

EVALUATION OF ADULT PACIFIC LAMPREY PASSAGE AND BEHAVIOR AT McNARY AND ICE HARBOR DAMS

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Funding:
U.S. Army Corps of Engineers



Corps of Engineers

University of Idaho
College of Natural Resources



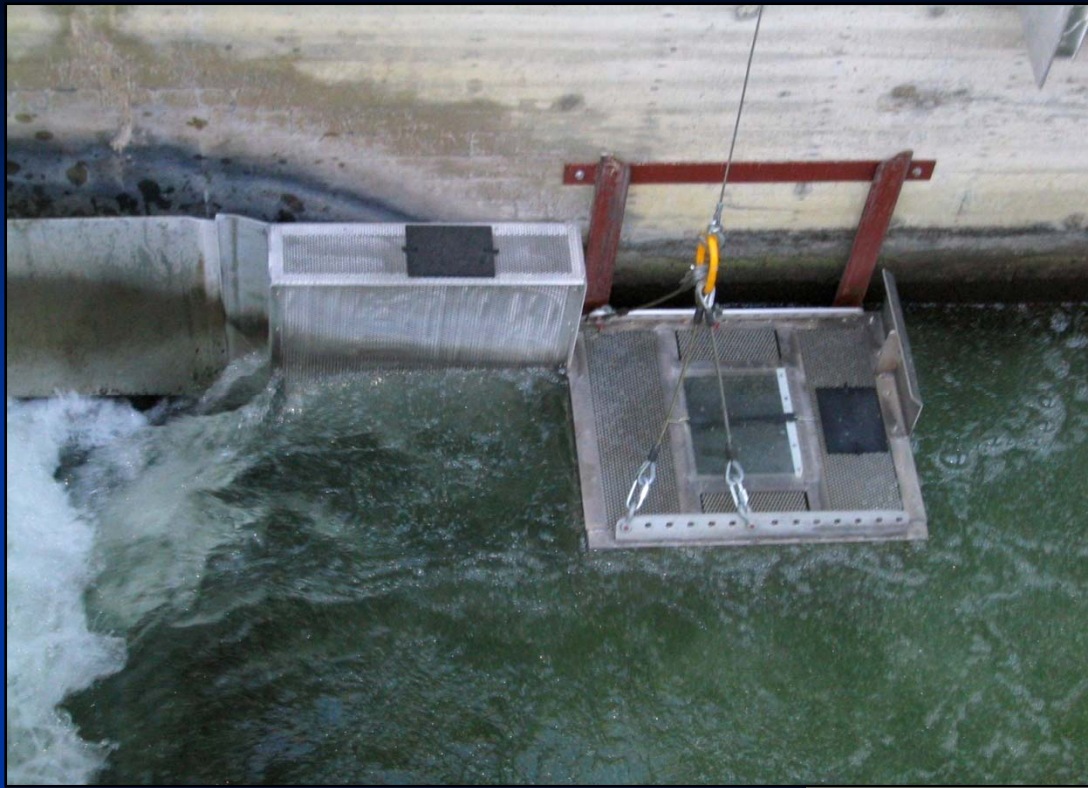
Topics to be covered

Lamprey run and trapping effort

Describe our RT and Half-Duplex coverage

Using these Systems

- Lamprey behavior at dams
 - approaches
 - entrances
 - exits
 - successful dam passages
- Detection efficiencies
- Passage times through reservoirs

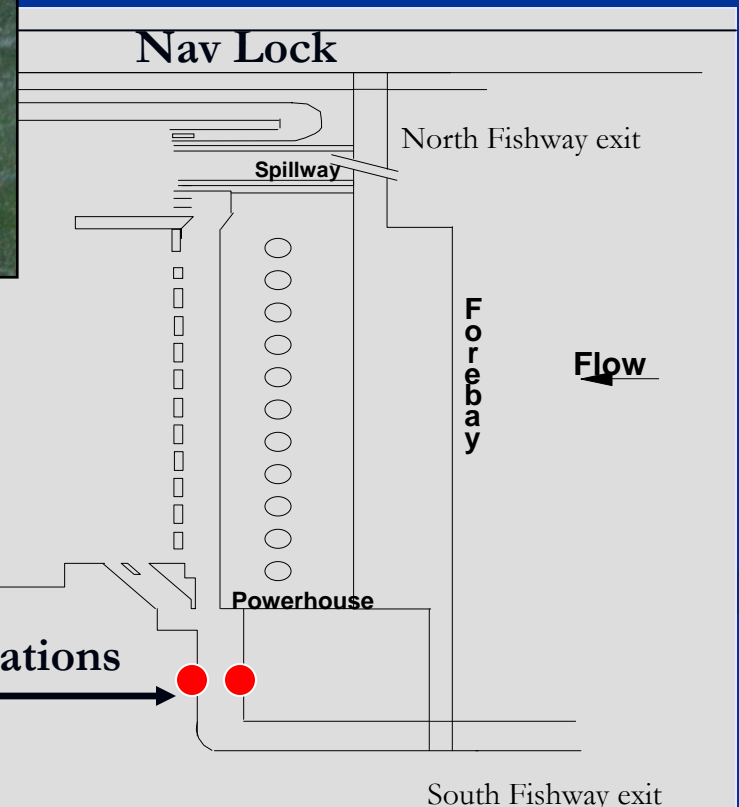


Capturing Lamprey At McNary Dam

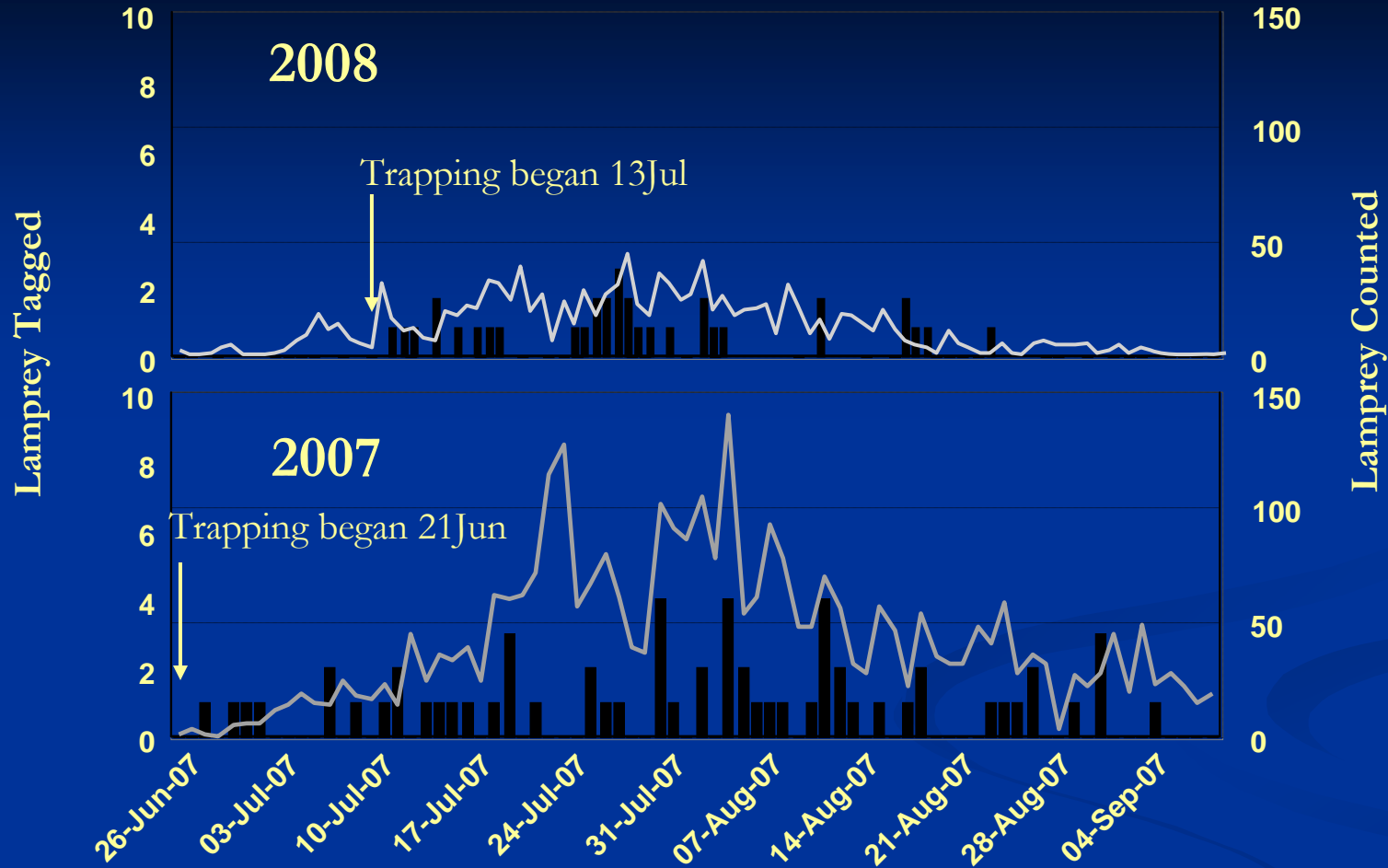
Lamprey Passage by Fishway

	South	North	Total
2008	1161	348	1509
2007	2567	944	3511

~ 3:1 North to South ratio



McNary Dam



	2008	2007
Total past dam	1,509	3,511
Total captured/tagged	34	61
Percentage tagged	2.2%	1.7%

← 57% decrease in fish count

← 30% increase in trapping efficiency



Radiotags

2.2 g in air

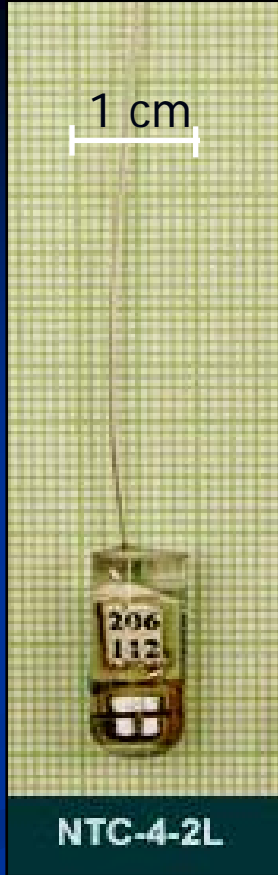
8.3 mm x 18.3 mm

8 Second Burst Rate

Half Duplex PIT tags

0.6 g in air

3.83 mm x 23 mm

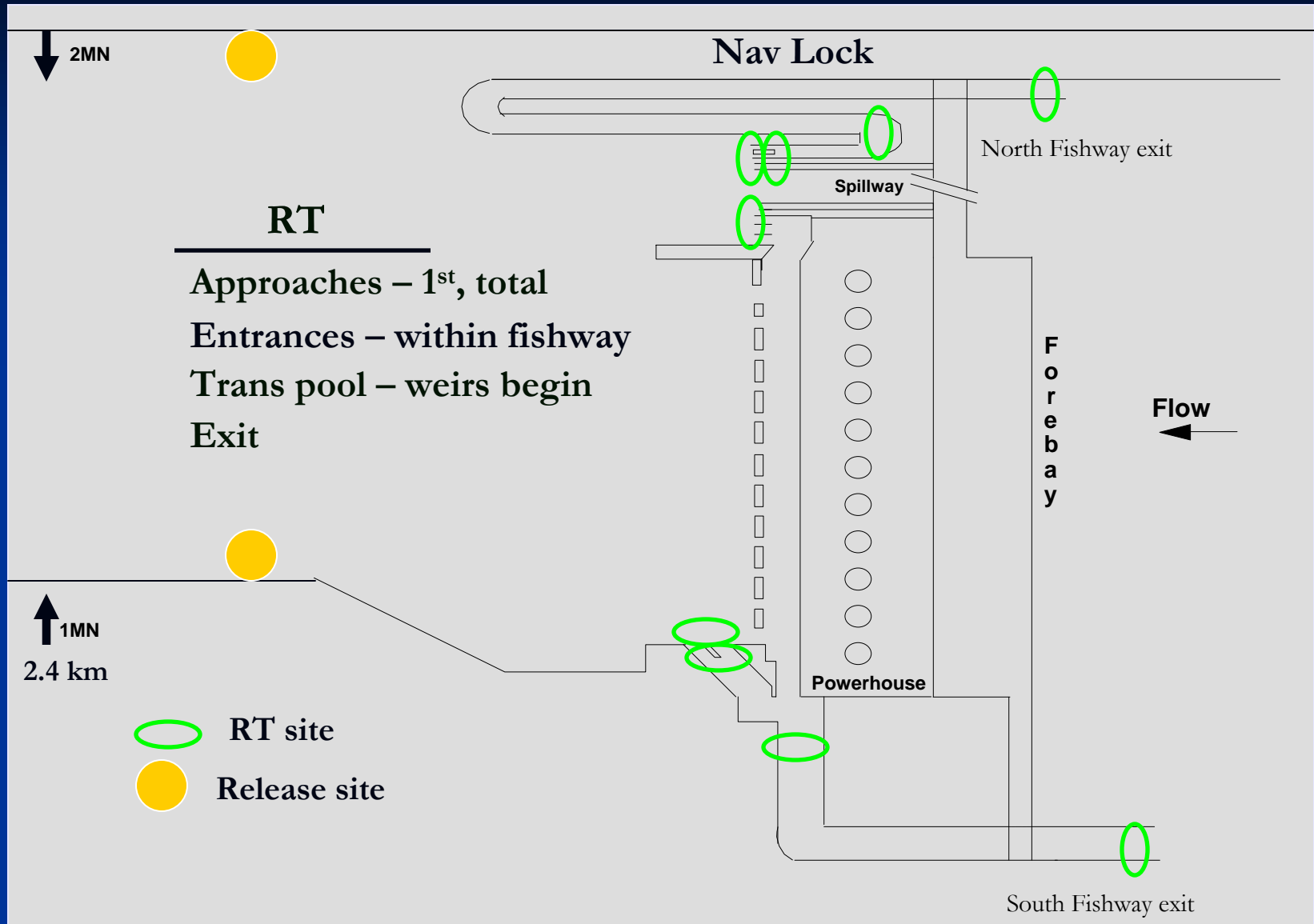


NTC-4-2L



12 mm FDX vs. 23 mm HDX

McNary Dam Radio-telemetry 2008



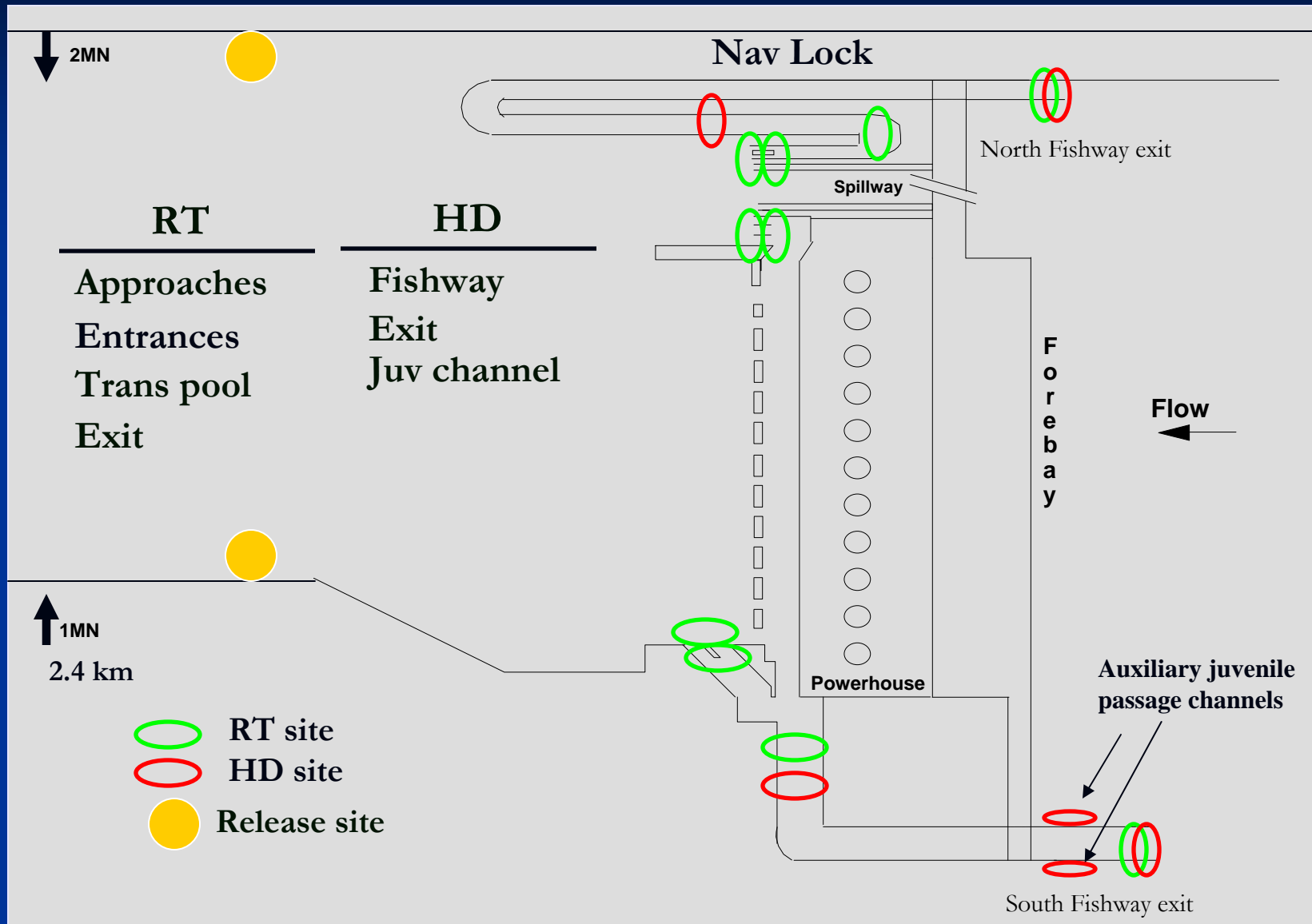
Identical to 2006-2007 except for additional “approach” antennas

More specifically...

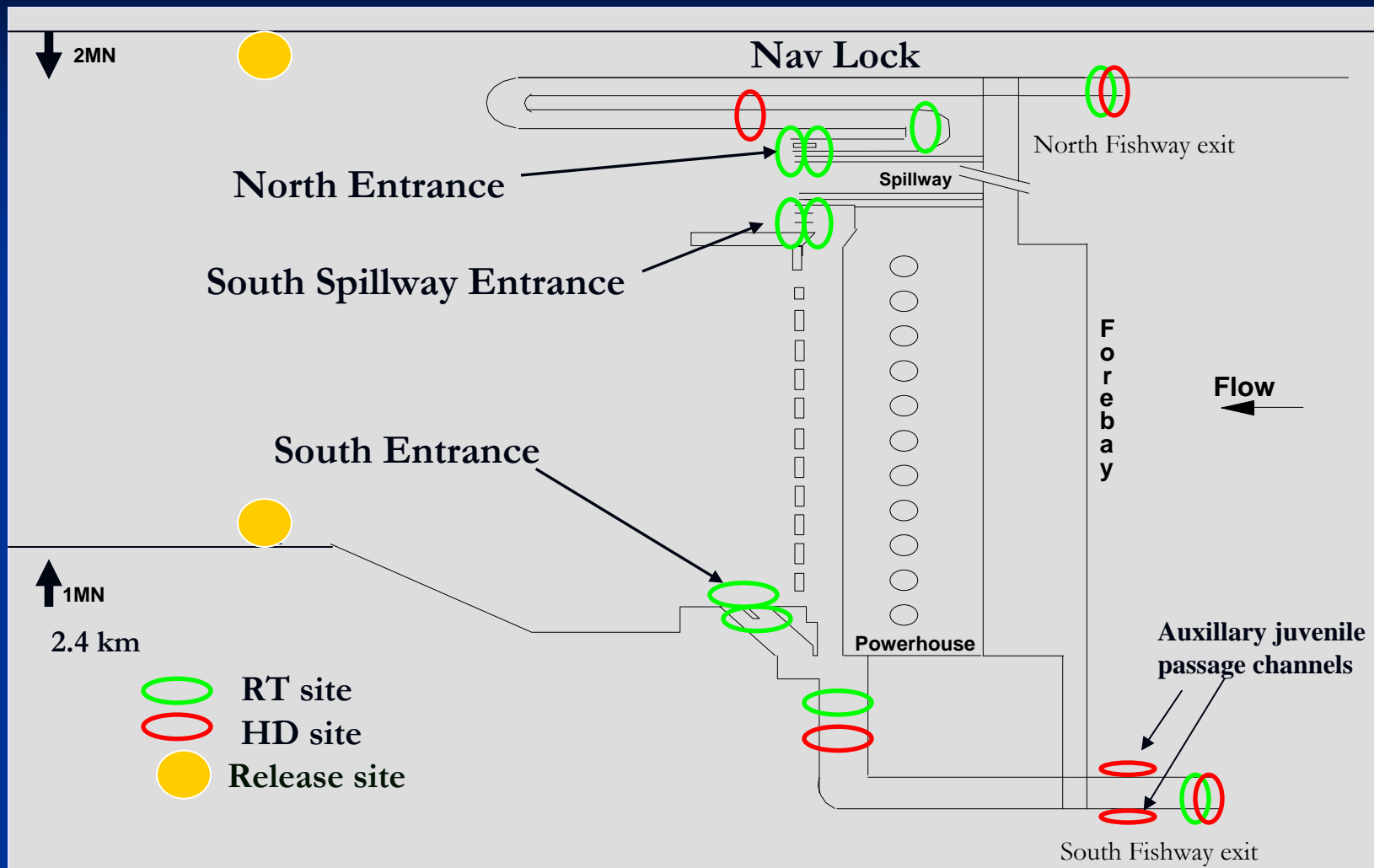


Better coverage of area adjacent to fishway entrances

McNary Dam RT and HD coverage 2008



Approaches and Entrances

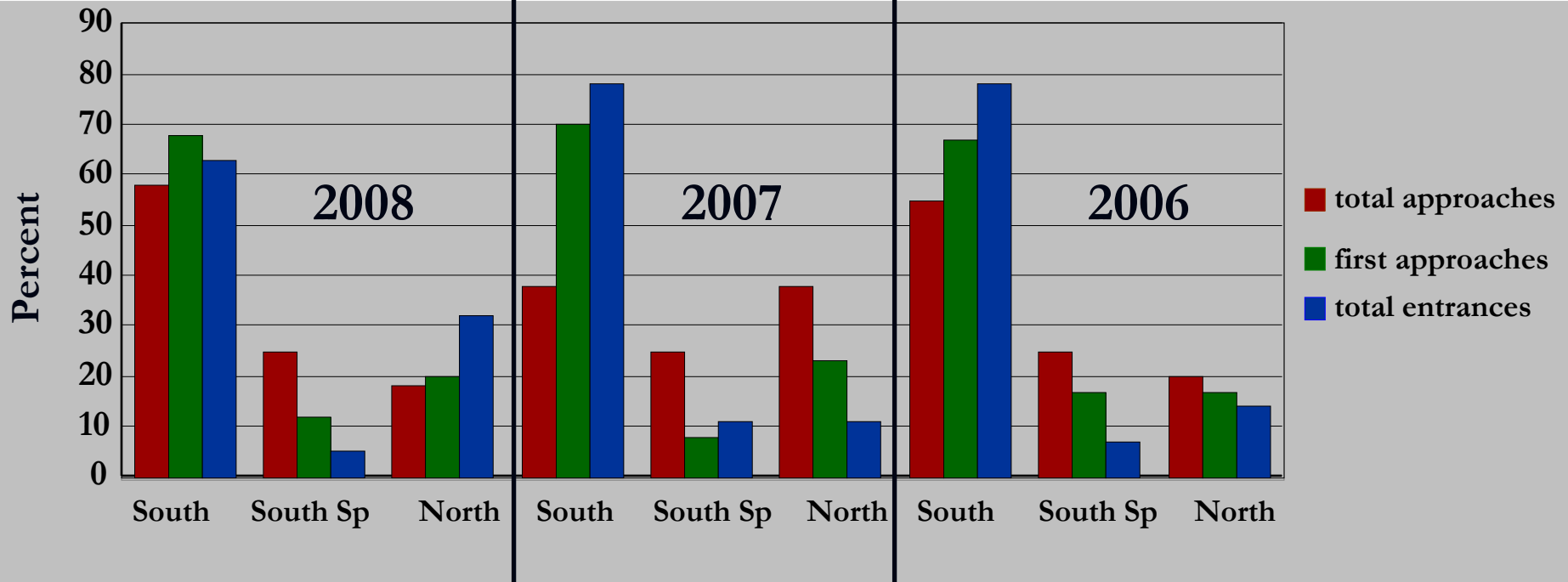


Of 34 lamprey released below McNary Dam in 2008:

FW Entrance	Approaches		Entrances		
	Total	First	Total	with 1 st App	dam passage
North	10	5	6	3	4
South Spill	14	3	1	0	-
South	33	17	12	10	11
Total	57	25	19	13	15

58% of all approaches and 68% of 1st approaches occurred at South Entrance
 63% of all entrances occurred at the South Entrance as did 73% of passages (82% in 2007)
 A high proportion of entrances occur with the 1st approach

Approaches and Entrances among years





McNary Lock & Dam

Most lamprey passage at McNary occurs in July and August during spill conditions

General passage information:

	2008	2007	2006
Released	34	60	40
Approached	26 (76%)	14 (23%)	18 (45%)
Entered	19 (56%)	12 (20%)	14 (35%)
Ent. Efficiency	73%	86%	78%
Exit then pass	3	3	0
Exit no pass	4	0	1
Passed	15 (44%)	12 (20%)	11 (28%)

- Two of five lamprey to exit and not pass the dam were detected moving downstream after release but prior to dam approach

-Of five fish detected on downstream antennas (2.4 km ds), only one passed the dam

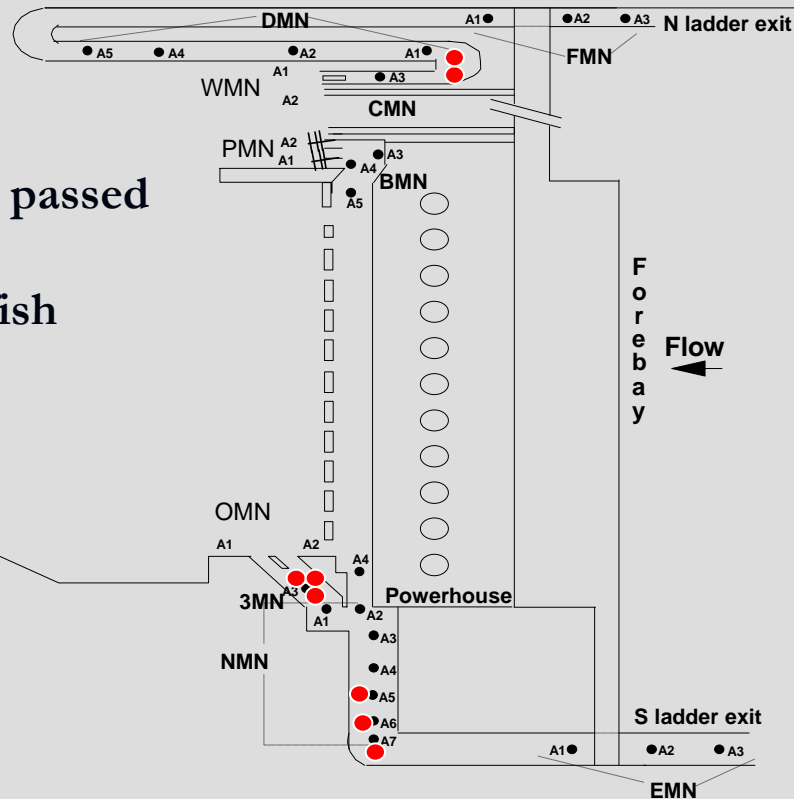
-No detected fallback

Where did fish that exited turn around?

McNary Dam - 2008

7 fish exited 8 times
3 fish re-entered and passed
a different fishway
No “disappearing” fish

• Underwater Antenna



Though proportionally more fish exited in '08 than previous years, areas where they turned around were similar

Passage times at McNary in 2008

	N	Median (days)	Range (days)	2007 med.
Rel to approach	25	1.6	0.6 – 13.6	7.6
Rel to enter	19	4.3	0.6 – 13.7	6.9
Approach to enter	18	0.01	0.002 – 10.0*	0.001
Enter to exit	14	0.6	0.2 – 7.0 **	2.8
Rel to exit	14	4.2	0.8 – 14.8	10.9

* 12 of 18 fish took 1 h or less from approach to entrance

** 8 of 14 fish took less than 1 d, 5 of 14 took less than 8 h
time of fishway entry influenced passage time

Detection Efficiencies at McNary Dam

- Proportion detected at downstream sites that were later detected at upstream dam
- 8 lamprey detected upriver

$$\text{RT} \quad 8/8 = 100\%$$

$$\text{HD} \quad 6/8 = 75\%$$

RT/HD Comparison at McNary Dam

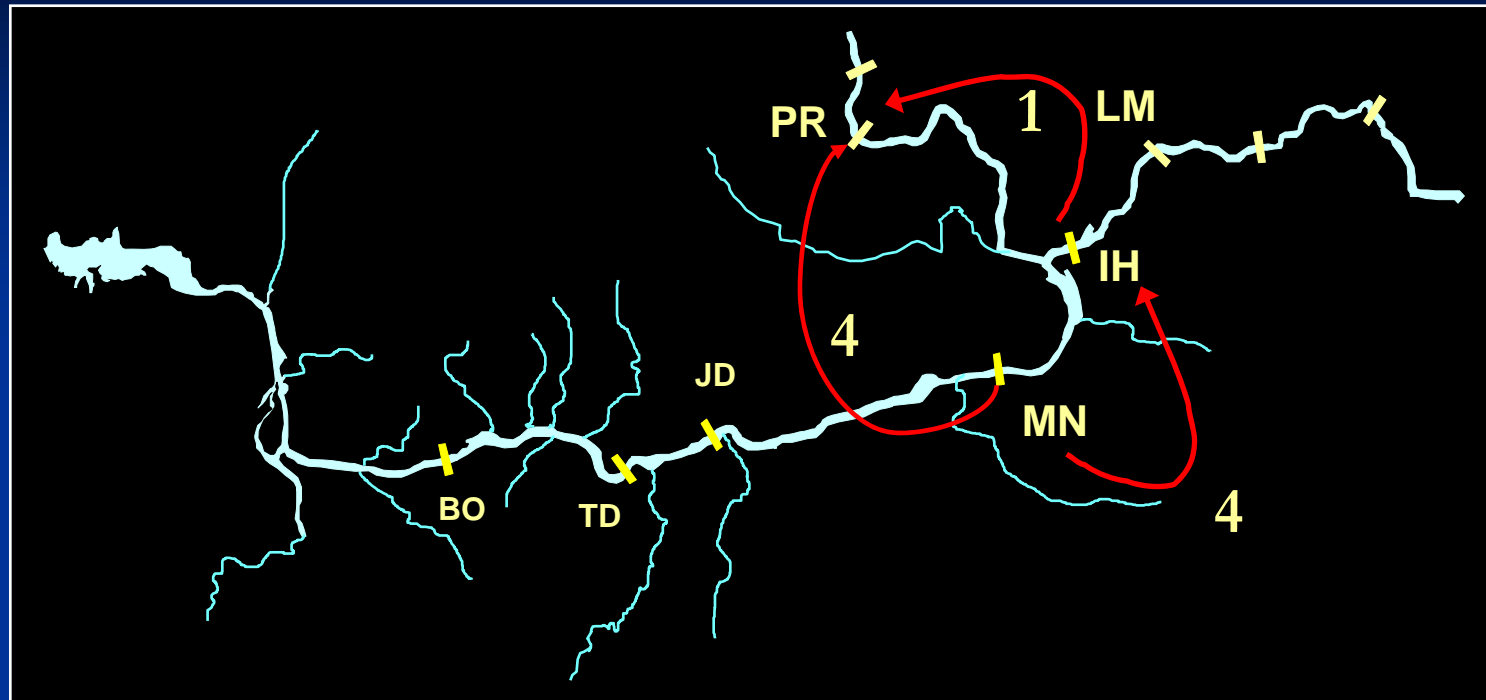
- 15 total “top of fishway” detections (combo of HD and RT data)

$$\text{RT} \quad 14/15 = 93\%$$

$$\text{HD} \quad 13/15 = 87\%$$

The fish missed by one system were detected by the other

Of the 15 Lamprey known to pass McNary we have upriver dam records of 8 fish.

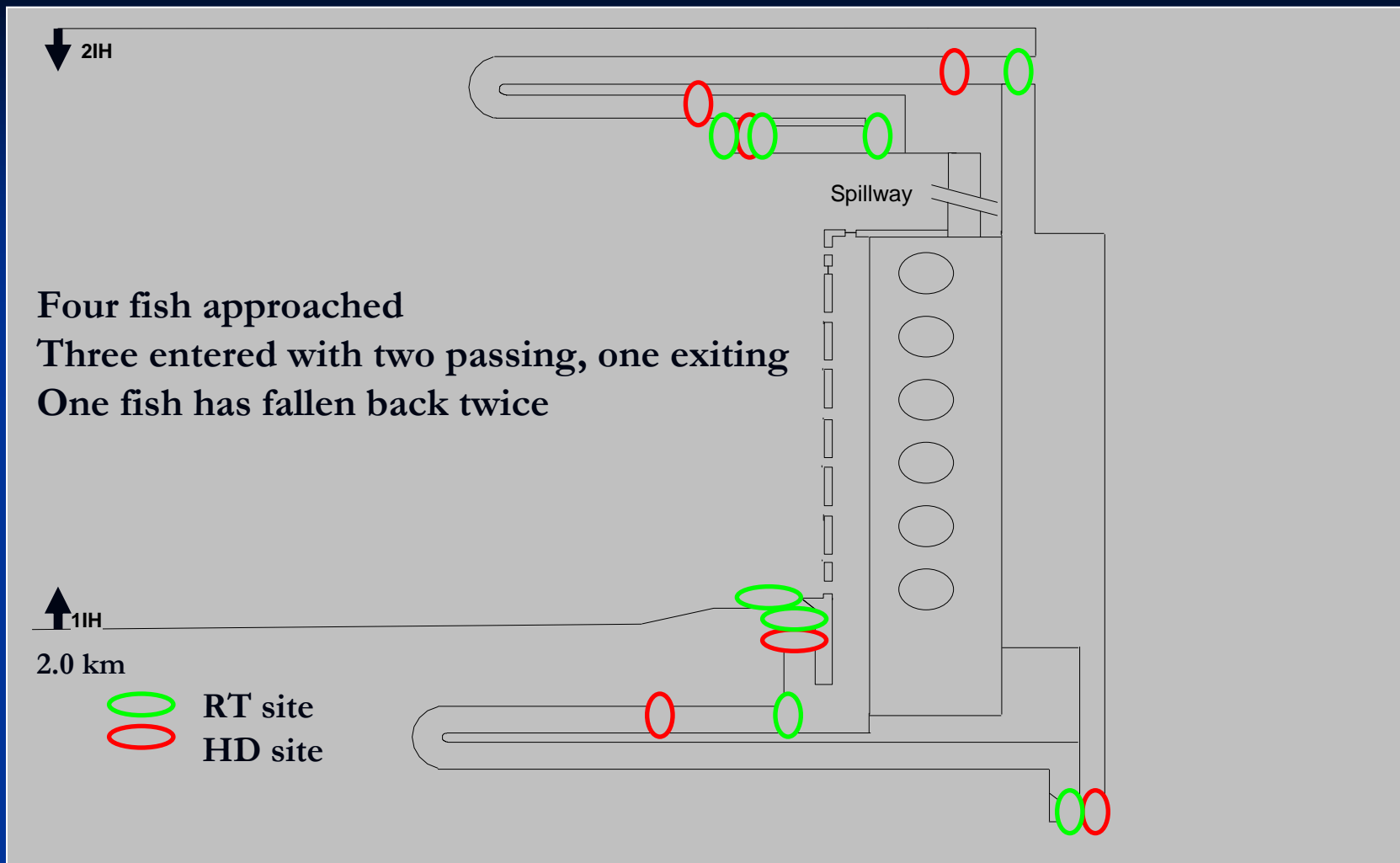


Reach	N	Time	Rate
MN to PR	5	7.1 – 18.1 d	9.3 – 23.8 km/d
MN to IH	4	1.3 – 9.4 d	7.2 and 52.5 km/d

All five lamprey to reach Priest Rapids passed the dam

Two of three lamprey to enter Ice Harbor fishway passed the dam with one fallback

Behavior at Ice Harbor Dam



	N	Mean	Range
Approach to entrance	3	1.2 d	0.01 – 3.1 d
Entrance to fishway exit	3	0.5 d	0.2 – 0.9 d

Summary

Though trapping efficiency increased by 30%, we were unable to meet tagging goals

At McNary Dam, rates of approach, entrance and dam passage were 1.5 to 2 times higher than in previous years, though 24% of tagged lamprey were not detected after release

Times from first approach to fishway entrance were small (median ~ 15 min.) as were times from entrance to dam passage (median ~ 14 h). These metrics at Ice Harbor were similar

Future Considerations

We need to increase our sample size

- identify areas of congregation in fishways
- multiple portable “funnel” traps
- translocation from John Day ??
 - 23 to 61% of lamprey counted at JD pass MN (2004-2008 DART)
 - tag sub-group to evaluate behavior

“Final Fates” of lamprey (25-75% not detected after release)

- long life acoustic tags