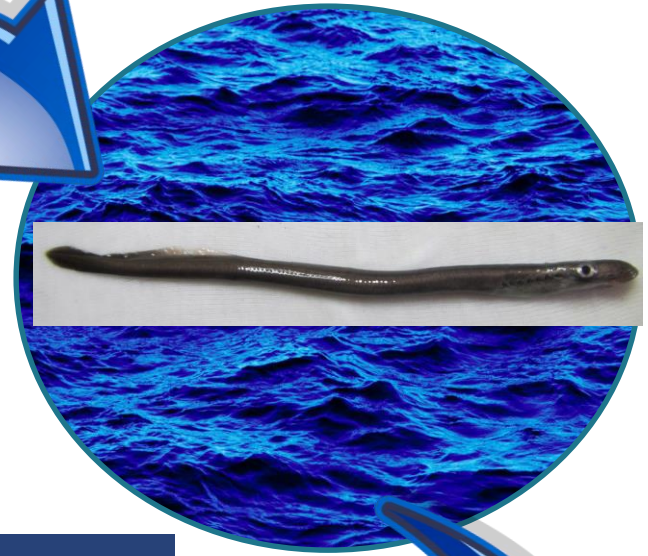


Pacific Lamprey: Larval and Juvenile Updates!

Yakama Nation Fisheries
Tyler Beals, Ralph Lampman, Hiroaki Arakawa
Presenter: Tyler Beals, Fish Biologist I

Pacific Lamprey Life Cycle



Larval Pacific Lamprey Updates in the Yakima Subbasin

- Distribution Summary of Pacific Lamprey Larvae
- Signs of translocation success from field monitoring
- Sediment Temperature Monitoring



Yakima River Mainstem

Pacific Lamprey Distribution



Yakima River Tributaries

Pacific Lamprey Distribution

- ▶ Downstream of Roza Dam
 - Satus Creek (RKM 12.9 – 42.3)
 - **Toppenish Creek (RKM 43.5 – 73.2)**
 - Ahtanum Creek (RKM 1.1 – 34.8)
 - Naches River (RKM 14.2 – 41.9)

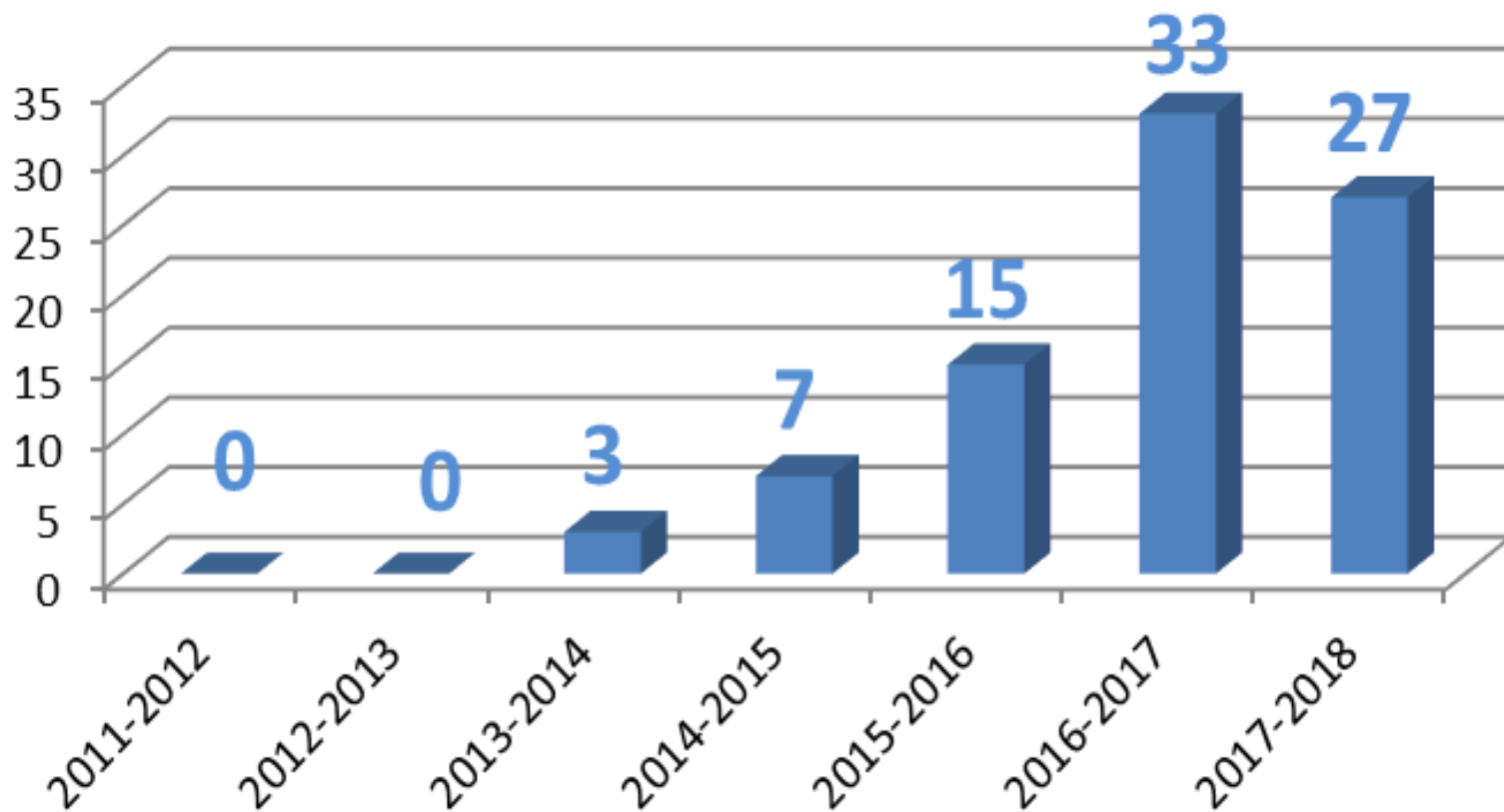
- ▶ Upstream of Roza Dam
 - Teanaway River (RKM 1.1 – 7.2)

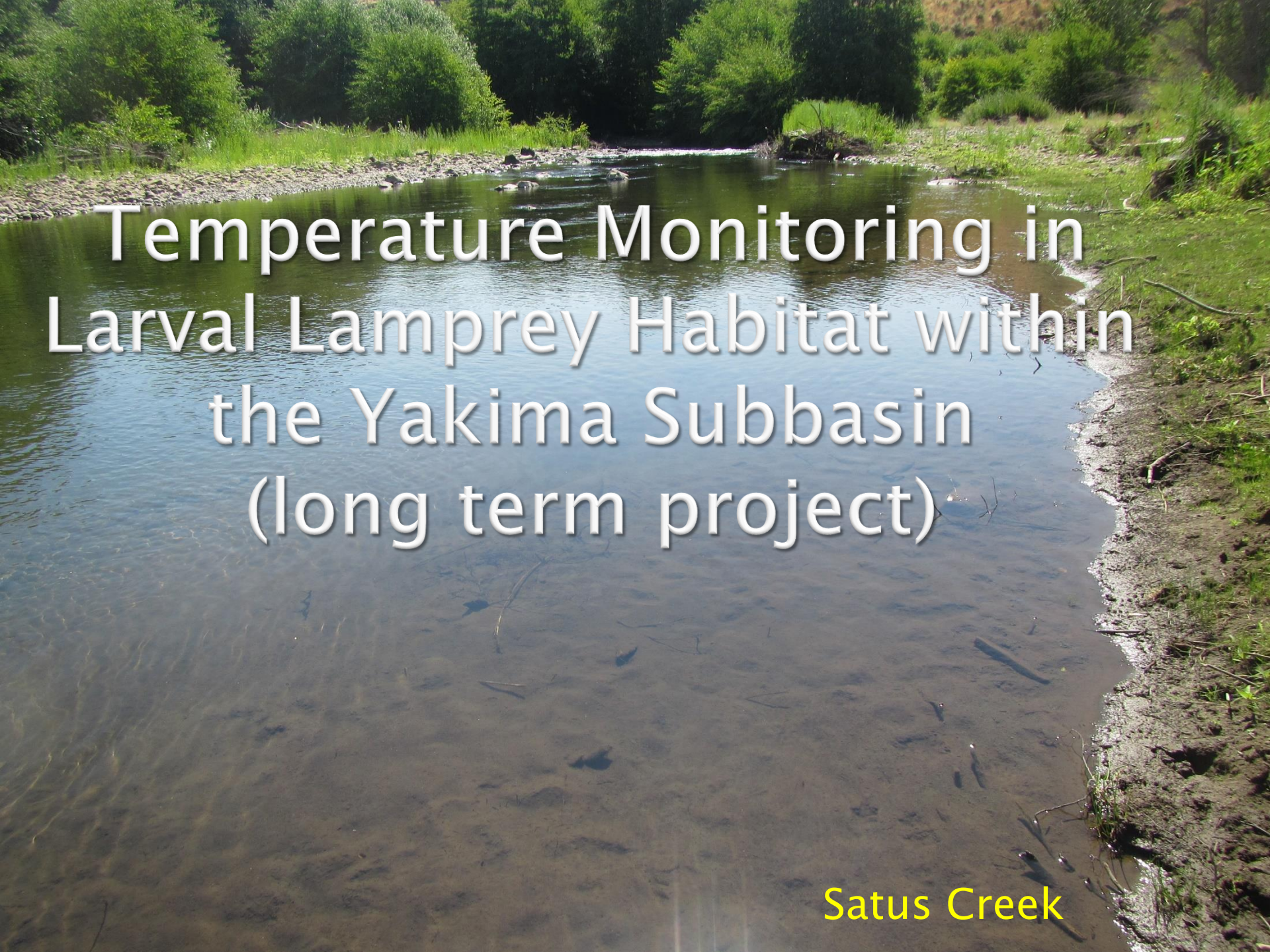
Locations where Pacific Lamprey have not been found (despite efforts to find them)....

- ▶ **Yakima River canyon reach** – (immediately upstream of Roza Dam).
 - Western Brook Lamprey are present.
- ▶ **Swauk Creek** (tributary of the upper Yakima River).
 - Western Brook Lamprey are present.
- ▶ **Cle Elum River**
 - Actually, no lamprey have been found in the Cle Elum River (except an isolated population in Cooper Lake and river upstream of the lake).

% Pacific Lamprey (vs. Western Brook/River Lamprey)

Wapato and Sunnyside Irrigation Diversions





Temperature Monitoring in
Larval Lamprey Habitat within
the Yakima Subbasin
(long term project)

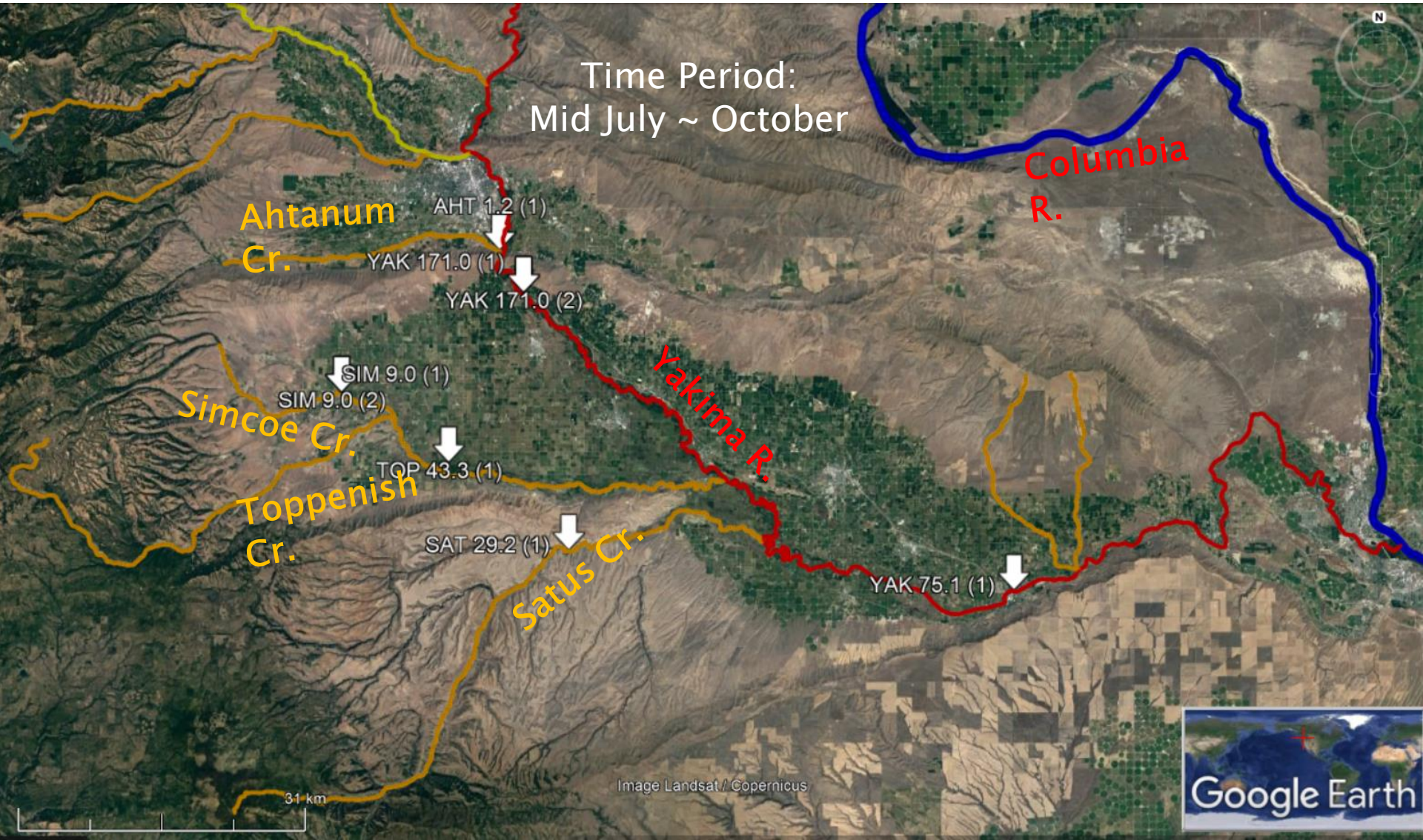
Satus Creek

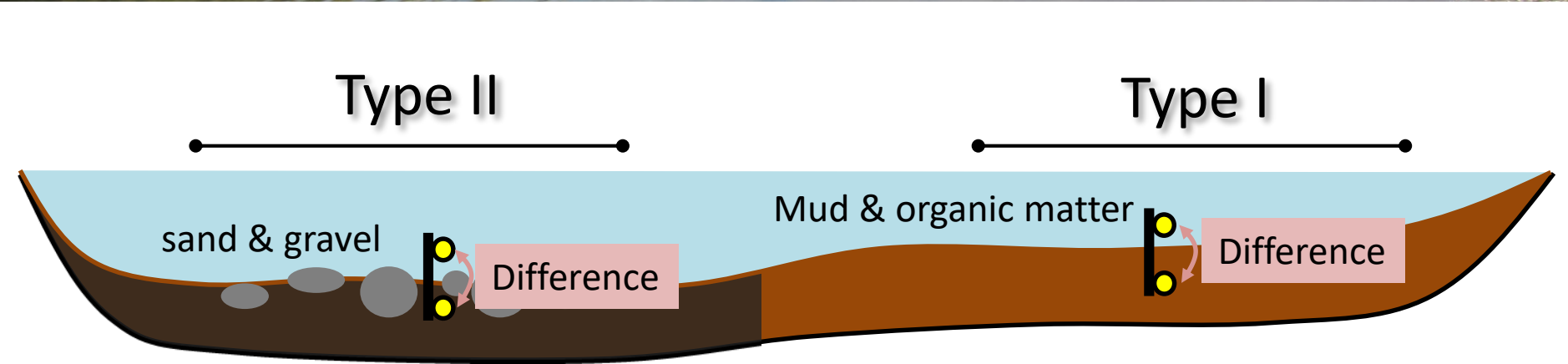
Temperature Monitoring Sites (6 Sites)

2 on Mainstem Yakima, 4 on Yakima Tributaries

[Plot Temp, Subsurface Temp (Type I / II)]

July–August, 2017



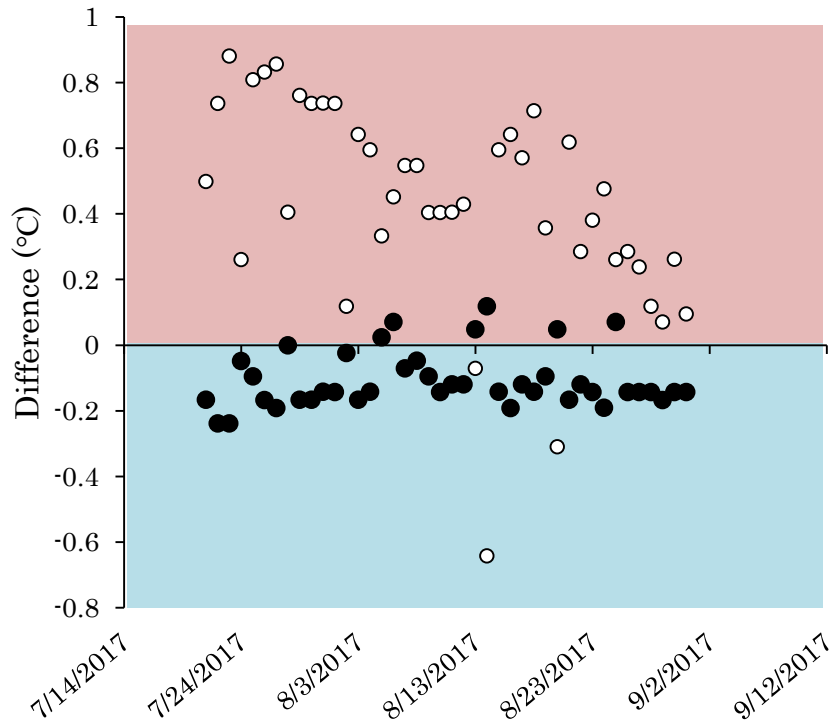


*Type I & II Habitat Probe buried inside sediment by **10 cm**
(typical depth range of larval lamprey)

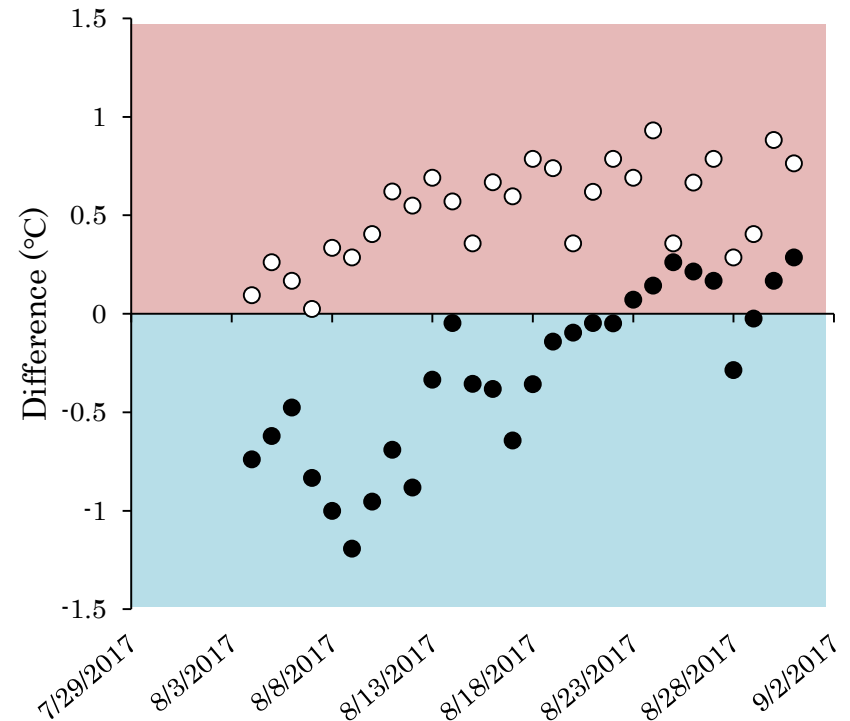


Type I (●) VS Type II (○)

Simcoe River



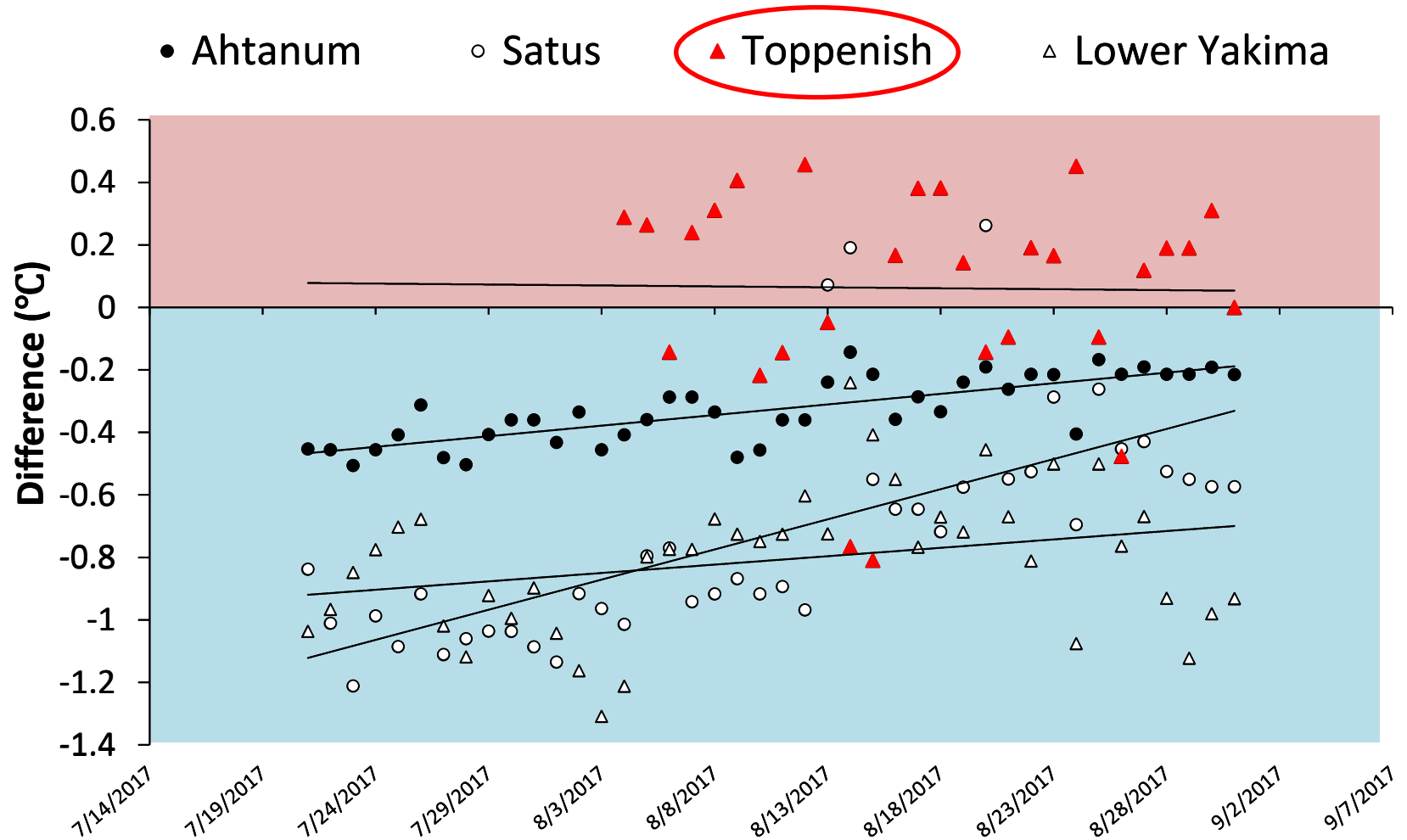
Yakima River



- ✓ Daily max temp within sediment was cooler than above sediment in Type I Habitat (Type II was warmer).

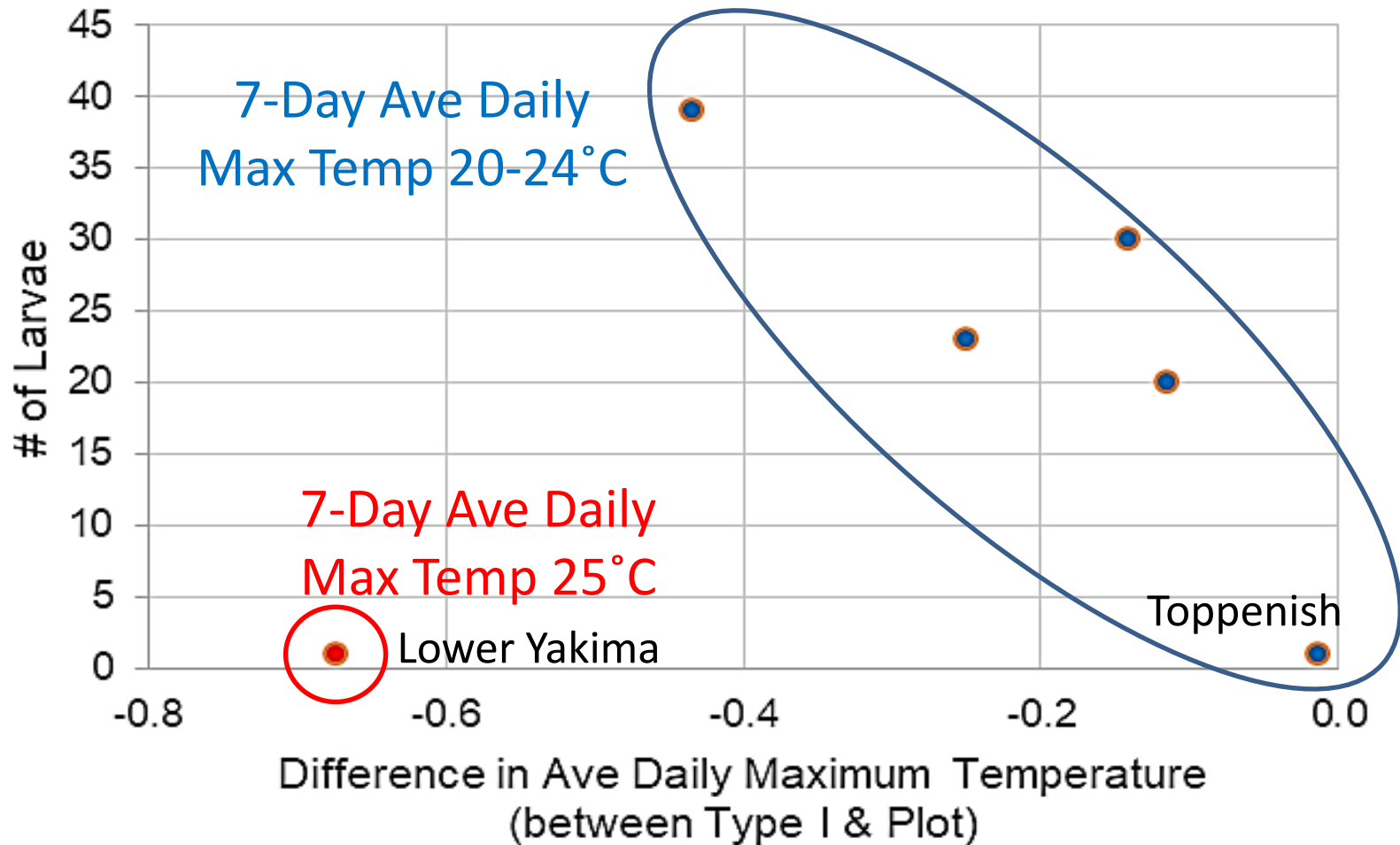


Diversity of thermal dynamics in Type I





Relationship with thermal refugia & larval abundance?



Macrophthalmia

(Smolt/Juvenile)

Pacific Lamprey Updates

- Toppenish Creek Screw Trap Macrophthalmia
- Lamprey Acoustic Tagging Study (Dummy Tag Portion)
- River Lamprey smolts in Lower Yakima River.



Macrophthalmia in Toppenish Creek Screw Traps

- ▶ **Adult Translocation began in 2013 (tributary of lower Yakima River)**
- ▶ **Two Screw Traps (~42.6 RKM apart)**
 - **Upper Toppenish (RKM 44.6) – 297 Captured, 188 pit tagged (8mm)**
 - **Lower Toppenish (RKM 2.0) – 350 captured, 129 pit tagged (8mm)**
- ▶ **Initially worried low abundance of Pacific Lamprey in Toppenish Creek from habitat surveys (compared to other tributary translocation streams).**
- ▶ **Increase in Toppenish Creek macrophthalmia numbers is a good sign!**

Macrophthalmia in Toppenish Creek Screw Traps

Preliminary Results

- ▶ **For Toppenish Upper Trap (river km 44.6)**
 - Estimated Trap Efficiency (macro) – 2.6% (0.0–7.0%)
 - Estimated Population (macro) – 11,345 (6,953–32,967)

- ▶ **For Toppenish Lower Trap (river km 2.0)**
 - Estimated Trap Efficiency (macro) – 3.1% (0.0–16.7%)
 - Estimated Population (macro) – 11,410 (7,875–16,713)

- ▶ **Travel Speed from Upper Trap to Lower Trap**
 - Average 7.4 rkm/day (3.3–10.7 km/day)
 - (based on 42.6 km distance of travel)
 - Those released <5.3 km upstream of screw traps all traveled in 1 night

Lamprey Acoustic Telemetry Study

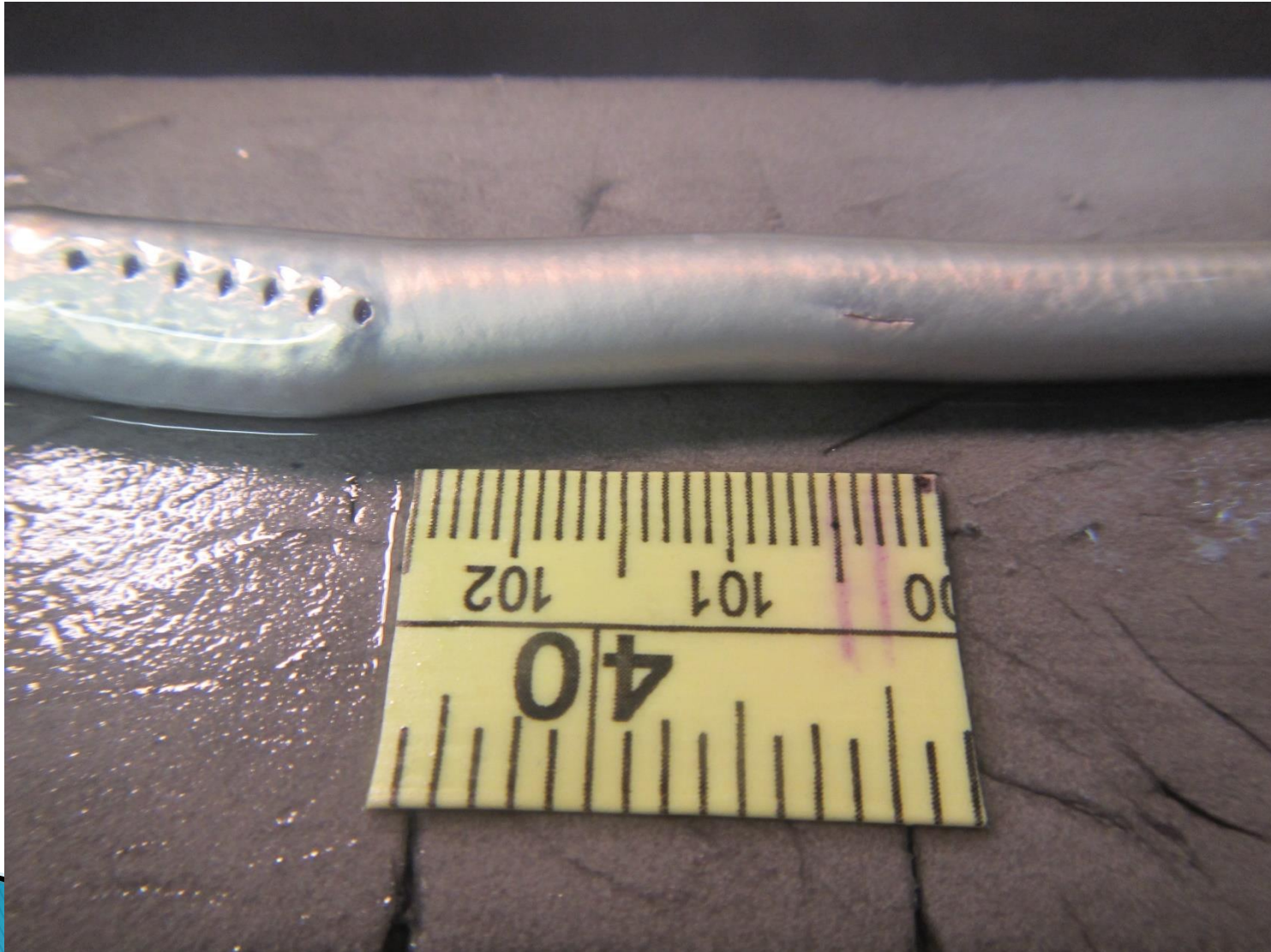
(Led by USGS and Yakama Nation)

- ▶ PNNL developed 12 mm acoustic tag for lamprey.
- ▶ 97 acoustic tagged lamprey released in the Yakima River (two locations)
- ▶ 31 dummy tags (modified pit tags designed to mimic acoustic tags); same outer layer, dimensions, weight etc.
- ▶ Lamprey held in 10–gallon aquariums for a minimum of 30 days.
- ▶ 100% well water
- ▶ “~ Equal” number of control lamprey in each aquarium (no tags)

Overview of Tag Placement



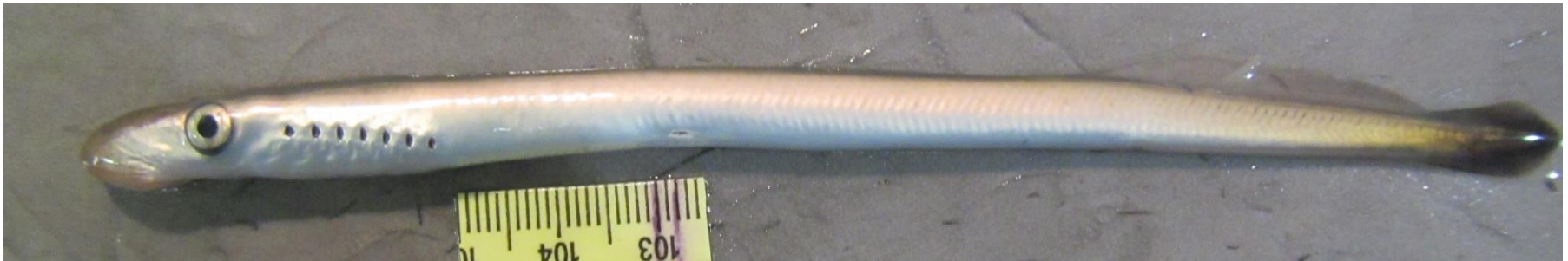
Overview of tag placement



Fungus Issue!



Example of Macrophthalmia with white fungus growth (inside red circle); Saprolegnia (most likely).



Example of Macrophthalmia without white fungus growth

Treatments for Fungus

35% Perox-aide[©]

50 mg / L ✓

100 mg / L ✓

~~200 mg / L~~

Formalin

6000:1 ✓

4500:1 ✓

3000:1 ✓

~~600:1~~

Salt

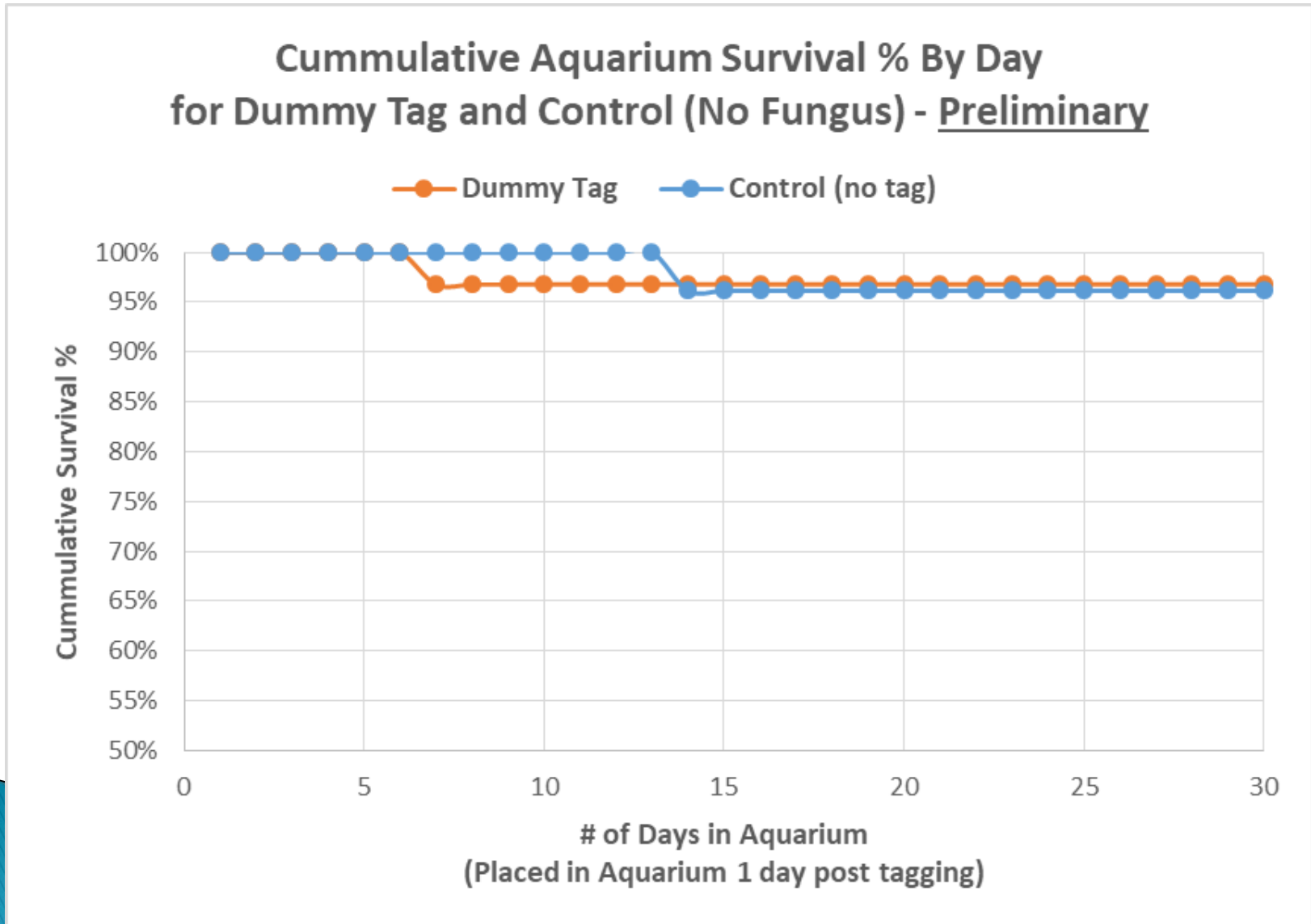
3% ✓

Weight by Volume

- 35% Perox-aide[©] treat fungus for Dummy Tag/Control fish.
- 2–3 consecutive treatments per week (each 1 hour long)
- 100 mg/L peroxide concentration – highest concentration of peroxide with no observable stress that we tried.
- Untagged (“extra”) Macrophthalmia used to “safety test” different concentrations of peroxide PRIOR TO treatment on Dummy Tag Fish. Additional treatments were only performed on these untagged macrophthalmia.
- No Macrophthalmia died during the treatments listed above; none are lethal higher concentrations.

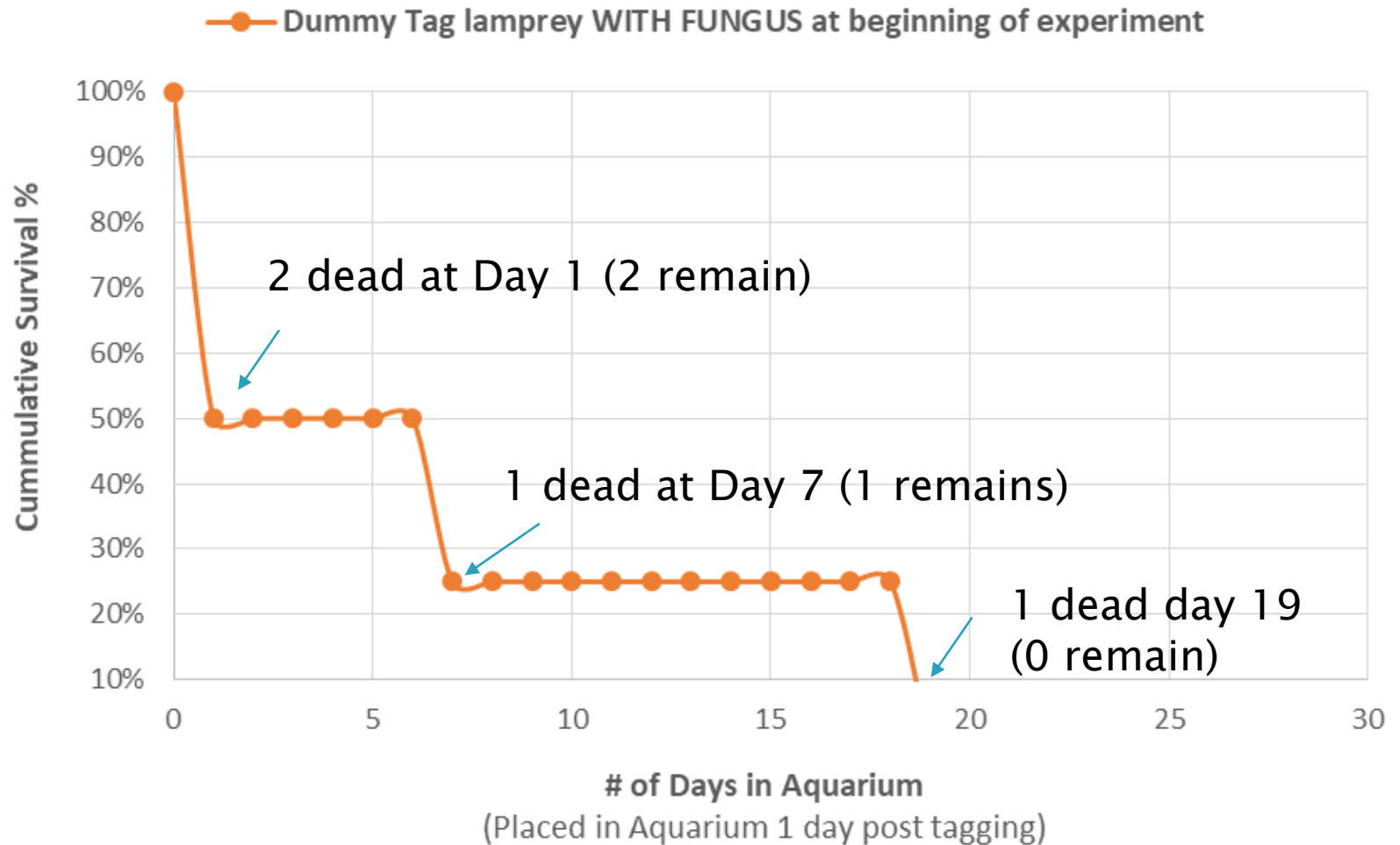
N = 27 Dummy Tags (no fungus to start)
97% Survival (1 mort at day 7)

N = 26 Control (no fungus to start)
96% Survival (1 mort at day 14)



N = 4 Dummy Tags (fungus present when tagged)
0 % Survival (all dead by day 19)

Cummulative Aquarium Survival % By Day for FUNGUS Dummy Tags



Western River Lamprey!!

- 2 smolts captured at Chandler Diversion Bypass Monitoring Facility (May, 2018)
- Diversion canal off of Prosser Dam (Lower Yakima River)
- 1 acoustically tagged (!) and 1 pit tagged the second)
- Rare capture (1–3 a year for the past few years); known to inhabit only lower rivers near ocean.



Questions???

Tyler Beals (509) 831-2267, beat@yakamafish-nsn.gov.
Ralph Lampman (509) 388-3871, lamr@yakamafish-nsn.gov

Additional Messages!

→ **Diversion Salvage; We need help saving lamprey (all are welcome)!**

- We are salvaging (through electrofishing) between 10,000 and 30,000 larval/juvenile lampreys from irrigation diversions in the Yakima Subbasin each season.
- Timing –
 - July 1-15 – Ahtanum Irrigation Diversion shut off (lots of lamprey in these small diversions!)
 - October 1 – March 15 – Irrigation shut off season for mainstem irrigation diversions. Thousands of lampreys need our help!!!
 - Contact either Tyler Beals or Ralph Lampman for more information

→ **Lamprey Identification Guide Available!**

- Contact either Ralph or Tyler for a PDF version of the lamprey ID guide.