

The tables below are detection summaries for adult lamprey implanted with HDX PIT tags detected at Rocky Reach in 2014 and 2015. Summary metrics include the count of unique tags detected at Rocky Reach Dam, count of tags last detected at the fishway exit, last detected at fishway entrances, last detected in the fishway, drop back within the fishway, and fall back to a fishway entrance. The row highlighted in yellow in the 2014 table represents the fish with final detections in the fishway during the period of August 7-18, 2014 when the Rocky Reach exit (station RR07) was compromised (16 fish), which is a subset of the 79 fish last detected in the fishway. Some portion of these 16 fish likely reached the exit undetected.

HDX PIT detections at Rocky Reach Dam, 2014

	Rocky Reach Fishway
Unique tags detected at dam	288
Total last detected at exit of fishway	66.0% (190 of 288)
Total last detected in fishway when RR07 was compromised	5.5% (16 of 288)
Total last detected at entrance	<1% (2 of 288)
Right fishway entrance	0 (0 of 2)
Left fishway entrance	50% (1 of 2)
Spillway entrance	50% (1 of 2)
Total last detected in fishway	27.4% (79 of 288)
Net drop back (total DB minus passage)	12.5% (36 of 288)
Net fall back (total FB minus passage)	2.8% (8 of 288)

HDX PIT detections at Rocky Reach Dam, 2015

	Rocky Reach Fishway
Unique tags detected at dam	37
Total last detected at exit of fishway	70.3% (26 of 37)*
Total last detected at entrance	13.5% (5 of 37)
Right fishway entrance	0 (0 of 2)
Left fishway entrance	60% (3 of 5)
Spillway entrance	40% (2 of 5)
Total last detected in fishway	10.8% (4 of 37)
Net drop back (total DB minus passage)	10.8% (4 of 37)
Net fall back (total FB minus passage)	5.4% (2 of 37)

*Not a complete record of 2015 detections. Last included detections occurred 9/1/15

T1. Calculate travel time summary statistics from release to first detection at Rocky Reach fishway in 2014 (first column in table; BLE-tagged fish only). Also reported here are travel time within the fishway (second column in table; tags from all data sources) and travel time from release to the exit station at Rocky Reach Dam (third column in table; BLE tagged fish only). Units of travel time are in days.

	Travel time from release to first detect at Rocky Reach	In-fishway travel time from entrance to exit	Travel time from release to Rocky Reach exit (RR07)
Min	0.22	0.18	0.51
Max	48.34	28.10	46.53
Mean	3.56 95% CI [2.81, 4.32]	3.14 95% CI [2.30, 3.98]	4.51 95% CI [3.47, 5.56]
Median	1.32	0.63	1.70
SD	5.87	4.86	6.34
Count	233	131	144

T2. Calculate fishway entrance efficiency (number released divided by number detected at any entrance 2014-2015). This calculation is representative of **fish tagged by BLE in 2014** (n=276) that were detected at Rocky Reach fishway in 2014 and 2015. Note that fishway entrance efficiency is a minimum/conservative estimate because it is likely some fish moved up the Wenatchee River rather than continuing to migrate up the Columbia River after release.

Total tagged by BLE in 2014: 276

Total detected (of fish tagged by BLE) at Rocky Reach in 2014: 233

Total detected (of fish tagged by BLE) at Rocky Reach in 2015: 6 (but only 2 new tags that were not previously detected in 2014)

Fishway entrance efficiency 2014 and 2015: $(233+2)/276 = 0.851$

T3. Calculate drop back and fall back rates. Drop back within the fishway was defined as the observation of a fish with a detection history that included a detection at an upstream location within the fishway, with the next sequential detection occurring at a downstream location within the fishway (i.e. a detection at RR06 follow by a detection at RR03). Fall back was defined as the observation of a fish detected at the fishway exit antenna (RR07) with the next sequential detection occurring at a fishway entrance station (i.e. a detection at RR07 followed by a detection at RR01, RR02, or RR05). This calculation is inclusive of **all detections of HDX tags in the Rocky Reach fishway in 2014** (n=288). Because the 2015 dataset was incomplete at the time of this Memo, it was not included here (see table above for summary results through September 1, 2015).

Total drop back in 2014: $58/288 = 0.201$

Net drop back (total drop back minus fish that passed) in 2014: $36/288=0.125$

Total fall back in 2014: $13/190 = 0.068$ (190 fish were detected at RR07 in 2014)

Net fall back (total fall back minus fish that passed) in 2014: $8/190 = 0.042$

T4. Calculate net ladder passage (proportion of fish with final successful passage; number detected at any Rocky Reach fishway station divided by number with final detections at exit antenna RR07). This calculation is inclusive of **all detections of HDX tags in the Rocky Reach fishway in 2014** (n=288 total fish detected; n=190 fish detected at the exit antenna in 2014).

Net ladder passage in 2014: $190/288 = 0.660$