

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

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Three reasons why salmon biologists have a hard time studying lamprey

Evidence suggests lamprey are not site specific spawners

Lamprey over-winter between entry into fresh water and spawning

Dam passage facilities were not designed for lamprey

Topics to be covered

Lamprey run and trapping effort

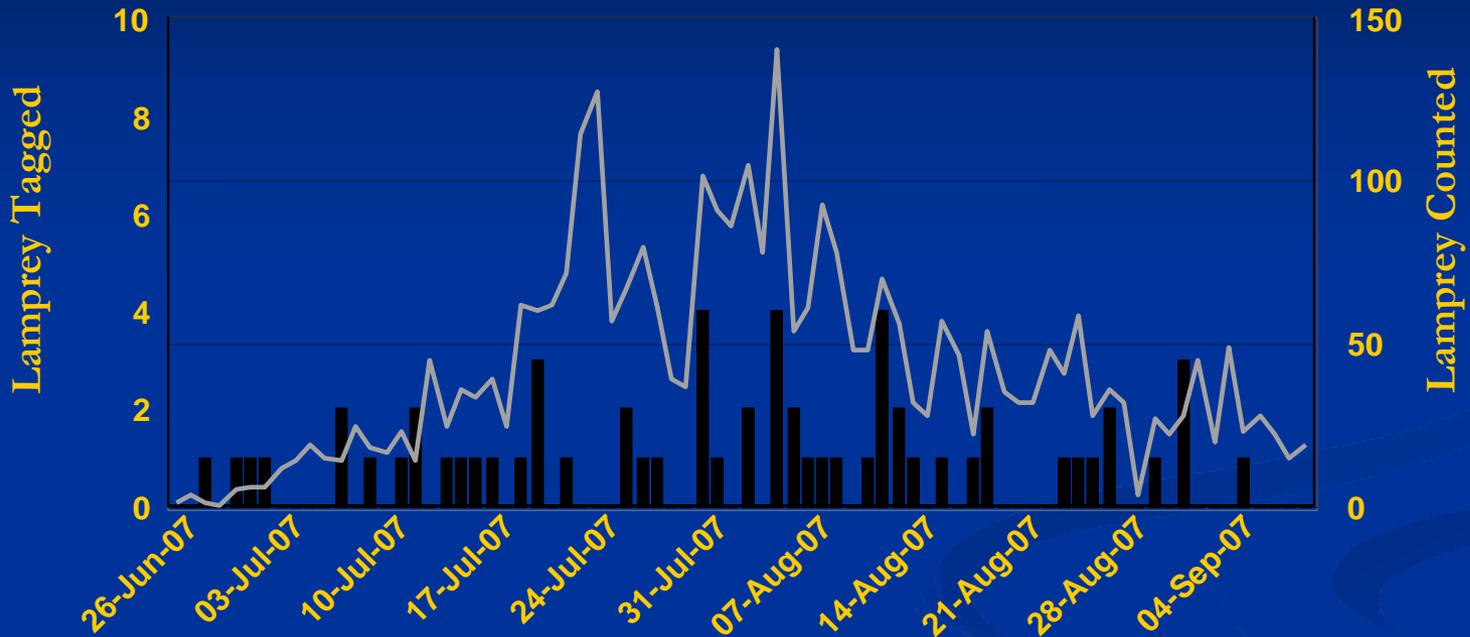
Describe our RT and Half-Duplex coverage at MN and IH dams

Using these Systems

- Lamprey behavior at dams
- Detection efficiencies
- Passage times through reservoirs

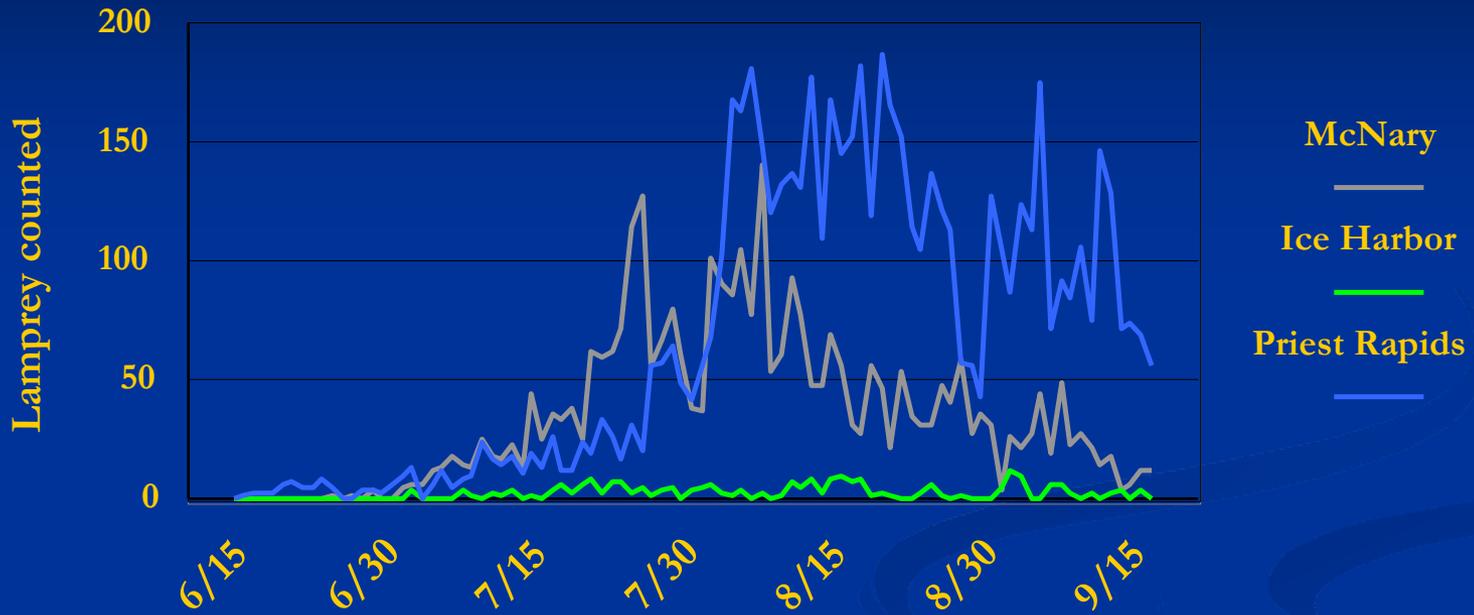
*These results are preliminary, study animals are still currently migrating

McNary Dam



Total past dam	3,234		<u>MN</u>	<u>BO</u>
Total captured/tagged	61	Mean Length	65 cm	66 cm
Percentage tagged	1.9%	Mean weight	431 g	466 g

2007 Daily Window Counts



McNary	3,279
Ice Harbor	276
Priest Rapids	6,193

Capturing Lamprey



Permanently mounted trap

42 of 61 lamprey (69%)



Portable Trap prototype

9 of 61 lamprey (15%)

9 additional lamprey were dip netted near the Oregon fishway viewing window
(Very labor intensive)





Radiotags

2.2 g in air

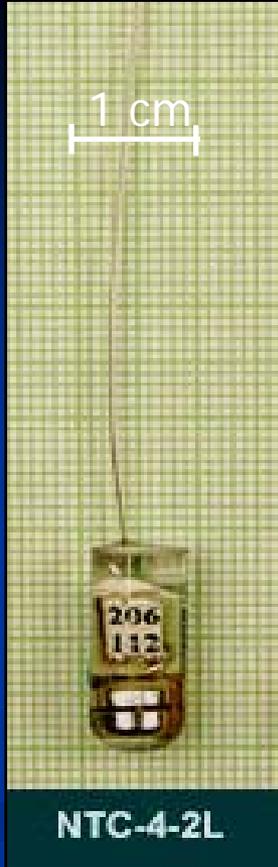
8.3 mm x 18.3 mm

8 Second Burst Rate

Half Duplex PIT tags

0.6 g in air

3.83 mm x 23 mm

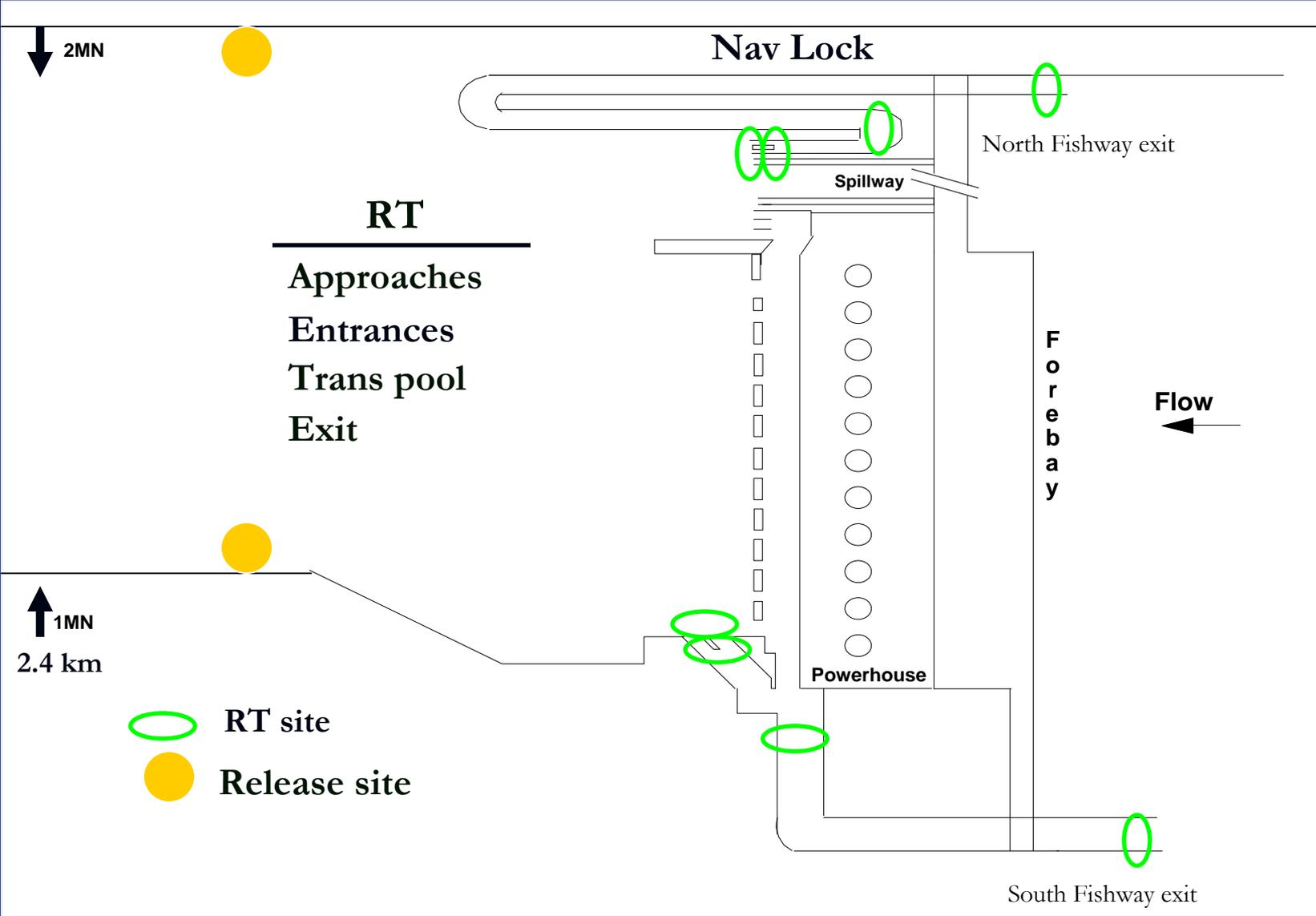


NTC-4-2L

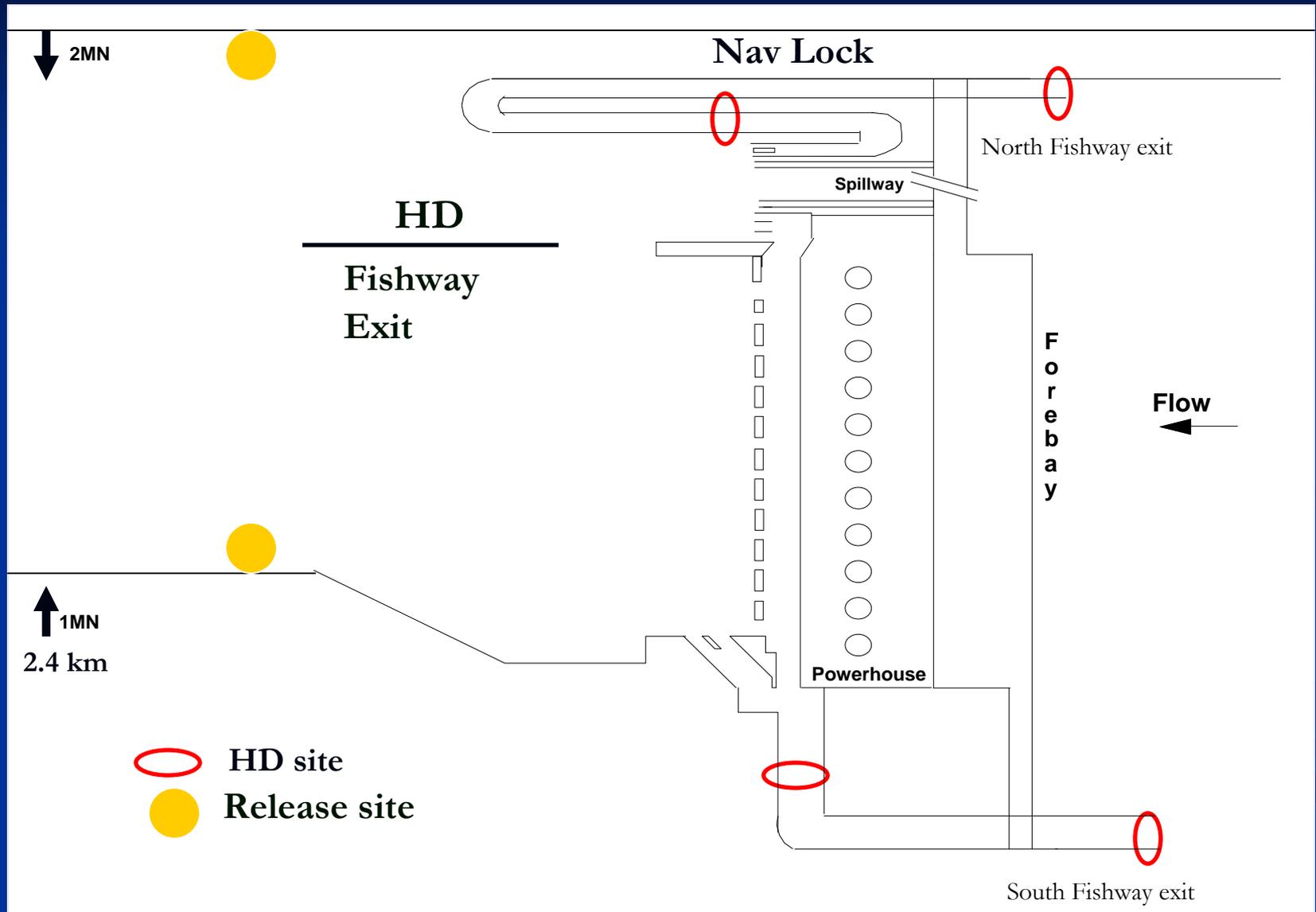


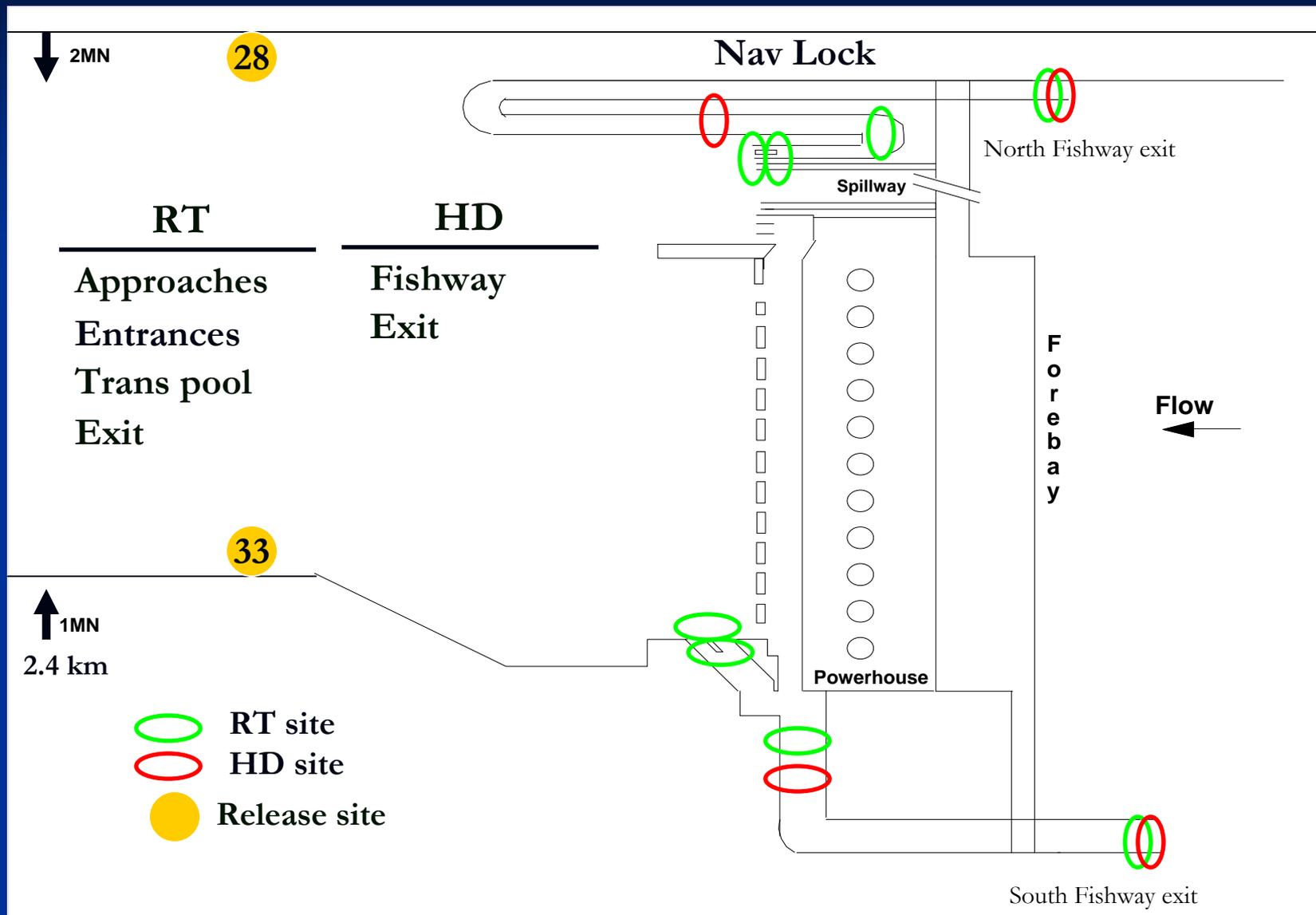
12 mm FDX vs. 23 mm HDX

McNary Dam Radio-telemetry

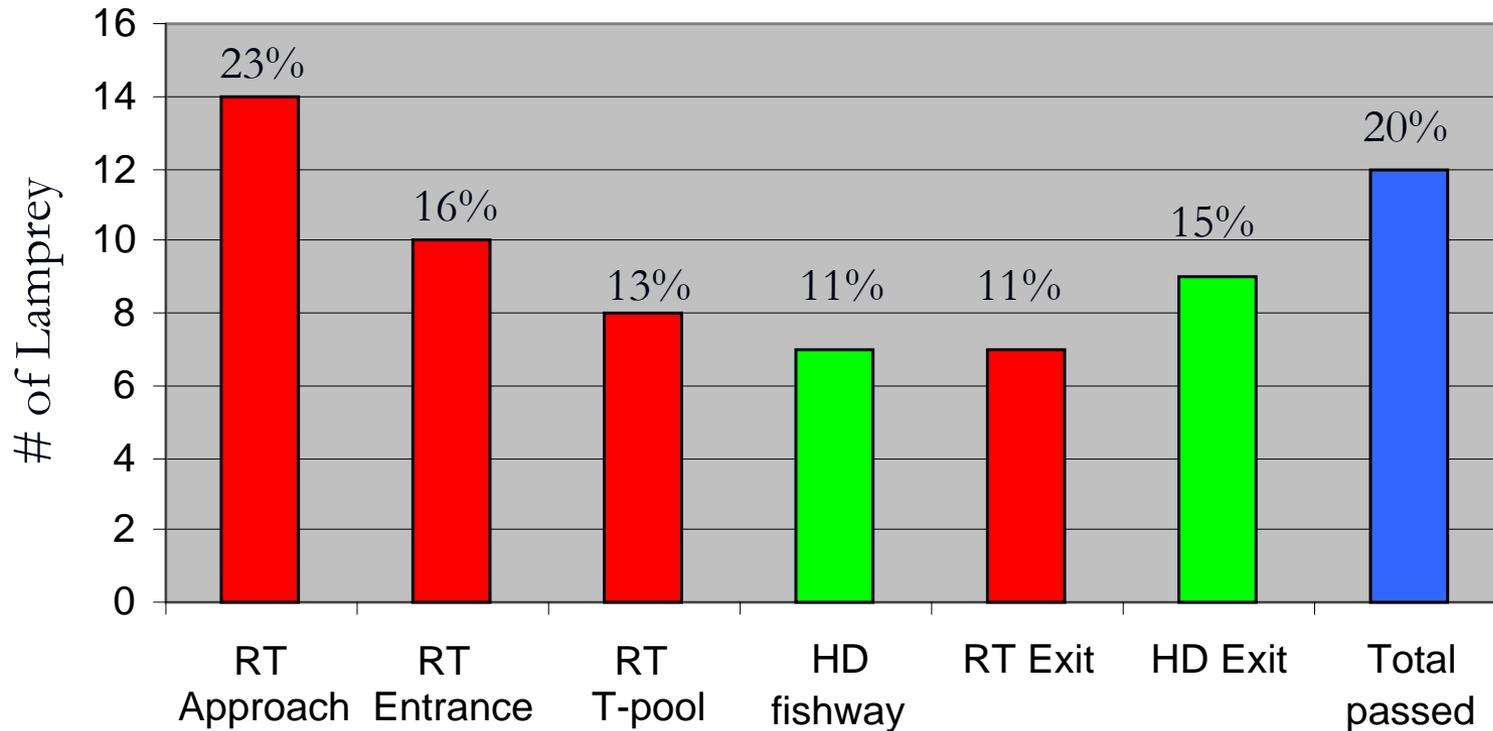


McNary Dam 2007





McNary Dam



61 lamprey released with PIT and/or Radios

16 had detections somewhere at MN, one had detections at upriver dams without being detected at MN.

One PIT tagged lamprey released 17Aug06 passed MN 11Jul07

Not all lamprey were detected on either or both monitoring systems
 Of 12 lamprey known to pass, 9 were detected on HD and 7 by RT
 One fish was not detected on either, possible nav lock passage

Code	RT App	RT Ent	RT Tpool	HD ladder	RT exit	HD exit	passed dam
31	x	x	x		x	x	x
32	x	x	x	x	x	x	x
41	x	x	x	x	x	x	x
44	x	x	x	x	x	x	x
45	x	x	x	x	x	x	x
39	x	x	x		x		x
94	x	x	x		x		x
36	x	x	x				
53	x	x		x		x	x
33	x	x					
35	x						
37	x						
40	x						
70	x						
64				x		x	x
67						x	x
76				x		x	x
51							x
	14	10	8	7	7	9	12

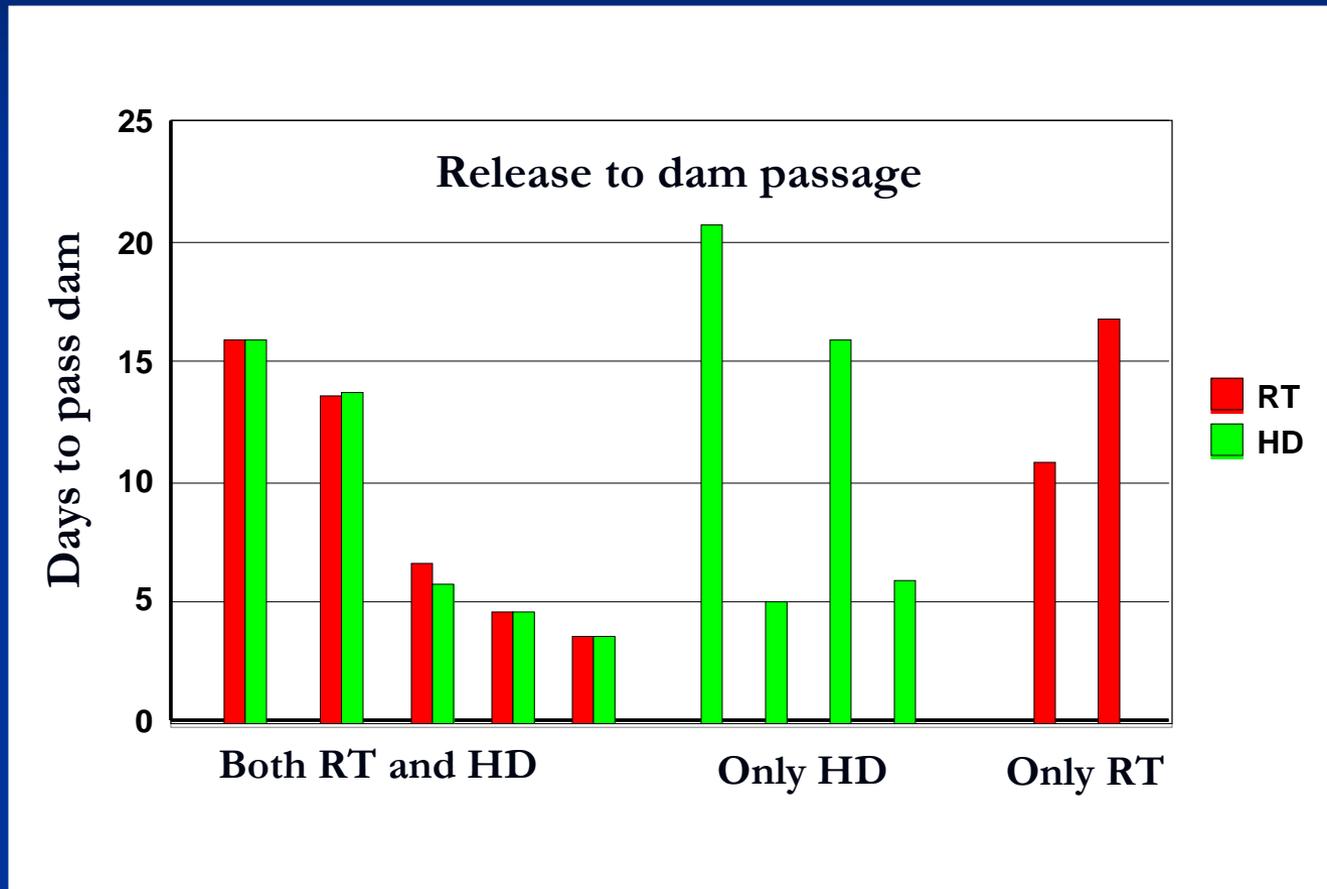
Comparing Detection Efficiencies of RT and HD

HD 9/11 = 82%

RT 7/11 = 64%

Lamprey passage times at McNary

11 lamprey with enough data for complete passage time analysis at MN
Passage times were highly variable, no difference between RT and HD



Passage times reported hereafter are RT derived except where noted

Passage times at McNary

	N	Median (days)	Range (days)
Rel to approach	14	7.6	0.7 - 42.5
Rel to enter	10	6.9	0.7 - 42.5
Approach to enter	10	0.001	0.001 – 0.06
Enter to exit	7	2.8	0.2 – 8.2
Rel to exit *	11	10.9	3.6 – 20.7

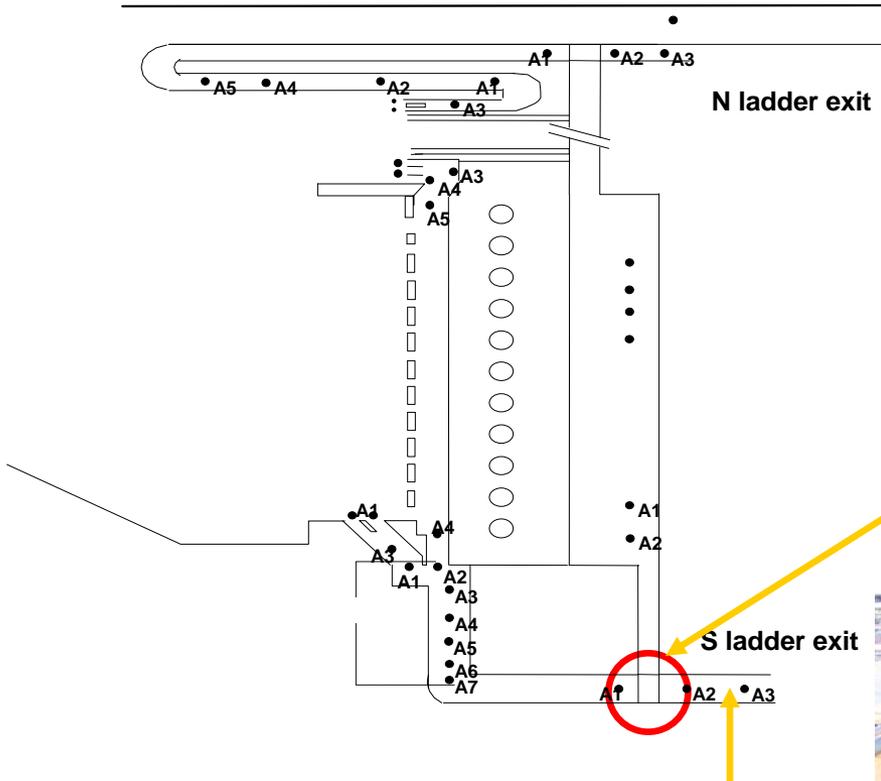
* HD and RT data combined

Comparison of years at McNary

	2006	2007
% of all released fish that approached	43%	28%
% of fish that approached to pass MN	59%	86%
% released that passed the dam	25%	20%
Median time (N) from approach to pass MN	3.01 d (3)	2.91 d (7)

Fishway Mystery Solved!

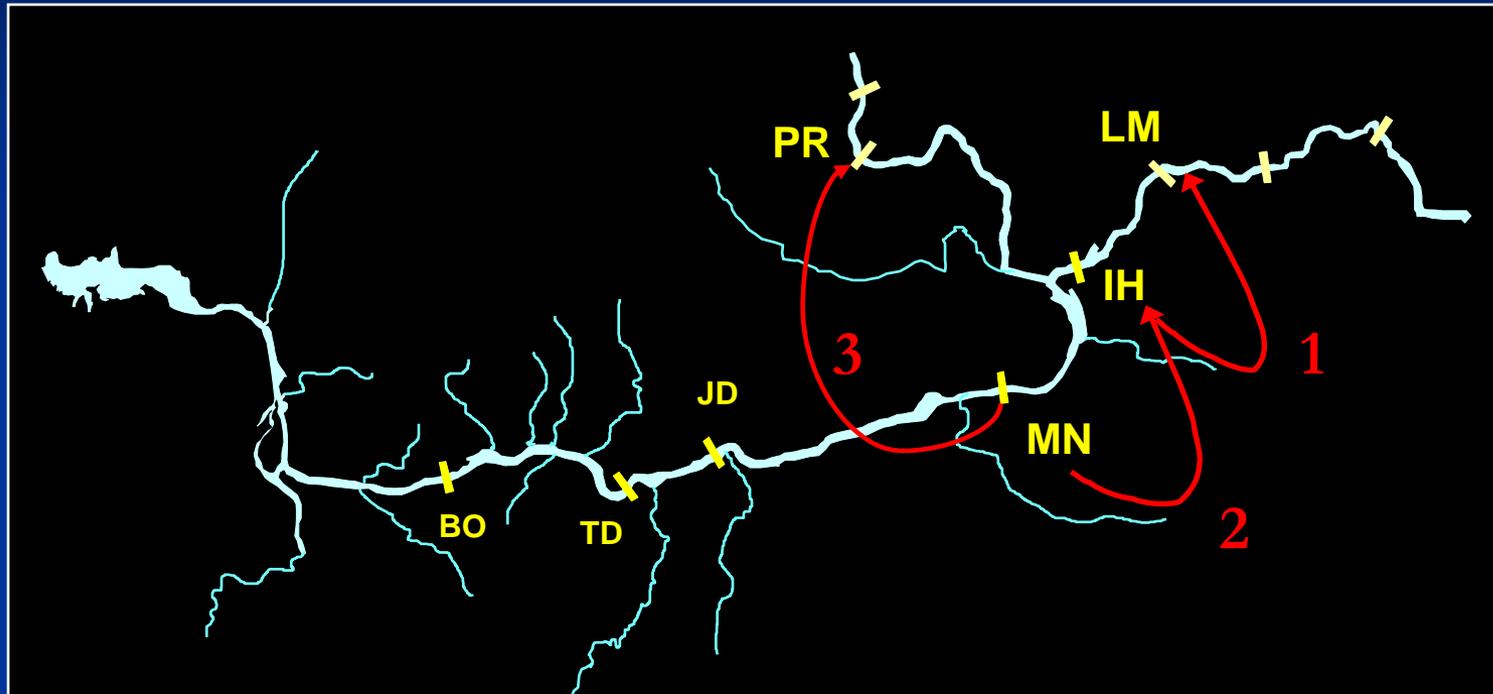
Last known location of four lamprey in 2006



Auxiliary Juvenile Passage Channel outfitted with HD antennas for 2007

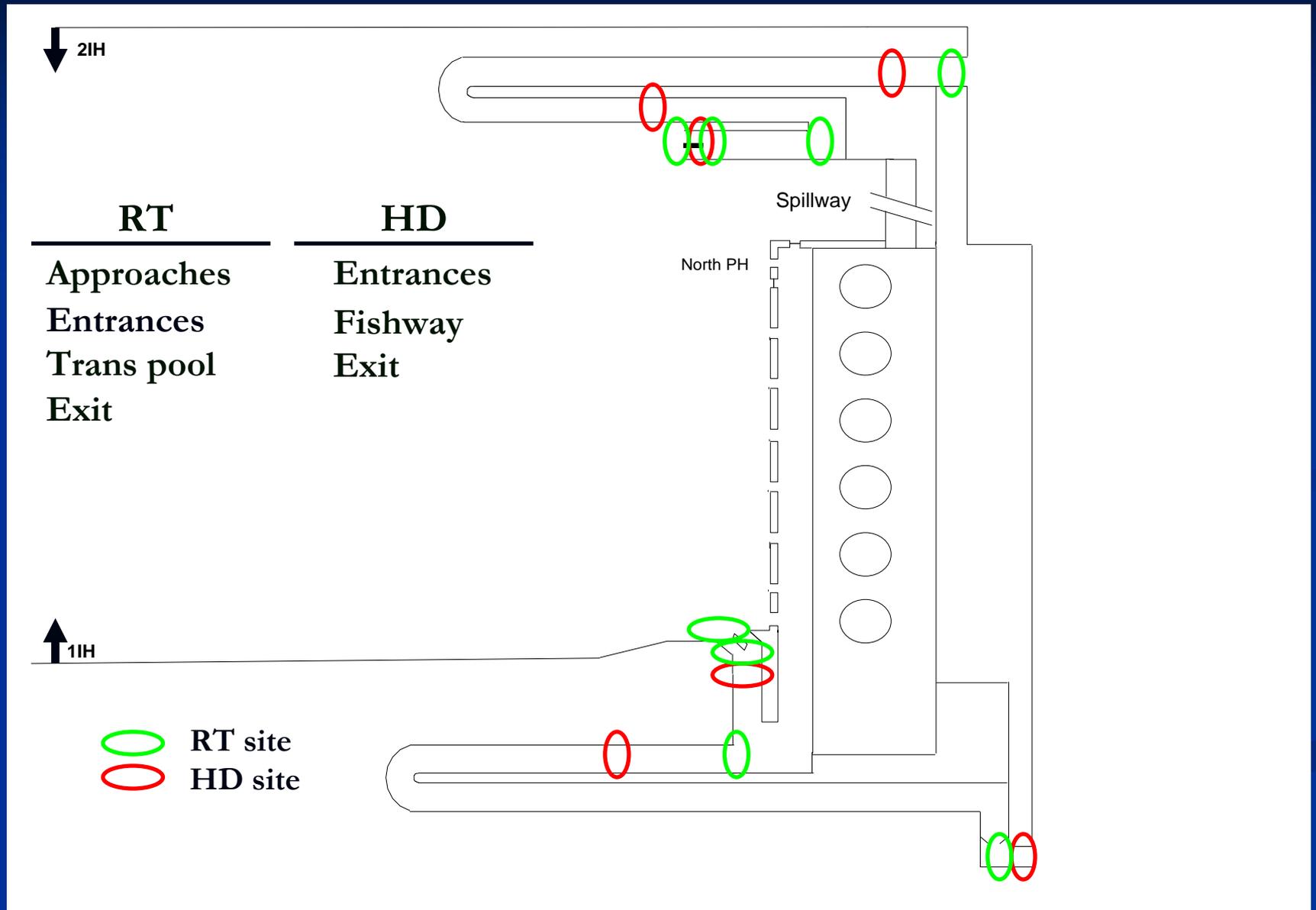
Five of seven lamprey to pass this fishway were detected on these antennas, with four of these fish not detected on the exit antenna

Of the 12 Lamprey known to pass McNary we have upriver dam records of 5 fish.



Reach	N	Time	Rate
MN to PR	3	8.7 – 39.7 d	4.3 – 19.4 km/d
MN to IH	2	5.9 and 19.1 d	3.6 and 11.5 km/d
IH to LM	1	5.7 d	9.0 km/d

Ice Harbor Dam PIT and Radio Monitoring



Lamprey behavior at Ice Harbor Dam

Two tagged lamprey have passed Ice Harbor via the South Fishway.

Both lamprey were detected by both HD and RT systems

Lamprey took 9.4 and 17.1 hour from first approach to exit Ice Harbor

Times from approach to entrance were 24 min. and 2 h.

One lamprey fell back three days later and has not been detected since

One lamprey was detected at Lower Monumental 9 days later

In summary...

17 of 61 (28%) of tagged lamprey were detected after release

86% of lamprey that approached the dam passed the dam (59% in 2006) with most lamprey entering quickly (~12 min) after approaching

Lamprey took about 3 d to pass MN after entering fishway

Lamprey migration rates through reservoirs were 3.6 to 19.4 km/d with three of five lamprey detected at Priest Rapids

Both fish detected at IH passed IH with one falling back and the other continuing to LM

HD detection efficiency at MN was 82% and 100% at IH

In the future...

Increase the trapping capacity at McNary

Continue to increase efficiency of HD system

“Tighten up” RT coverage at MN and IH

Install HD monitoring at Priest Rapids Dam



I'll migrate when
I'm good and ready