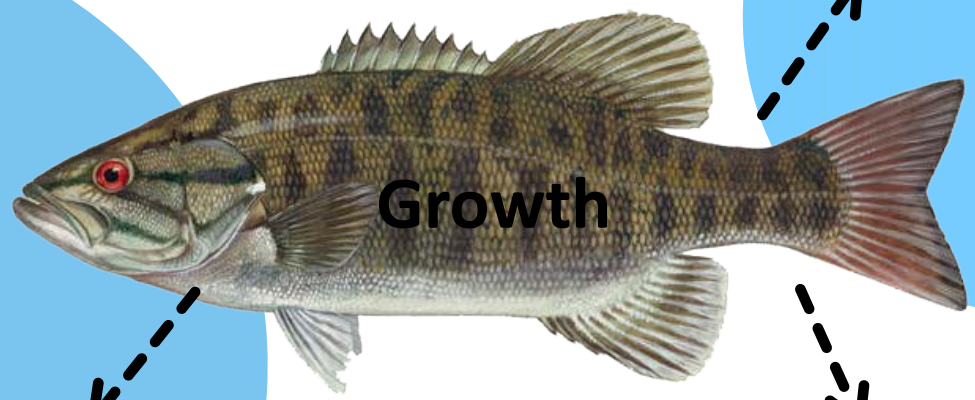
Whitledge et al (2003)

Prey energy



Consumption

Metabolism



Growth

Respiration

Excretion

Temperature, body size

Illustration: Duane Raver

How many lamprey eaten in 500m?

+/-50% change in the diet proportion of larval lamprey resulted in total consumption estimates of **1,013-2,937 larval lamprey**

North American Journal of Fisheries Management 37:714–723, 2017
© American Fisheries Society 2017
ISSN: 0275-5947 print / 1548-8675 online
DOI: https://doi.org/10.1080/02755947.2017.1317677

ARTICLE

Bioenergetics Models to Estimate Numbers of Larval Lampreys Consumed by Smallmouth Bass in Elk Creek, Oregon

L. D. Schultz,*[1] Michael P. Heck, Brandon M. Kowalski, and Collin A. Eagles-Smith
U.S. Geological Survey, Forest and Rangelands Ecosystems Science Center, 3200 Southwest Jefferson Way, Corvallis, Oregon 97331, USA

K. Coates
Cow Creek Band of the Umpqua Tribe of Indians, 2371 Northeast Stephens Street, Roseburg, Oregon 97470, USA

Jason B. Dunham
U.S. Geological Survey, Forest and Rangelands Ecosystems Science Center, 3200 Southwest Jefferson Way, Corvallis, Oregon 97331, USA

kcoates@cowcreek.com