Evaluation of Upstream Migration and Dam Passage by Adult Pacific Lamprey in the Lower Snake River, 2014

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Goal

Evaluate adult lamprey behavior and fate within the reservoirs, passage success through the adult fish ladders and conversion rates at the Lower Snake River projects to determine potential passage problems and areas for future fishway improvements.

Objectives

1. **Collect and radio-tag adult Pacific lamprey collected from lower river sources and released at Snake River Dams.**

2. **Estimate adult lamprey upstream passage rates (entrance and fishway efficiency), relative fishway route use, passage times, and fallback rates and identify areas of delay at IHR, LMN, LGO, and LGR.**

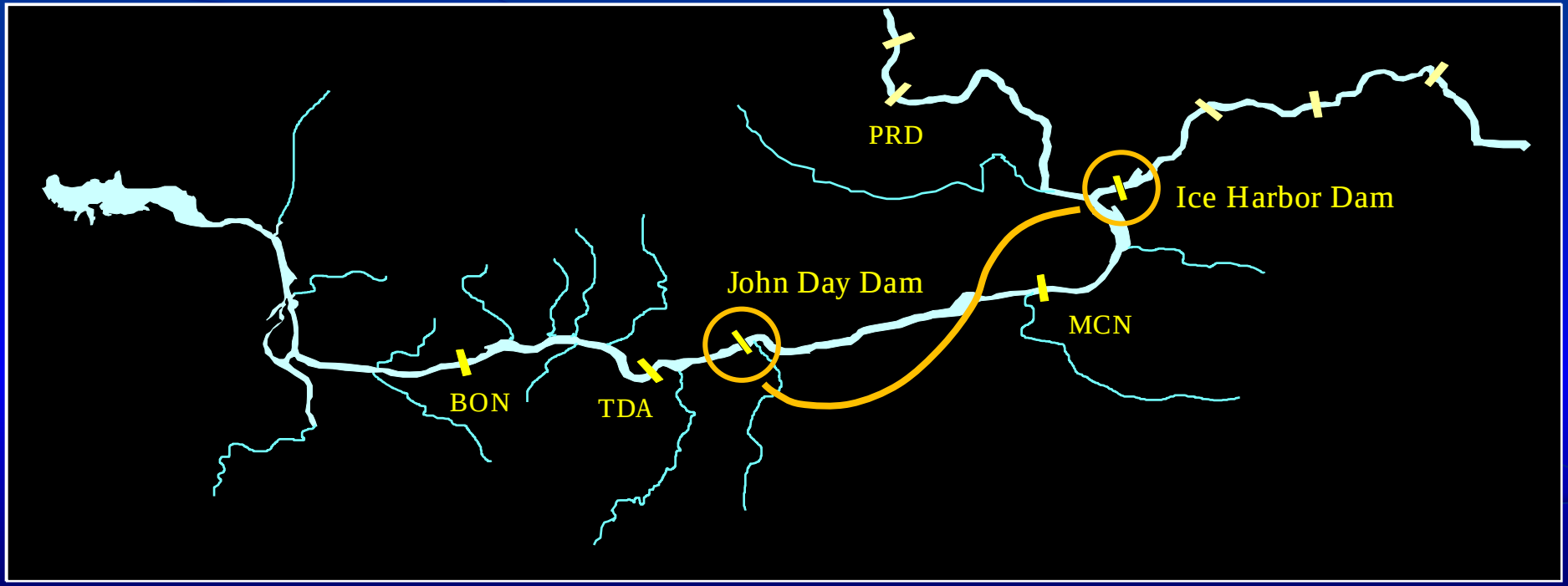
3. **Determine conversion rates from one project to the next and initiate understanding the fate of adults in the reservoirs and estimate adult entrance into important tributary streams.**

4. **Determine behavior and fates (spawning locations) of tagged adults that leave FCRPS reservoirs and enter into tributaries. - Collaborative effort beyond ACOE requirements**

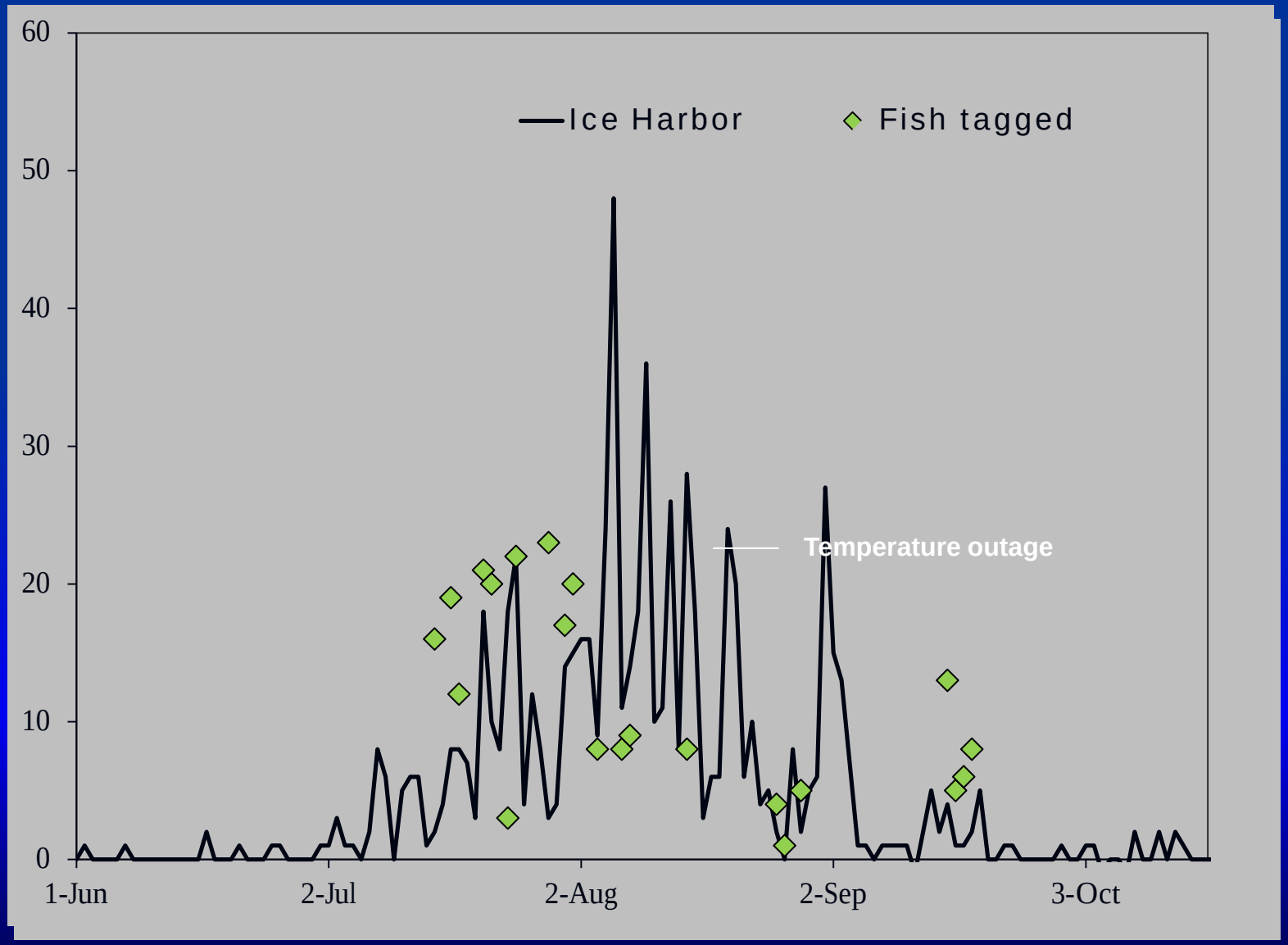
Methods

Objective 1 – Collect and radio-tag adult Pacific lamprey collected from lower river sources and released at Snake River Dams.

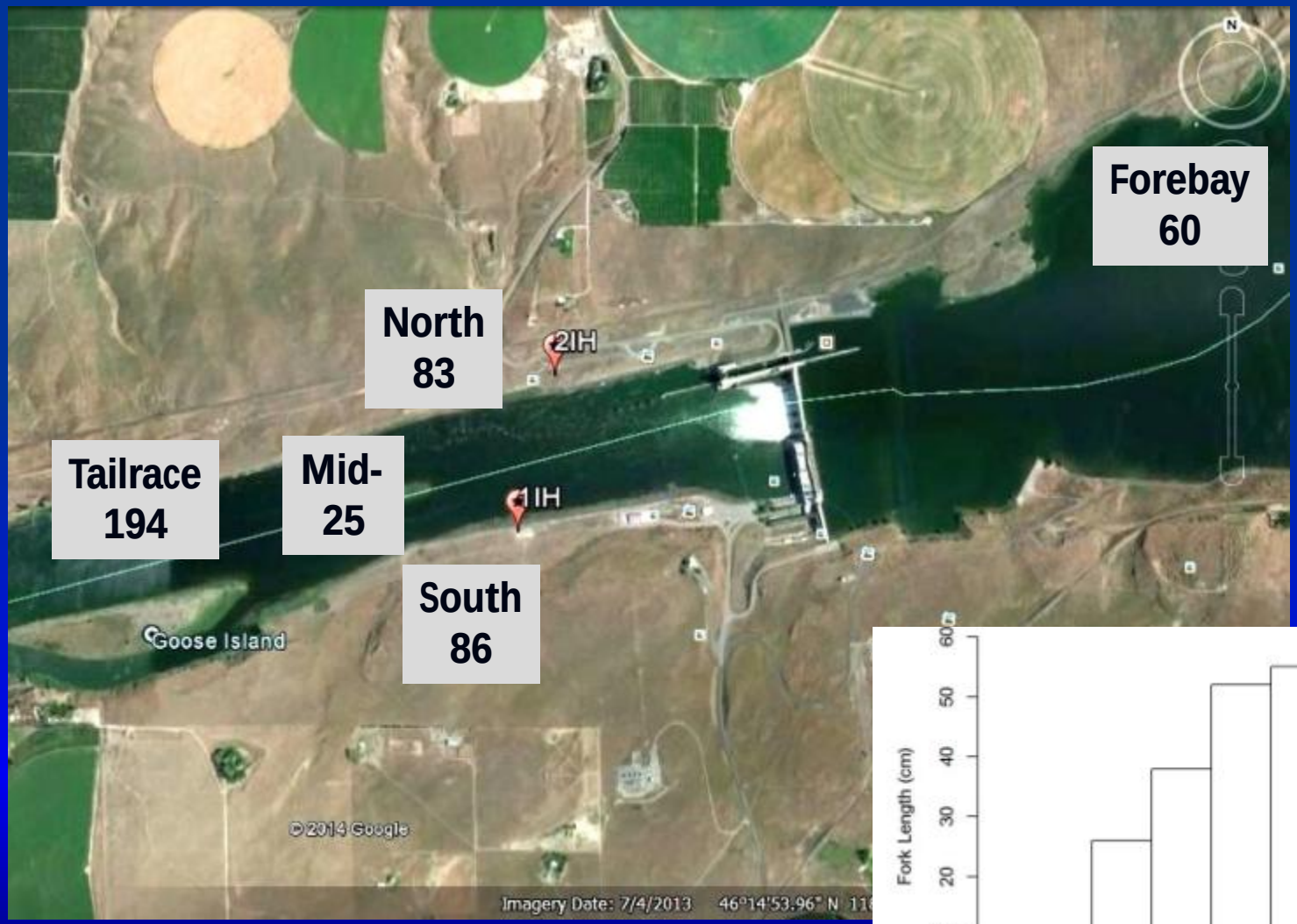
- Collect up to 500 lamprey from John Day Dam
- Outfit with RT and HD PIT tags
- Release downstream and in the forebay of Ice Harbor Dam

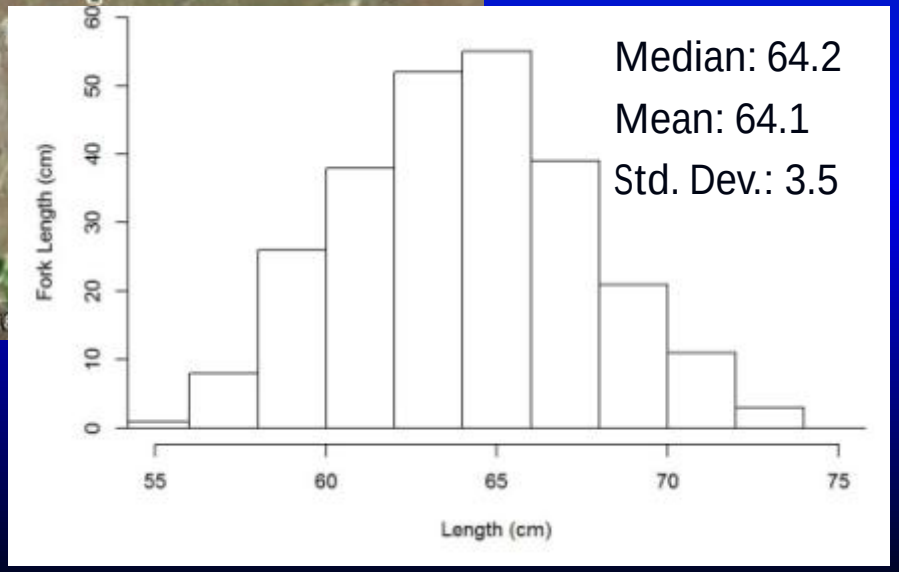


Methods 254 Lamprey tagged



Methods 254 Lamprey tagged



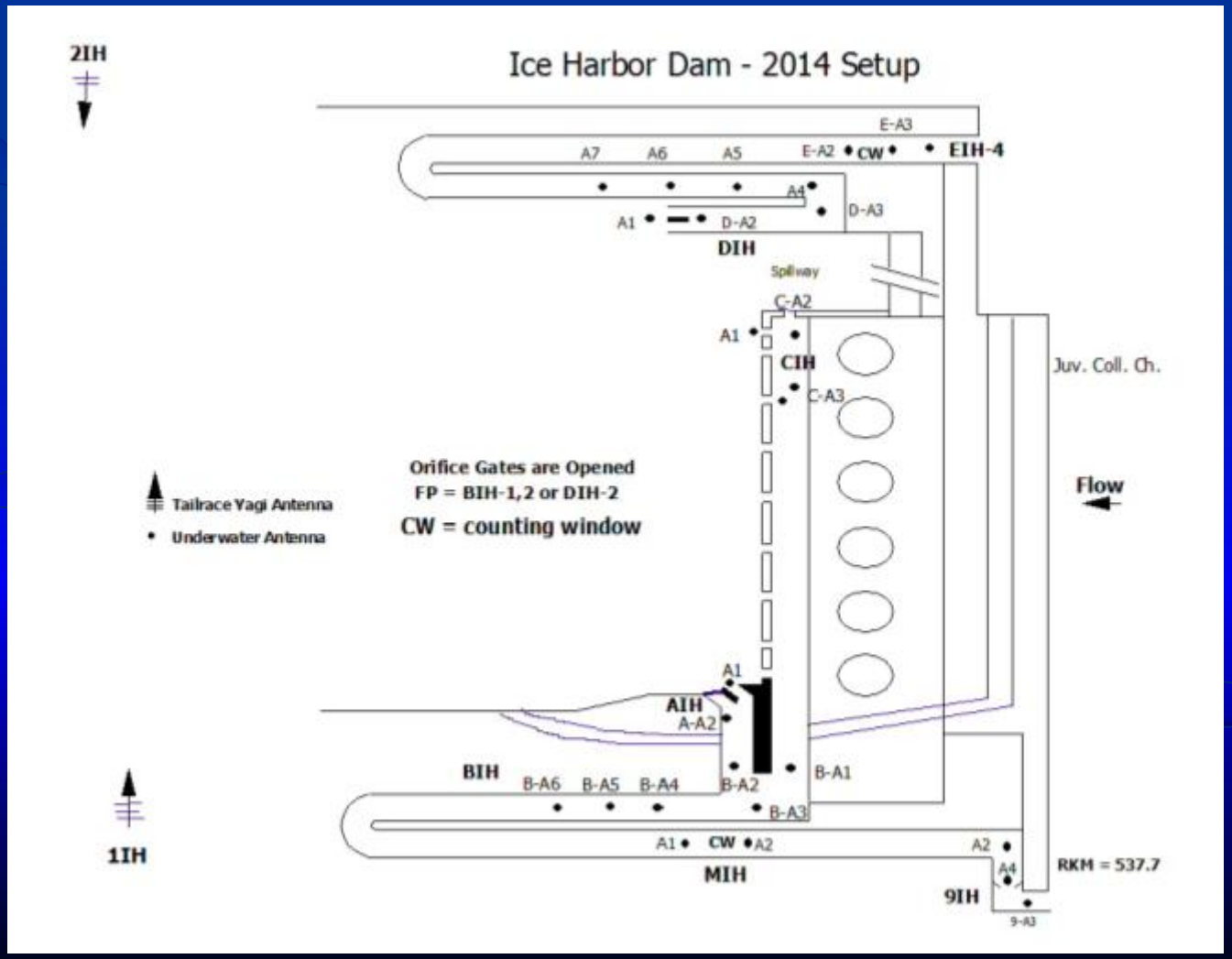


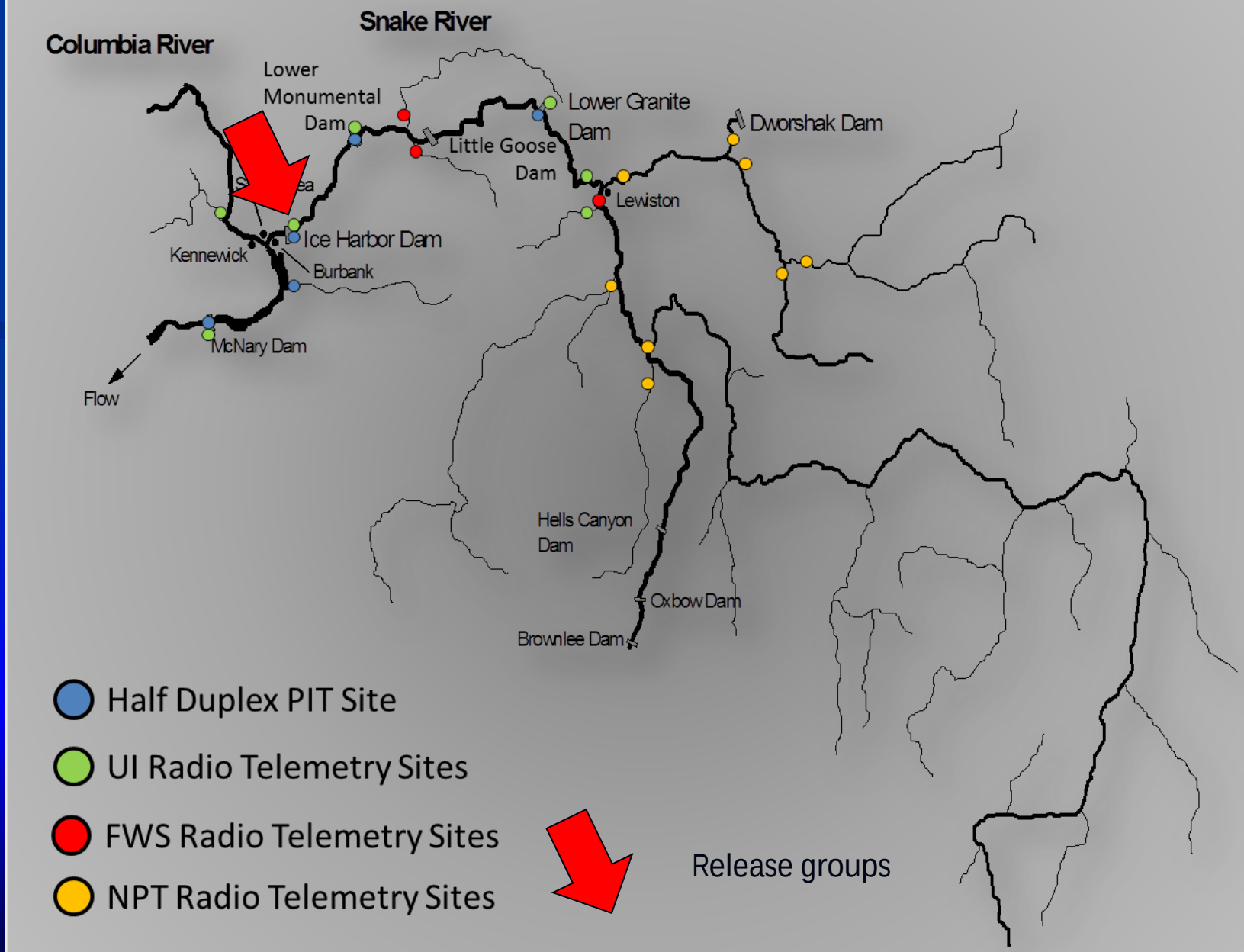
Methods

Objective 2 – Estimate adult lamprey passage metrics

Objective 3 – Determine inter-dam conversion rates

Objective 4 – Determine final fates

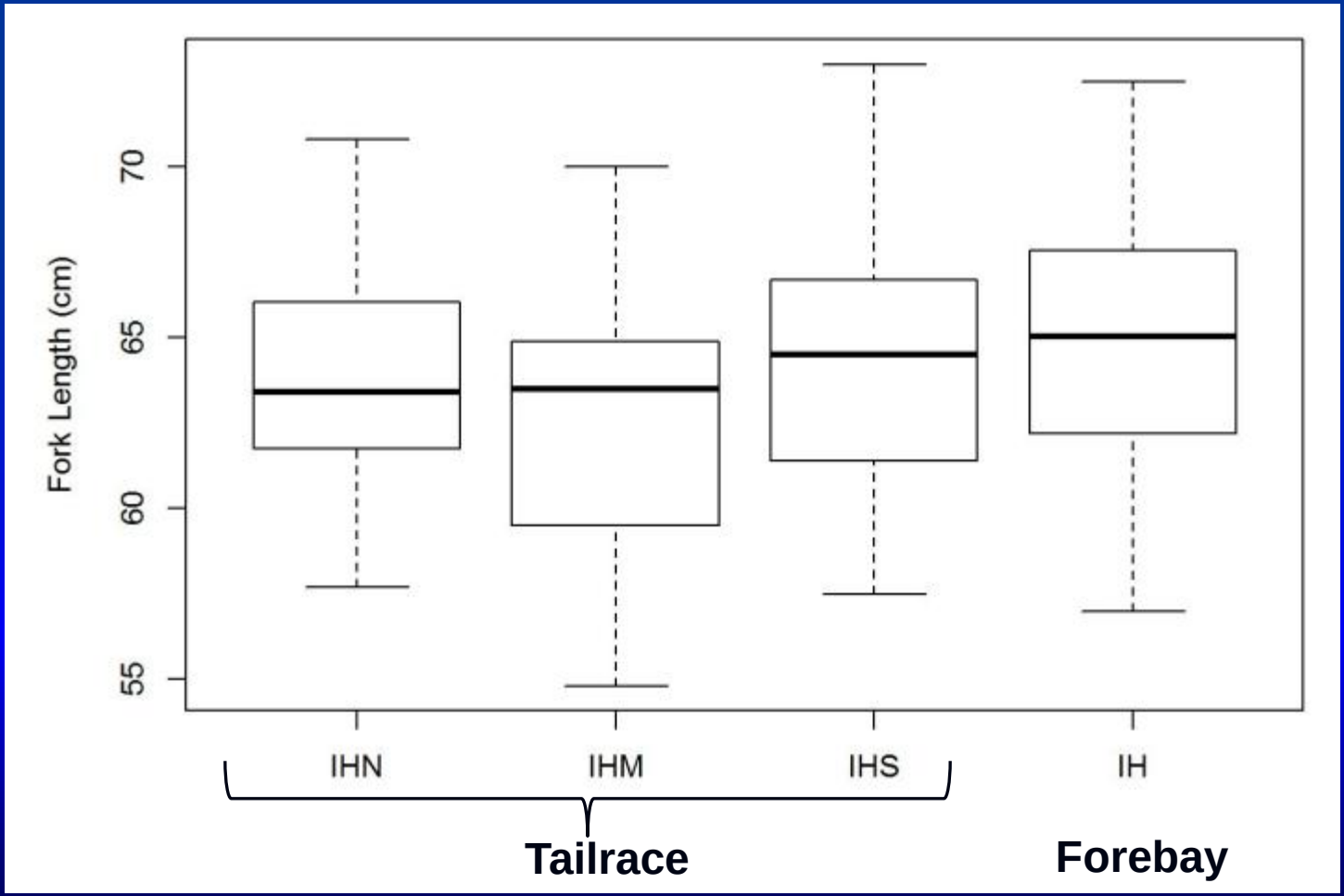



Columbia River
Snake River
Lower Monumental Dam
Little Goose Dam
Lower Granite Dam
Dworshak Dam
Lewiston
Ice Harbor Dam
Kennewick
Burbank
McNary Dam
Flow
Hells Canyon Dam
Oxbow Dam
Brownlee Dam
Half Duplex PIT Site
UI Radio Telemetry Sites
FWS Radio Telemetry Sites
NPT Radio Telemetry Sites
Release groups

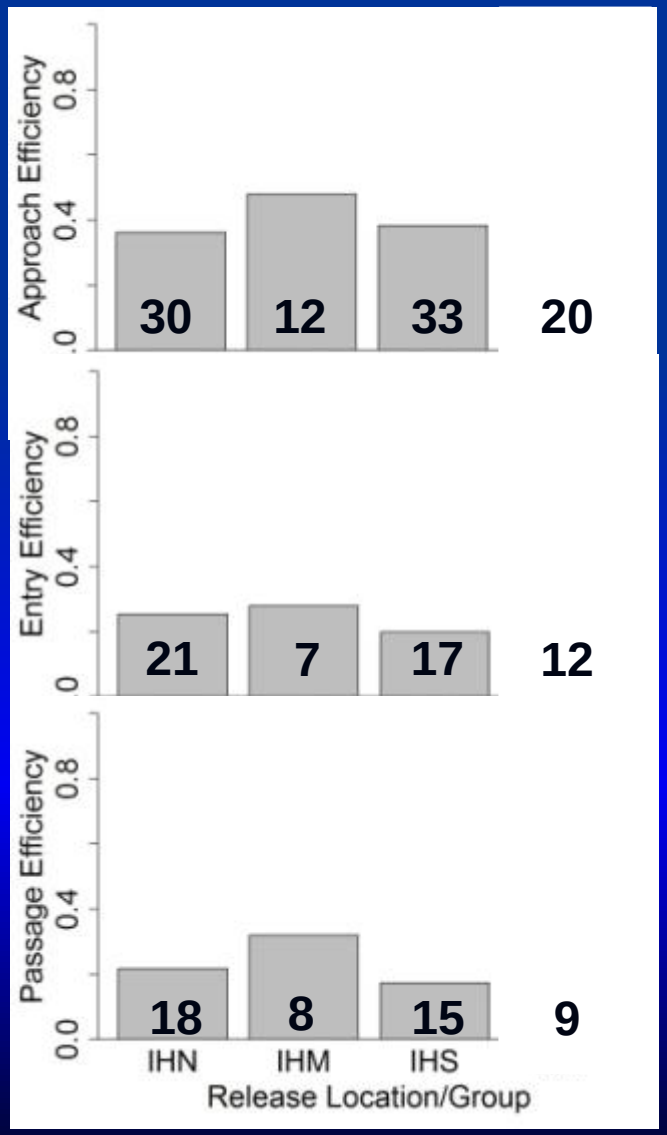
Initial Year Questions

- Are release groups sufficiently homogeneous?
- Are there passage differences between release groups?
- Are there passage differences between L. Snake River Dams?
- How do L. Snake results compare to Columbia River dams?
- What does system-wide passage look like?

Lamprey size by release group



Tailrace Passage by Release Site

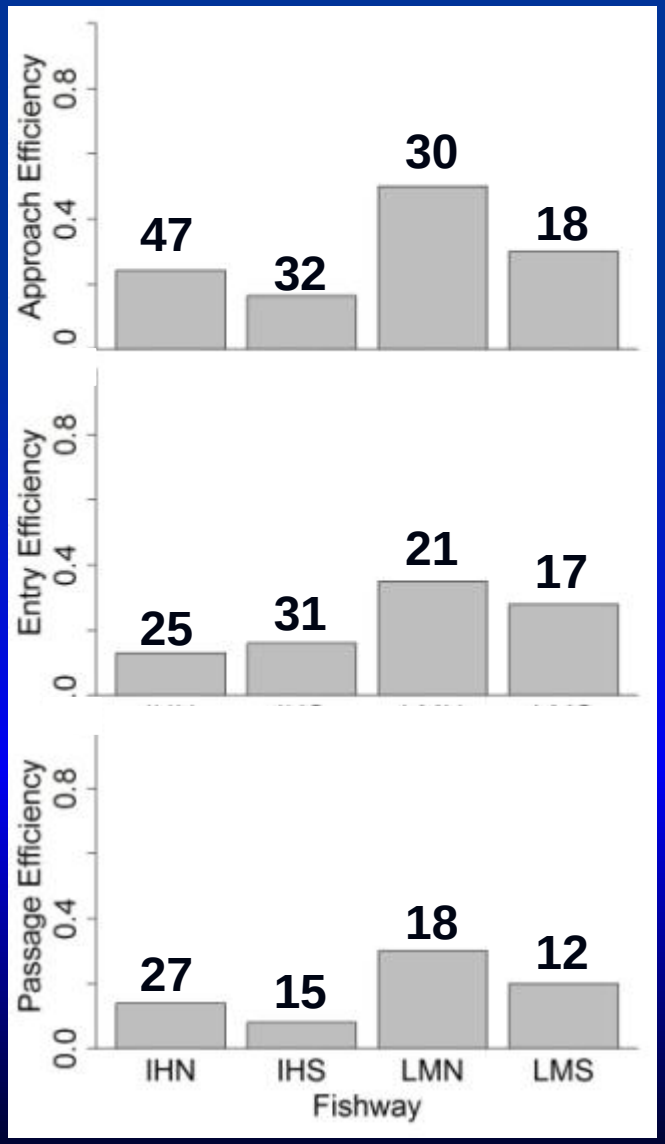


Approach Efficiency = # Approached / # Released

Entry Efficiency = # Entered / # Released

Passage Efficiency = # Passed / # Released

Tailrace Passage by Fishway

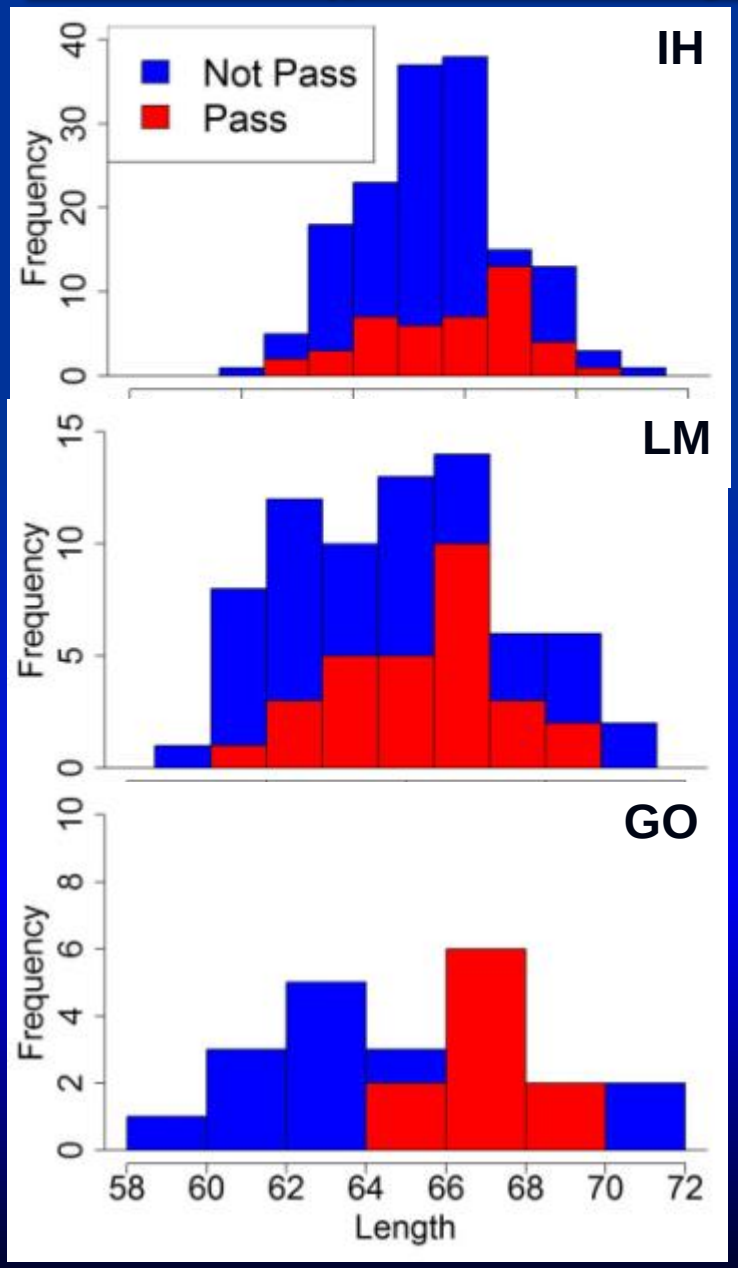


Approach Efficiency = # Approached / # Released

Entry Efficiency = # Entered / # Released

Passage Efficiency = # Passed / # Released

Results (preliminary)



	Mean Length (cm)			
	IH	LM	GO	GR
Available	197	101	29	10
Passed (n)	41	29	10	5
Passed (cm)	64.5	65.7	67.0	67.2
Not Passed (cm)	63.6	64.7	65.0	66.8

Results (preliminary)

	Fall Back Rate			
Metrics	Ice Harbor	L. Monumental	L. Goose	L. Granite
Fallback Rate	0.10 (4)	0.03 (1)	0.10 (1)	0

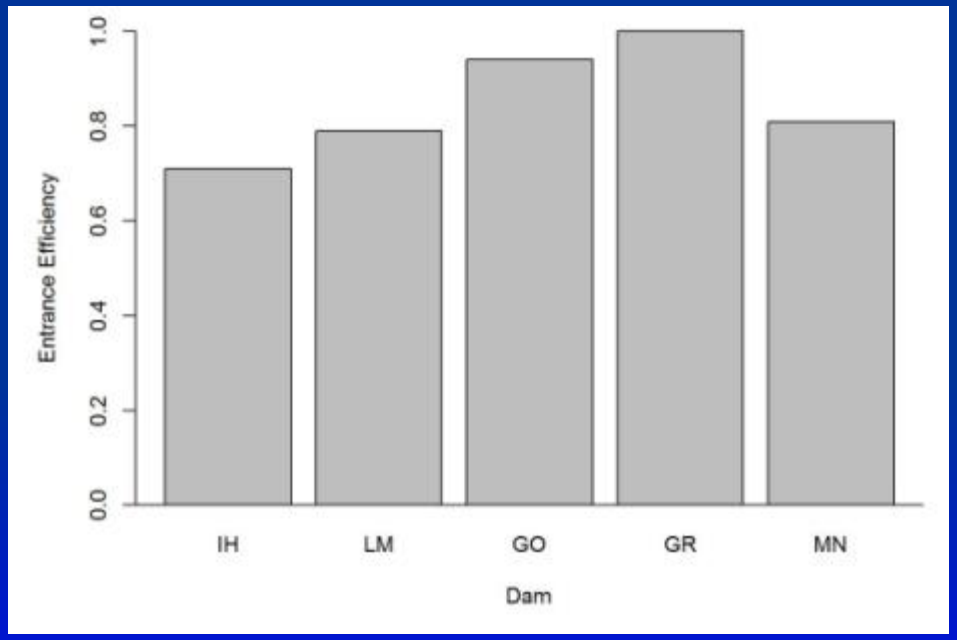
	Passage Times - days			
Time to:	Ice Harbor	L. Monumental	L. Goose	L. Granite
Approach (n)	0.14 (65)	0.86 (7)	0.11 (4)	N/A
Enter (n)	0.10 (60)	0.04 (42)	0.01 (19)	0.002 (8)
Pass (n)	0.26 (39)	0.35 (27)	0.38 (10)	0.27 (5)

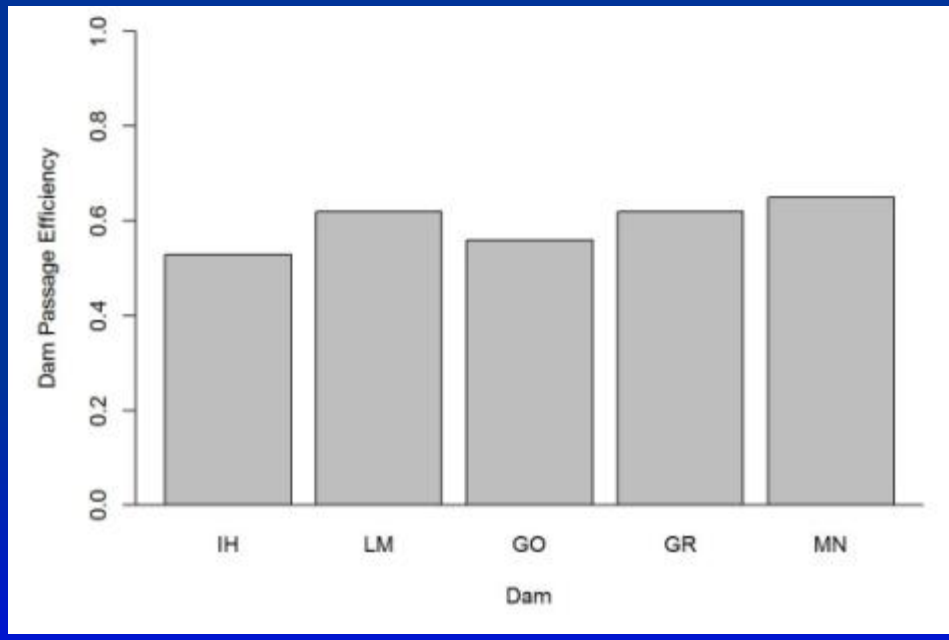
Results (preliminary)

	Tailrace Passage Metrics		
Metrics	**Ice Harbor**	**L. Monumental**	**McNary***
Released	194	60	276
Approached (n)	0.40 (78)	0.78 (47)	0.57 (158)
Entered (n)	0.29 (55)	0.63 (37)	0.46 (128)
Passed (n)	0.22 (41)	0.50 (29)	0.37 (102)

***Years: 2005 – 2010; Keefer et al. 2013**

Results (preliminary)



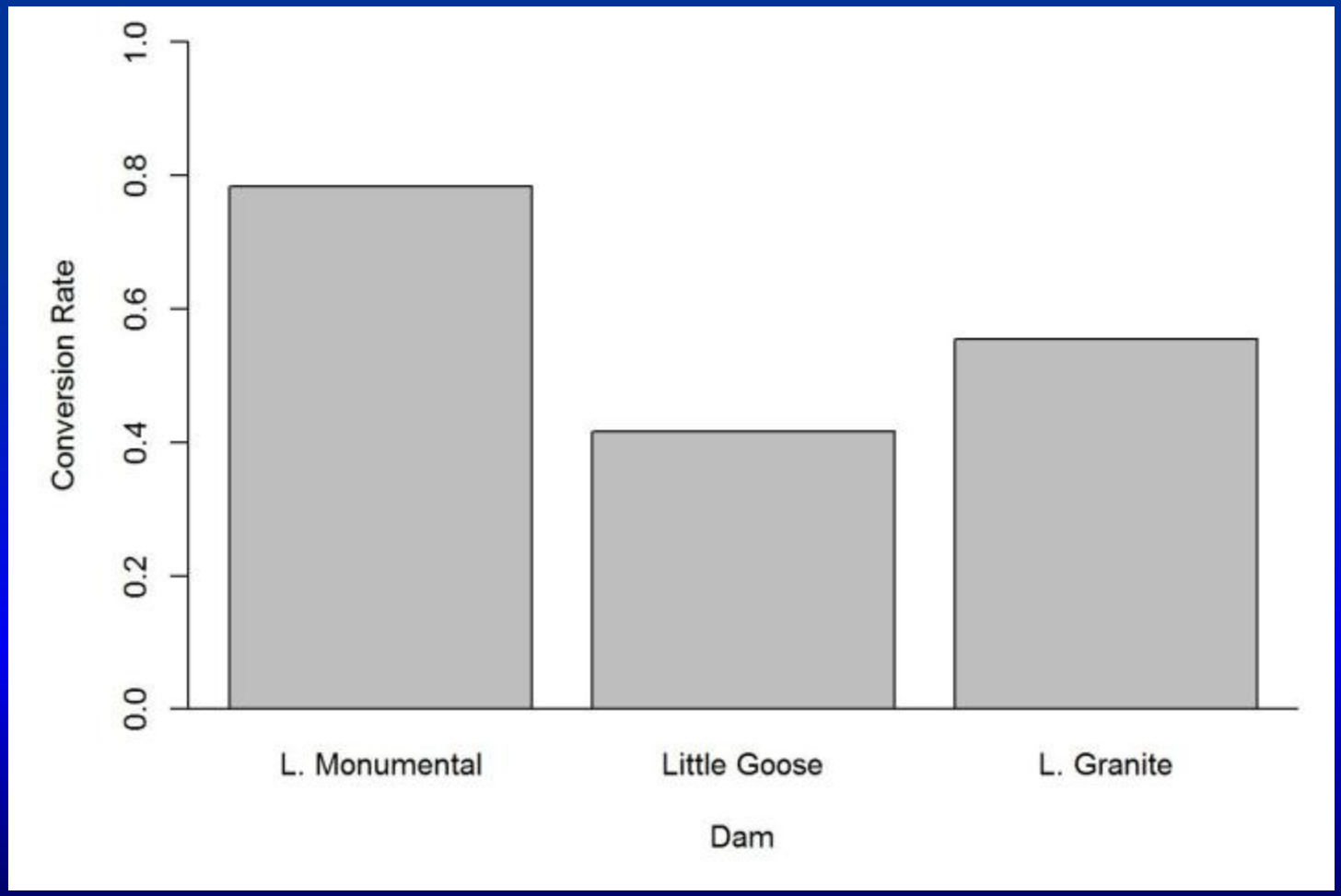


	Passage Metrics				
Metrics	**IH**	**LM**	**GO**	**GR**	**MN***
Approached	78	47	18	8	158
Entered (n)	0.71 (55)	0.79 (37)	0.94 (17)	1.00 (8)	0.81 (128)
Passed (n)	0.53 (41)	0.62 (29)	0.56 (10)	0.62 (5)	0.65 (102)

***Years: 2005 – 2010; Keefer et al. 2013**

Results (preliminary)

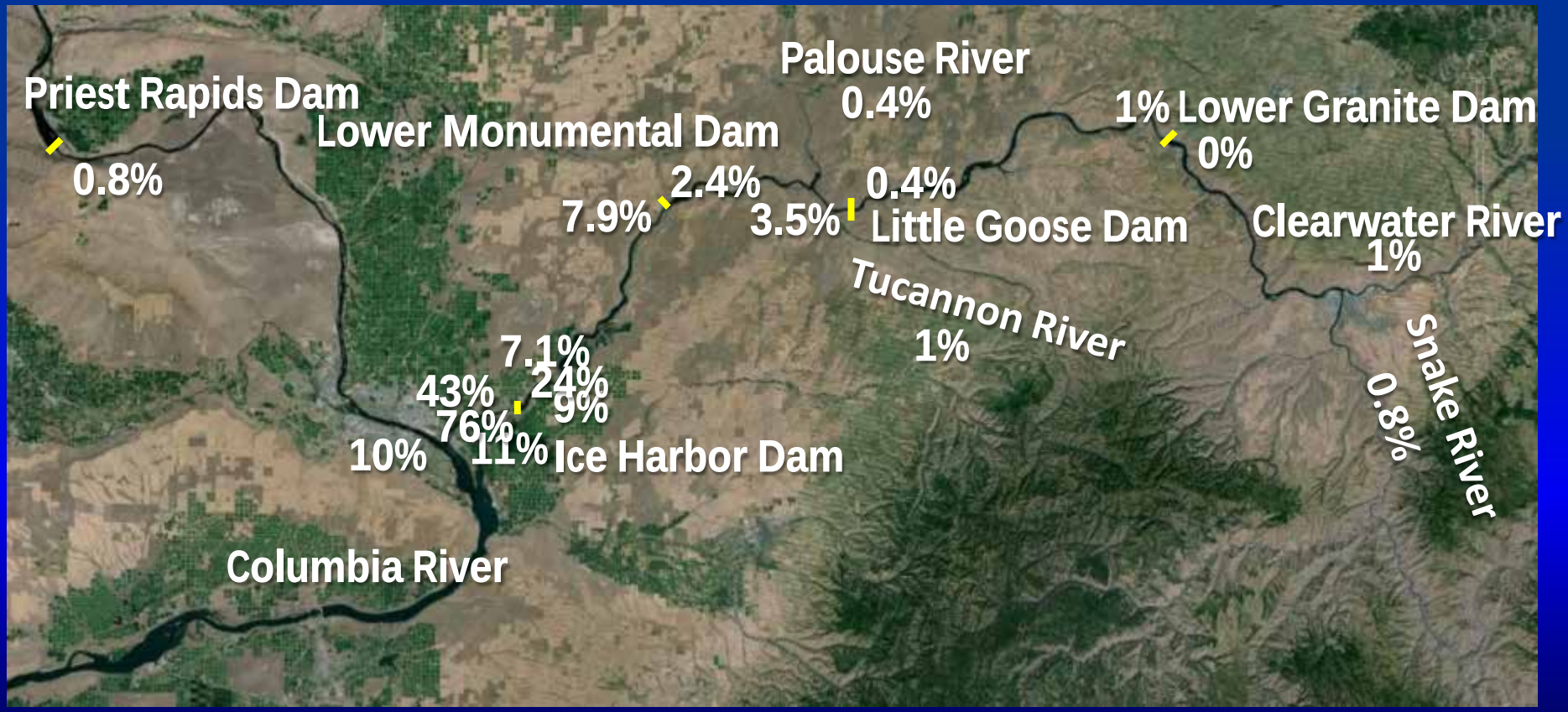
Conversion Rates



Conversion Rate = # passed current / (# passed previous – (# fallback + # tributaries))

Results (preliminary)

Final Distribution



Summary

- Successful Initial year
  - No significant biases due to release location
  - Results comparable among lower Snake and Columbia River Dams
- Open Questions
  - Final fate fish remaining in the system?
    - Unmonitored Tributary
    - Reservoir mortality
    - Tailrace Spawning
    - L. Snake River drop-outs
  - Spring movements

Acknowledgements

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