

REFUGE OR RISK

Impacts of Irrigation Diversions on Larval/Juvenile Lamprey in the Yakima River Basin



**BONNEVILLE
POWER ADMINISTRATION**



Yakama Nation Fisheries: Pacific Lamprey Recovery Project

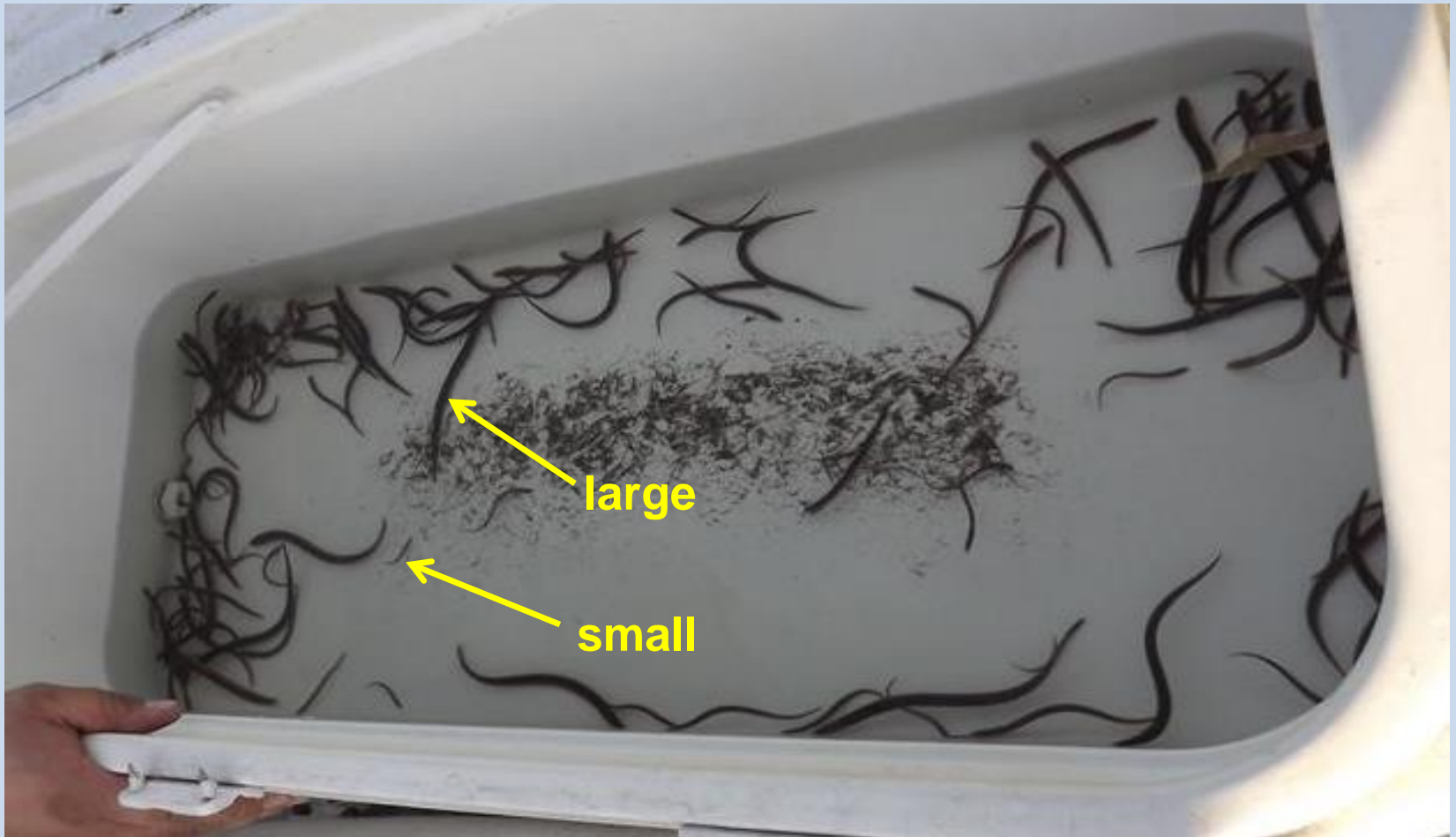
Tyler Beals, Ralph Lampman, Bob Rose, Dave'y Lumley, Sean Goudy, Frank Spillar
and Kaylei Ryan

Overview

- **Background**
 - Lamprey vs. Irrigation Diversions
- **Lamprey Entrainment and Impacts**
- **Short-term and Long-term Solutions**
- **Entrainment Pit tag Study**
- **Wenatchee River – Dryden Diversion**

Background

Hundreds of thousands of juvenile and larval lampreys are found each year in dewatered diversions





Lamprey Species

(Yakima River Basin)



Western River Lamprey



Western Brood

Photo by Gary Susac, ODFW

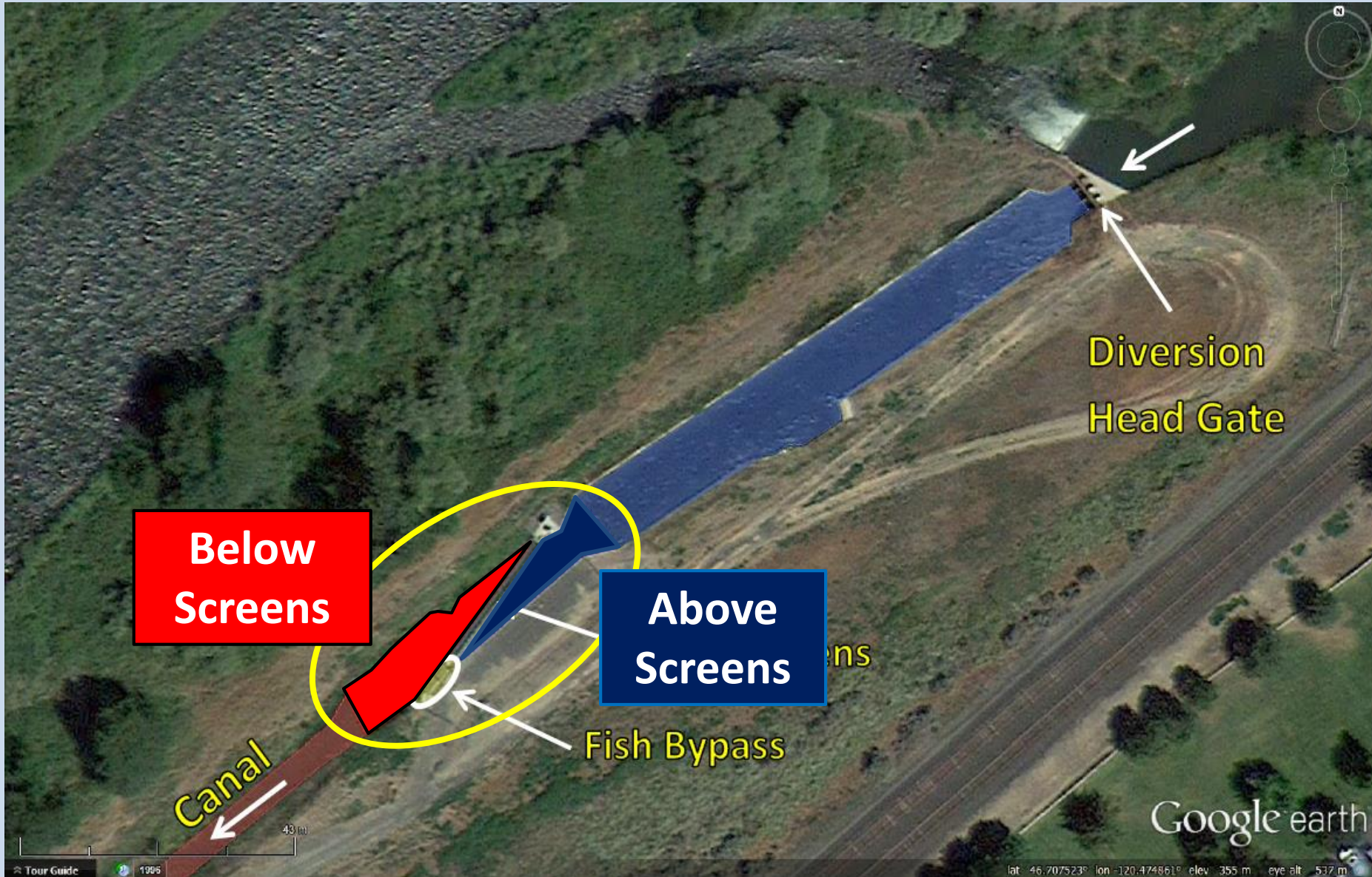
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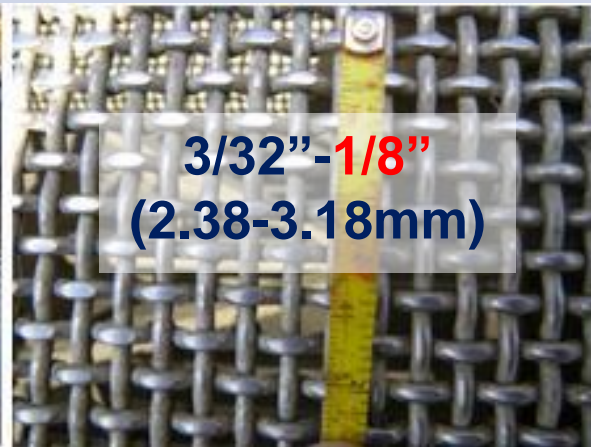


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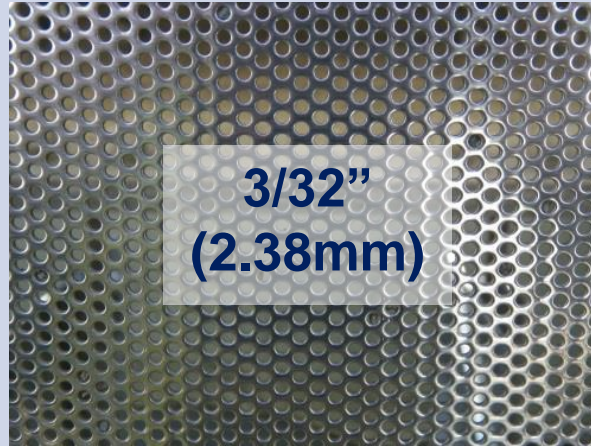


Dewatered Diversion Surveys





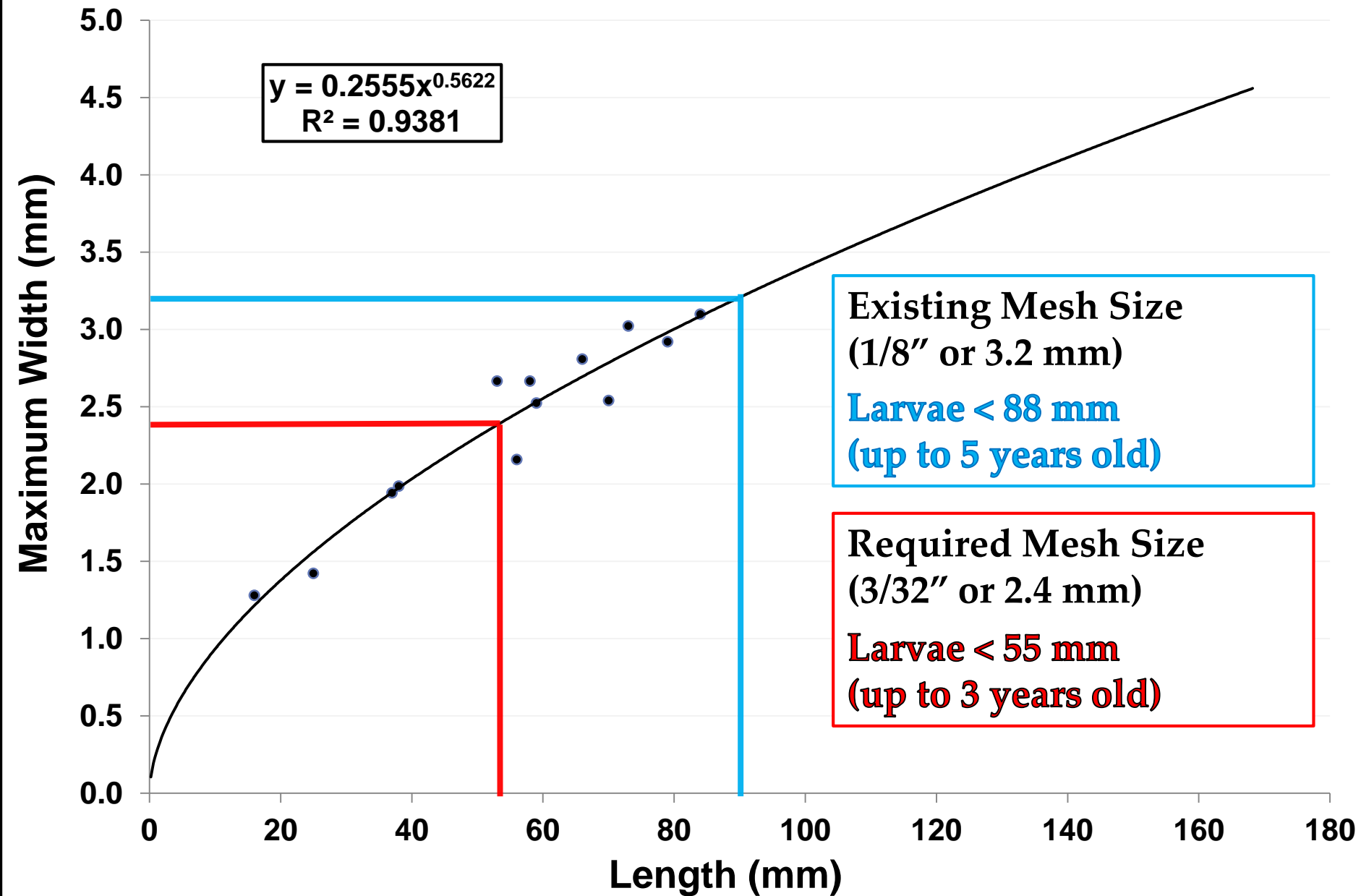
**Wire Cloth
/ Rotary Drum**



**Perforated Plate
/ Vertical**



**Vertical Bar
/ Vertical**









Lamprey Entrapment Timing



Bob Mueller
PNNL (Pacific Northwest National Laboratory)
Deepwater Electrofishing Platform (DEP)

Lamprey Entrainment Timing (2015 Results)

Deepwater Electrofishing (October, 2015)

- **Sunnyside Diversion**

- Headgate Area - **232**

- Downstream of Screens - **12,408** **11,115**
from YN Dewater Survey

- **Wapato Diversion**

- Headgate Area – **14**

- Upstream of Screens – **9,404** **7,200**
from YN Dewater Survey

- **Mark-Recapture Study in 2014 – only seeing between 19-45% during electrofishing; these estimated numbers are likely much higher.**

Diversion Impacts on Translocation Efforts



Short-Term Recommendations



Long-Term Recommendations

(Fine Sediment Management)

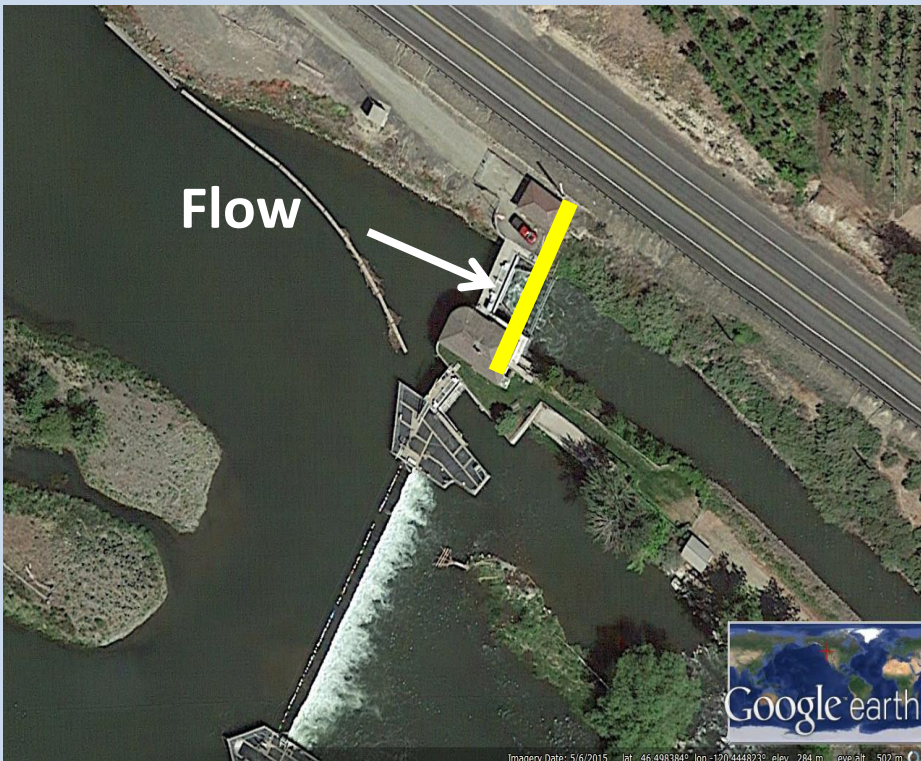
(Sunnyside Diversion)

Diversion
Headgate

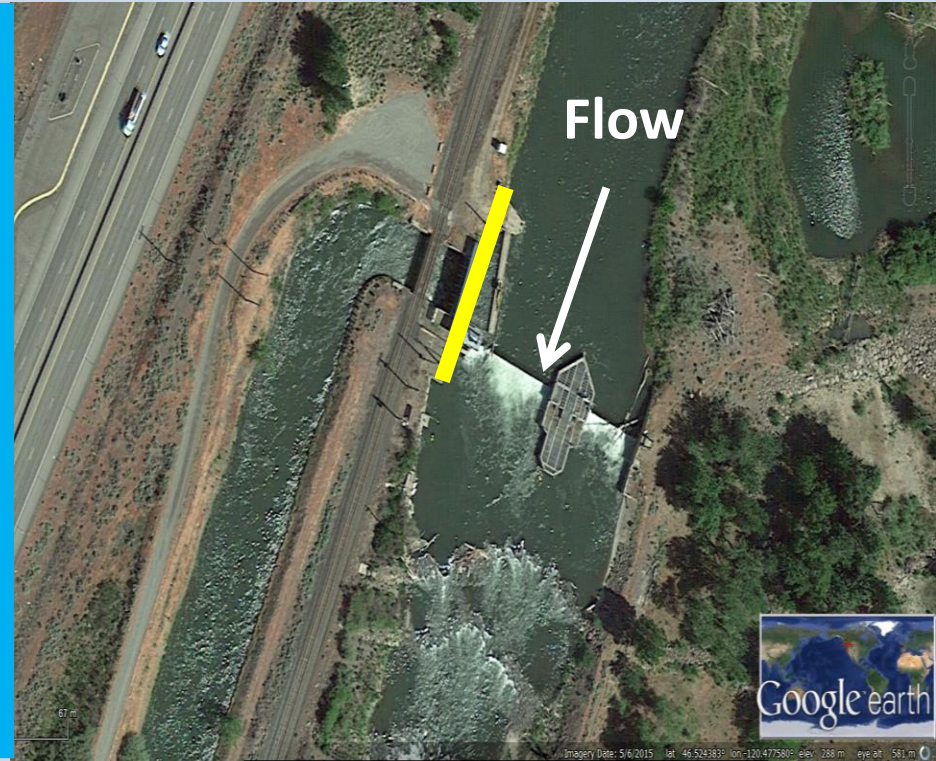
Sluice Gate



Long-Term Recommendations (Fine Sediment Management)



Perpendicular to Flow
-> More Sediment?
~ 1117 m³ in 2014



Parallel to Flow
-> Less Sediment
~ 770 m³ in 2014

Long-Term Recommendations (Fish and Sediment Management)

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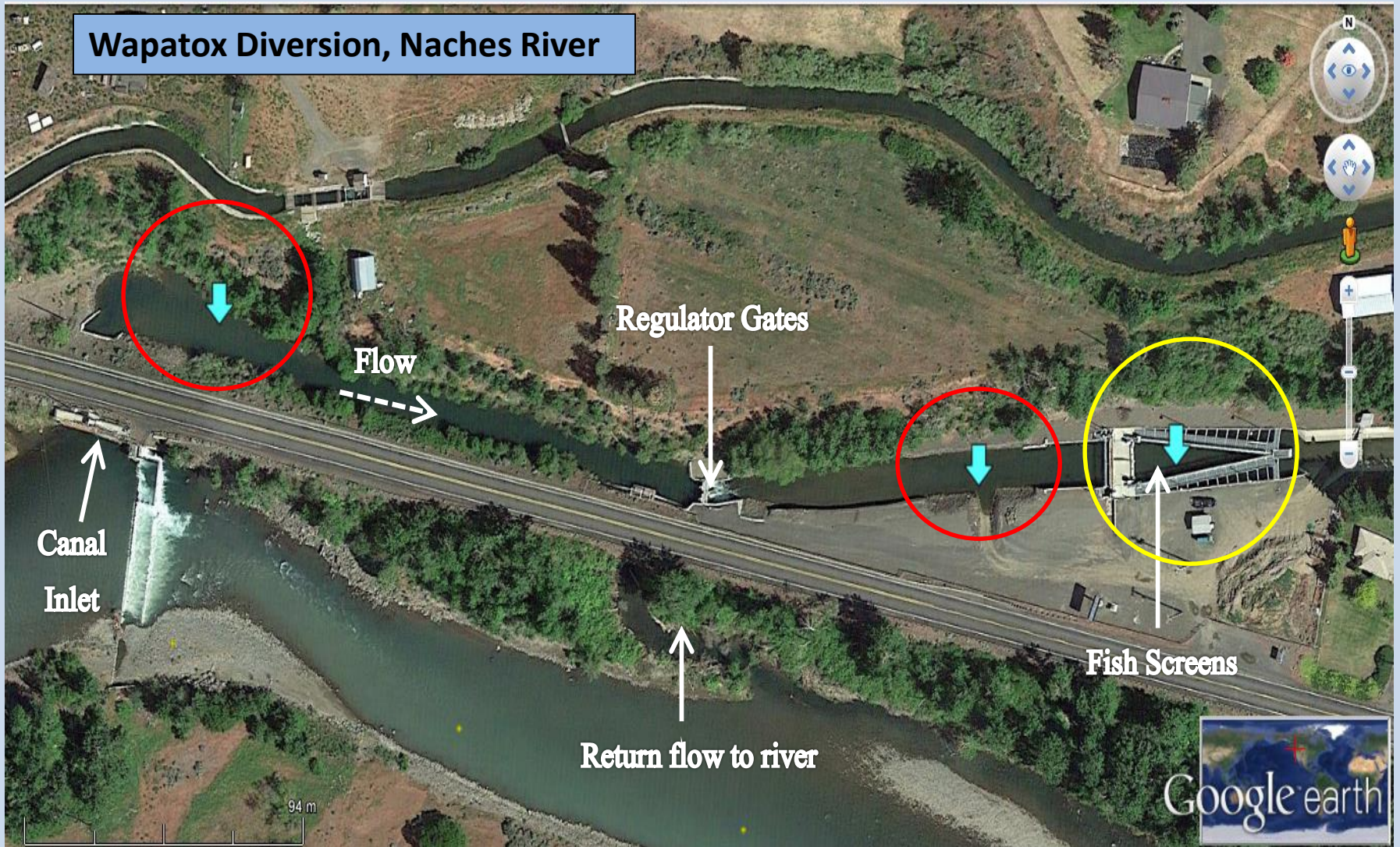
mprey

are most active.

Long-Term Recommendations (Protecting Larval Habitat)



What You See is What You Get – Explore New Areas



Diversion Impacts on Out-Migration

Impacts

- Chandler Diversion (Prosser, WA)
- Severe threat to out-migrating Pacific Lamprey



Our Study

- 2014 / 2015 Releases
- 40 macrophthalmia (Columbia R / Yakima R.)
- 36 Pacific Lamprey larvae (Yakima R. / Wenatchee R.)
- Released 850 meters upstream of the fish screens/fish bypass
- **Only 5.0% of the macros and 2.8% of the larvae detected.**

Causes:

- Predation, screens designed for salmonids or other unknown factors??

Chandler Bypass Release

- **73 Total Pit tagged Fish Released (split for 4 release groups)**
 - Transformed (eyed) and larval Pacific Lamprey and Western Brook Lamprey
- **One release into each of the 3 bypass channels**
- **One release immediately downstream of trash-racks**
 - Bypass Detection – **61.1-88.9%**
 - Trash-rack Release Detection – **26.3 %**
 - Overall detection – **61.6 %**
- **Where are they going??**

Wenatchee Subbasin – Dryden Diversion

- Dredging in the forebay occurs 2-3 years (depending on need)
- Chelan PUD salvaged **18,767**
- YN aided in salvage on first day of dredging.

- **Lessons Learned:**
 - Electrofishing in dredged material (helps)
 - Temperature Monitoring
 - Large tarp to improve efficiency



03/04/2016



Questions /
Other Solutions??

