



Willamette Falls Lamprey Passage

NWHA –NHA Regional Meeting October 4, 2011

Tim Shibahara – Portland General Electric

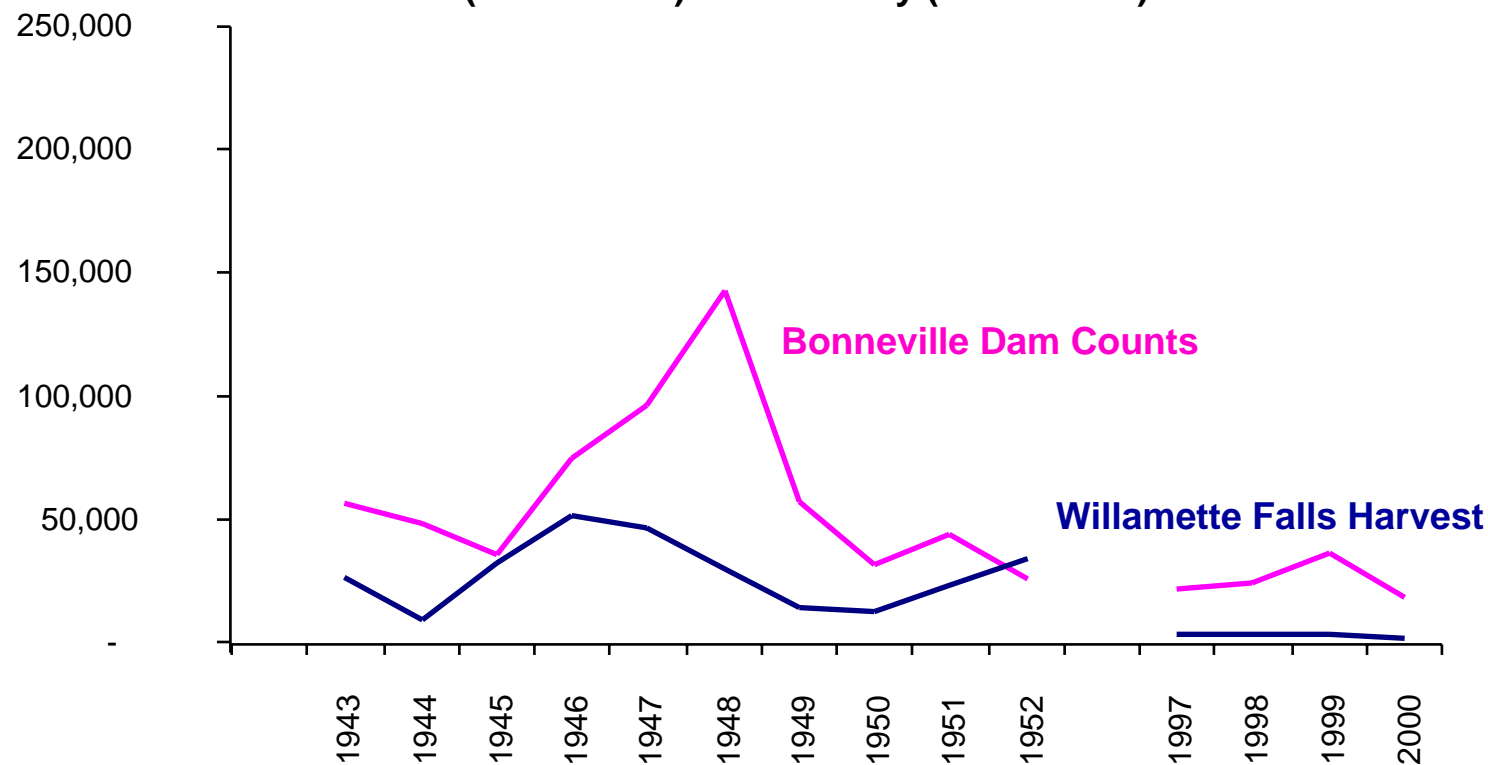


Willamette Falls



- Lamprey Passage Prior to Recent License (2005)

A comparison of the counts of Pacific Lamprey at Bonneville Dam and in the Willamette Falls harvest in an historic period (1943 - 1952) and recently (1997 - 2000)



Willamette Falls



- Lamprey Passage Prior to Recent License (2005)



Willamette Falls Project Description



- T.W. Sullivan Powerhouse
 - Built in 1895
 - 13 Units (16 mw)
 - ~ 6,000 cfs capacity
- The Falls
 - Naturally occurring
 - 12 m tall
 - 2-6 m tall cap
 - (1 m flash boards)
 - Flow Control Structure
- ODFW Fish Ladder
 - Consists of 3 Legs

— Leg 1
— Leg 2
— Leg 3



Willamette Falls



- Active Tag Study Objectives

- **Evaluate the migration characteristics of adult Pacific Lamprey pre and post modifications completed at the Falls by determining:**
 - Specific routes of passage
 - Duration of route specific passage times
 - Overall passage efficiency
 - Location of potential barriers

Willamette Falls



- Historic Lamprey Passage Studies

- **2001 Passage Study (n=47) *Late Season Pilot Study**

- 24% passage efficiency
 - 78% ascended the Falls
 - 22% ODFW Fish Ladder



- **2005 Passage Study (n=136) *Normal Operations**

- 35% passage efficiency
 - 100% ODFW Fish Ladder

- **2006 Passage Study (n=107) *Powerhouse Off – All Flow Over Falls**

- 23% passage efficiency
 - 8% ascended the Falls
 - 92% ODFW Fish Ladder

Willamette Falls Lamprey Passage



Willamette Falls



- Lamprey Passage Improvements

ODFW Fish Ladder Modifications

- Leg 1 entrance modification
- Smoothing transition areas
- Aux. water supply repair/maintenance

Falls Experimental Passage Structures

- “Lamprey Ramps” along flashboards
- Utilizing the “Old Fishway” channel



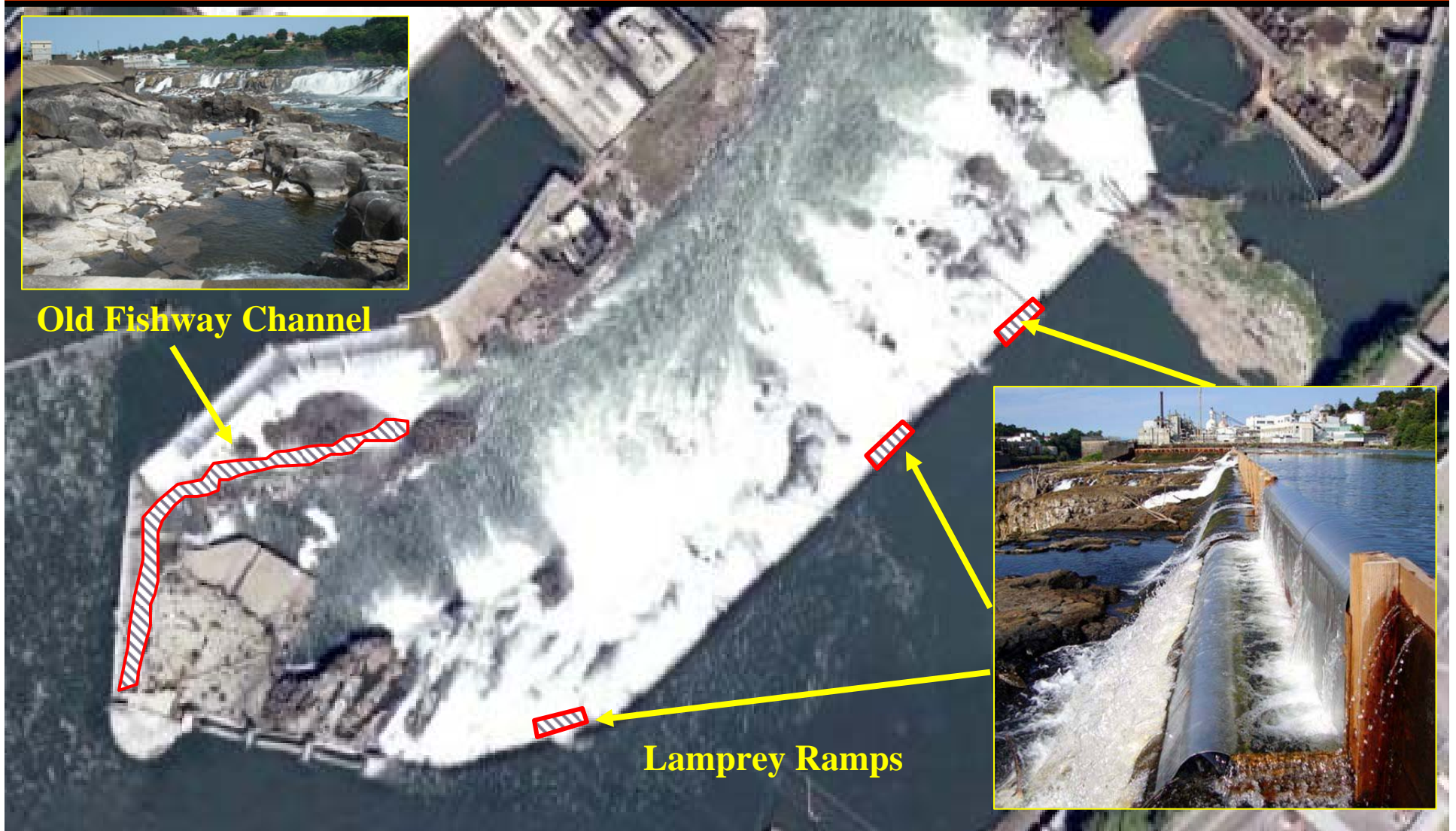
Willamette Falls



- Lamprey Passage Improvements – *Falls Passage*



Old Fishway Channel



Lamprey Ramps

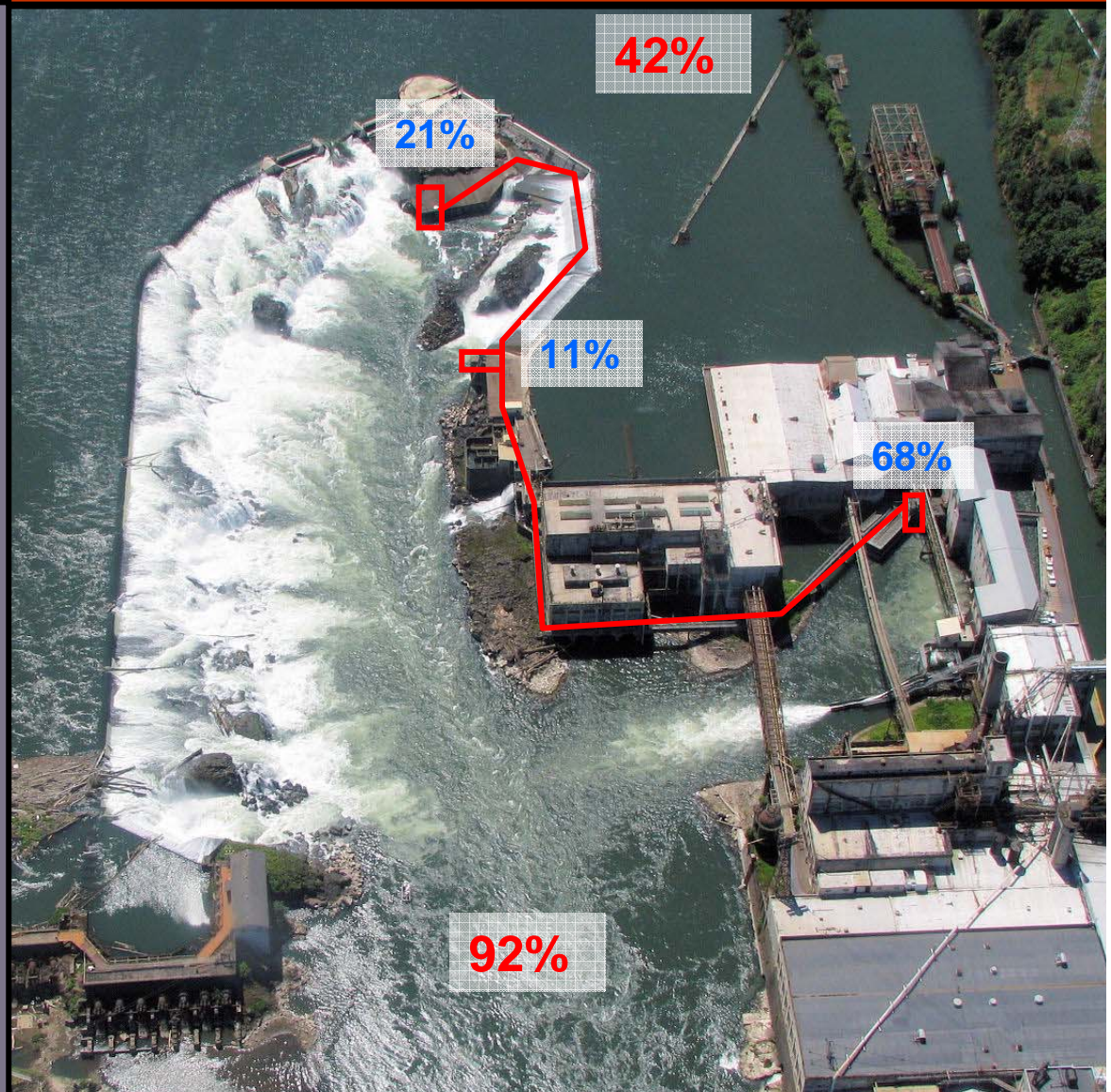


Willamette Falls Project Description



- 2009 Post Project Evaluation Results

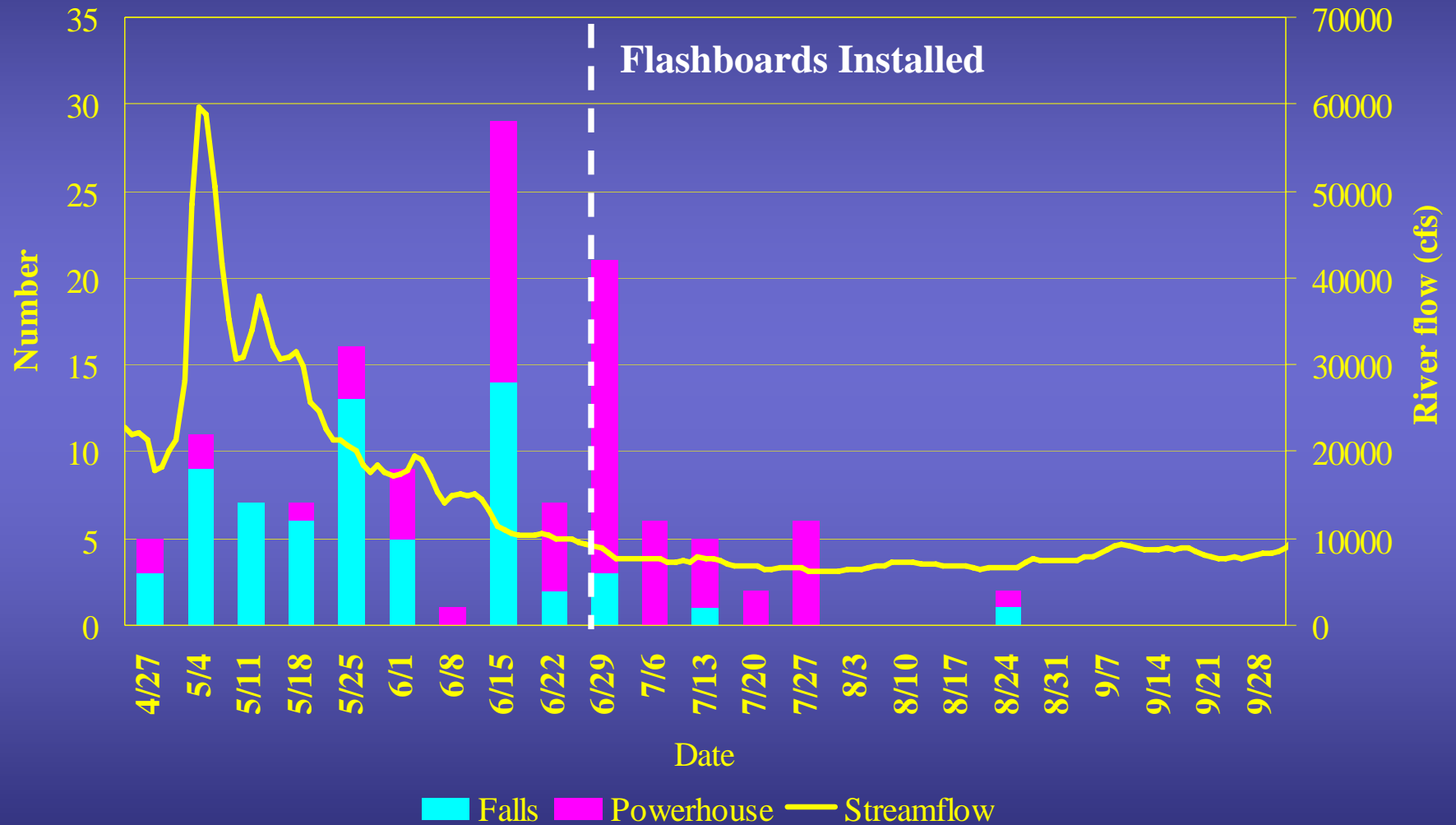
- 92% Returned to Project (n = 134)
- 42% Upstream Passage (tailrace to forebay)
 - Leg 1 – 68%
 - Leg 2 – 11%
 - Leg 3 – 21%
- 27% - last detected moving downstream
- 31% - last detected at the project
- Experimental Fish Passage Structures: 0 Fish





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Initial Approach (n=134)



Ladder Passage



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Passage Efficiency:

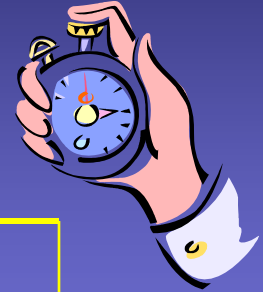
	Passed	Attempted but did not pass	Percent Efficiency
Leg 1	38	9	81%
Leg 2	7	3	70%
Leg 3	11	0	100%
Combined	56	12	82%

Ladder Passage



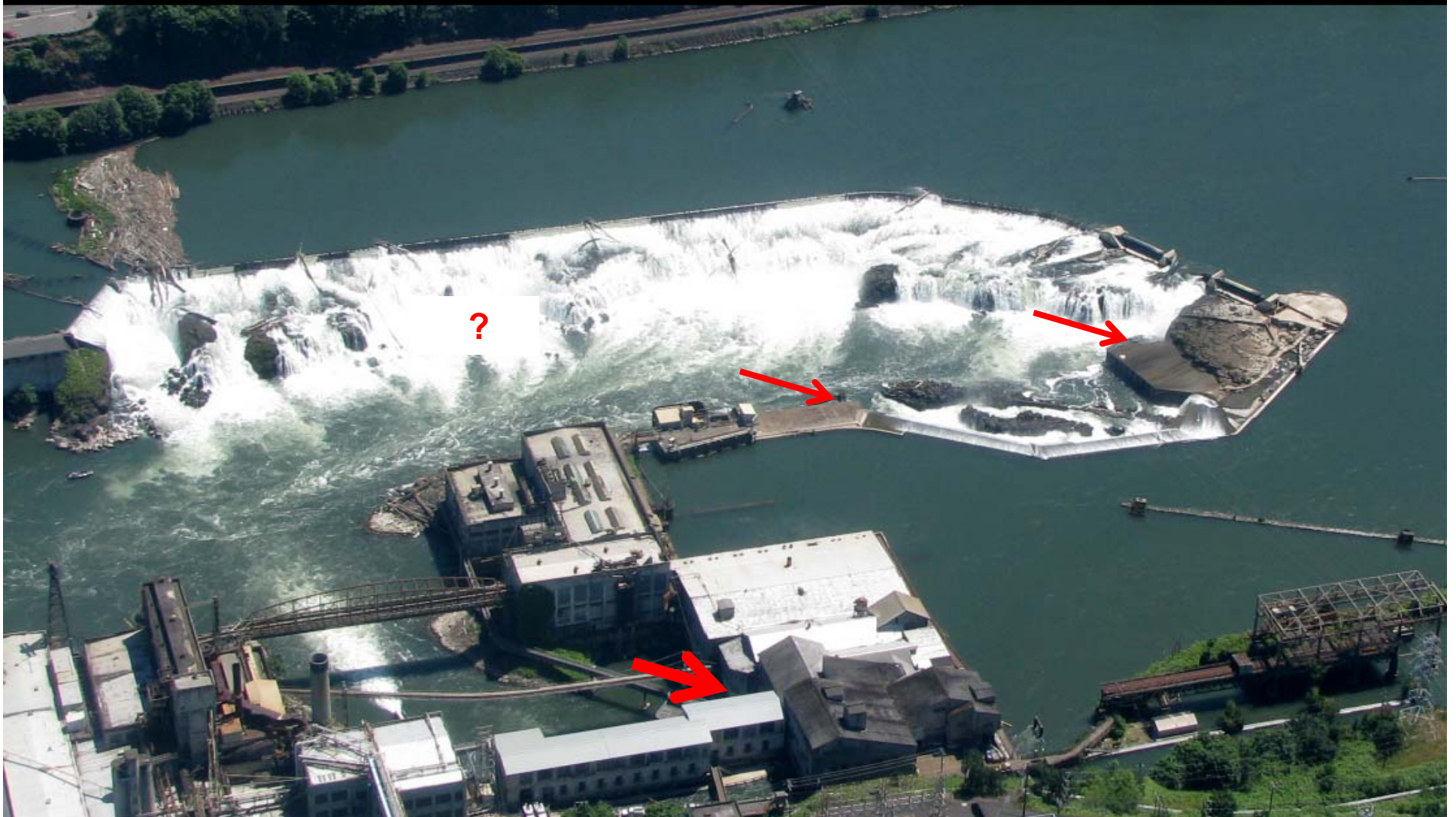
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Passage Time: (hours)



	n	Min	Median	Max
Leg 1	38	3	19	290
Leg 2	7	3	4	133
Leg 3	11	4	5	44
Combined	56		9	

Willamette Falls Lamprey Passage



Willamette Falls Lamprey Passage



Summary



Willamette Falls



- Experimental Lamprey Passage Structures



Willamette Falls



- 2011 Lamprey Passage Improvements

“Old Fishway” Features

- Ascends 14 m above dam
- Connects 120 m sections of historic fishway blasted into rock
- 52 m linear concrete curb
- Adjustable Gate with aux. water supply line
- Seasonally operated during low water season



End

