The 2014 adult Pacific lamprey migration: HD-PIT and radiotelemetry summaries

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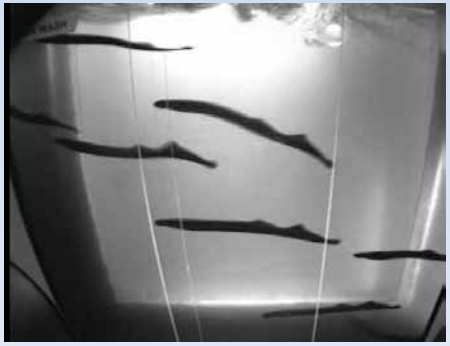
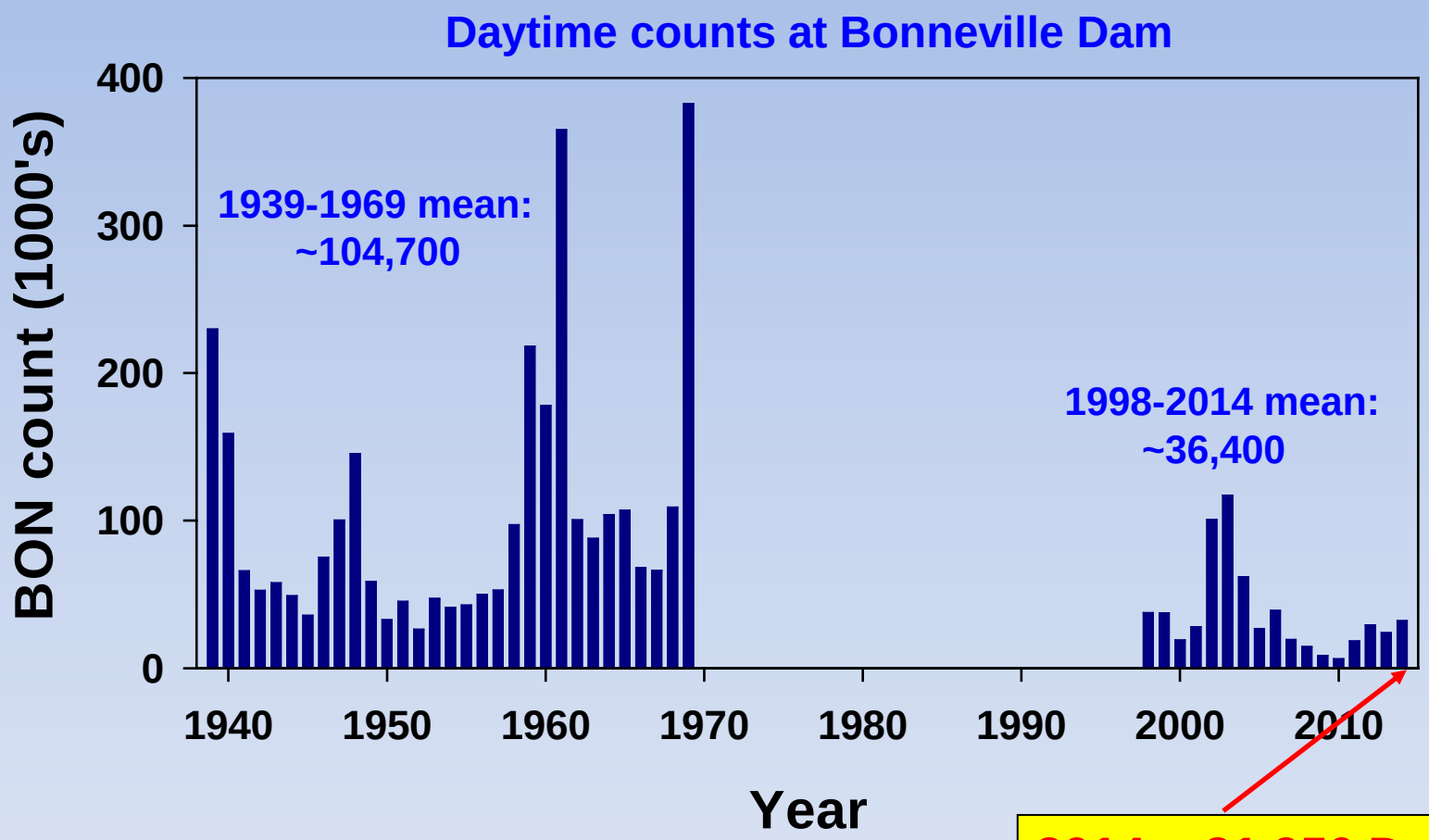
Presentation objectives

- Introduce the 2014 lamprey run
- Migration summaries for the 2014 HD PIT-tagged and radio-tagged samples
  - Upstream escapement past dams
  - Last detection distributions
  - Bonneville & The Dalles passage problems
  - Overwintering: 2013 fish



The 2014 lamprey migration



2014: ~31,950 Day count

Total day count + night count + LPS ~ 120,000

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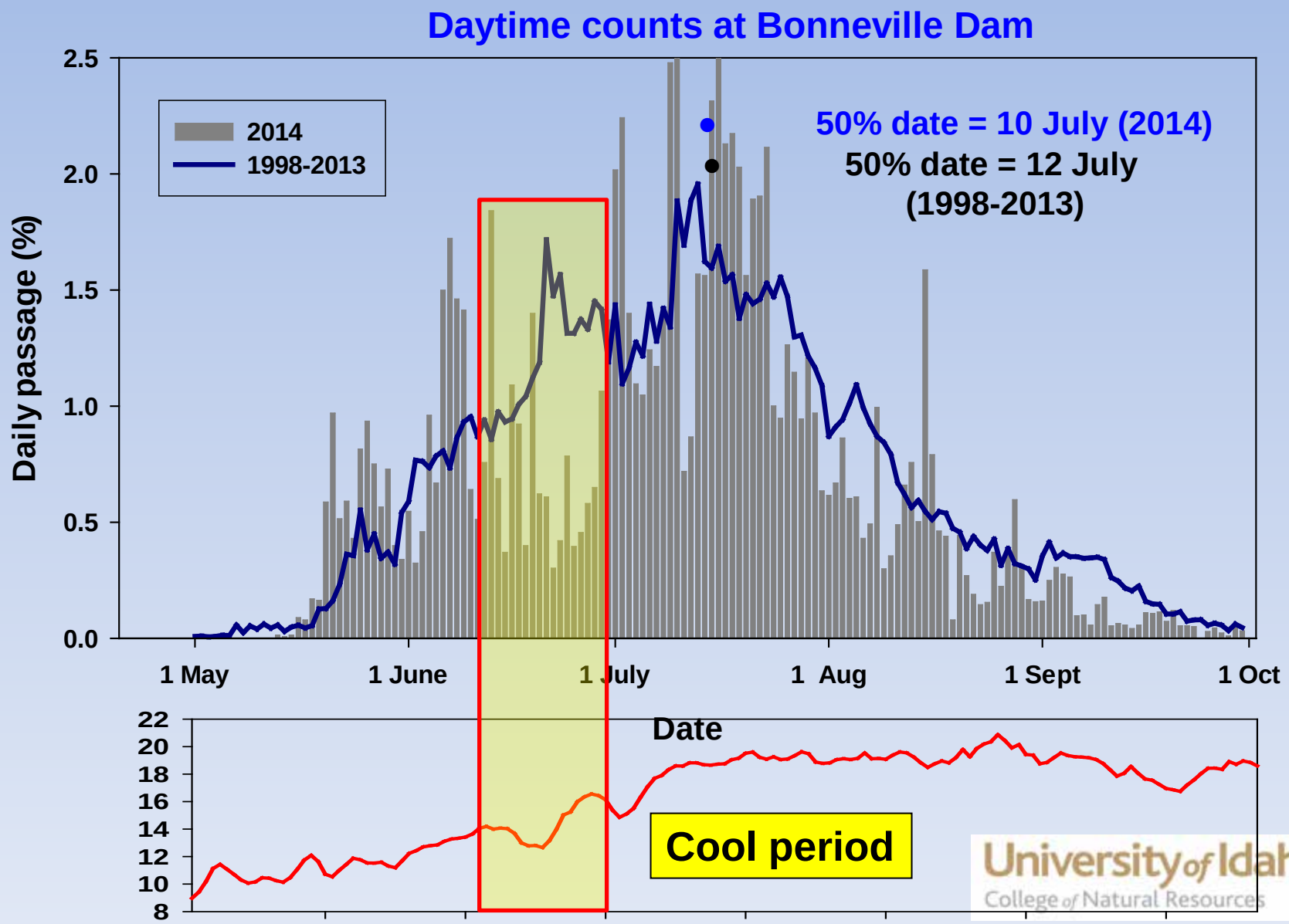
The 2014 lamprey migration



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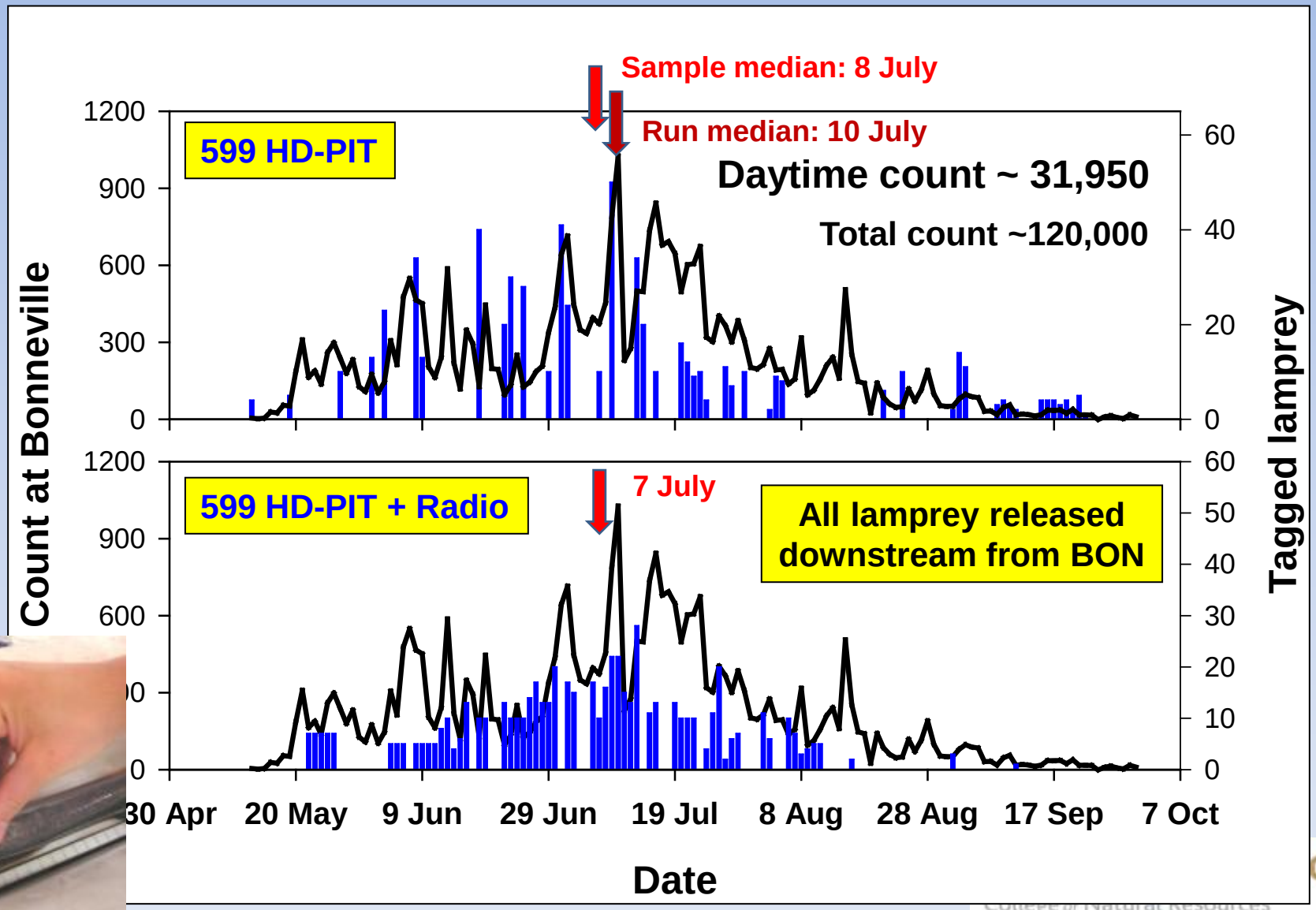
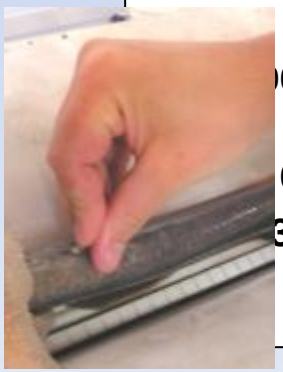
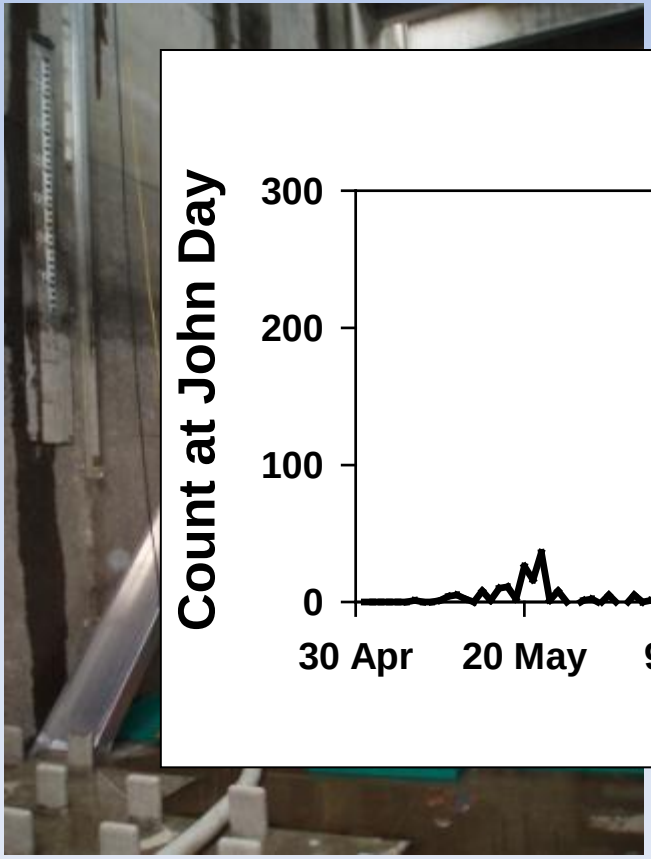
2014 Tagging at Bonneville

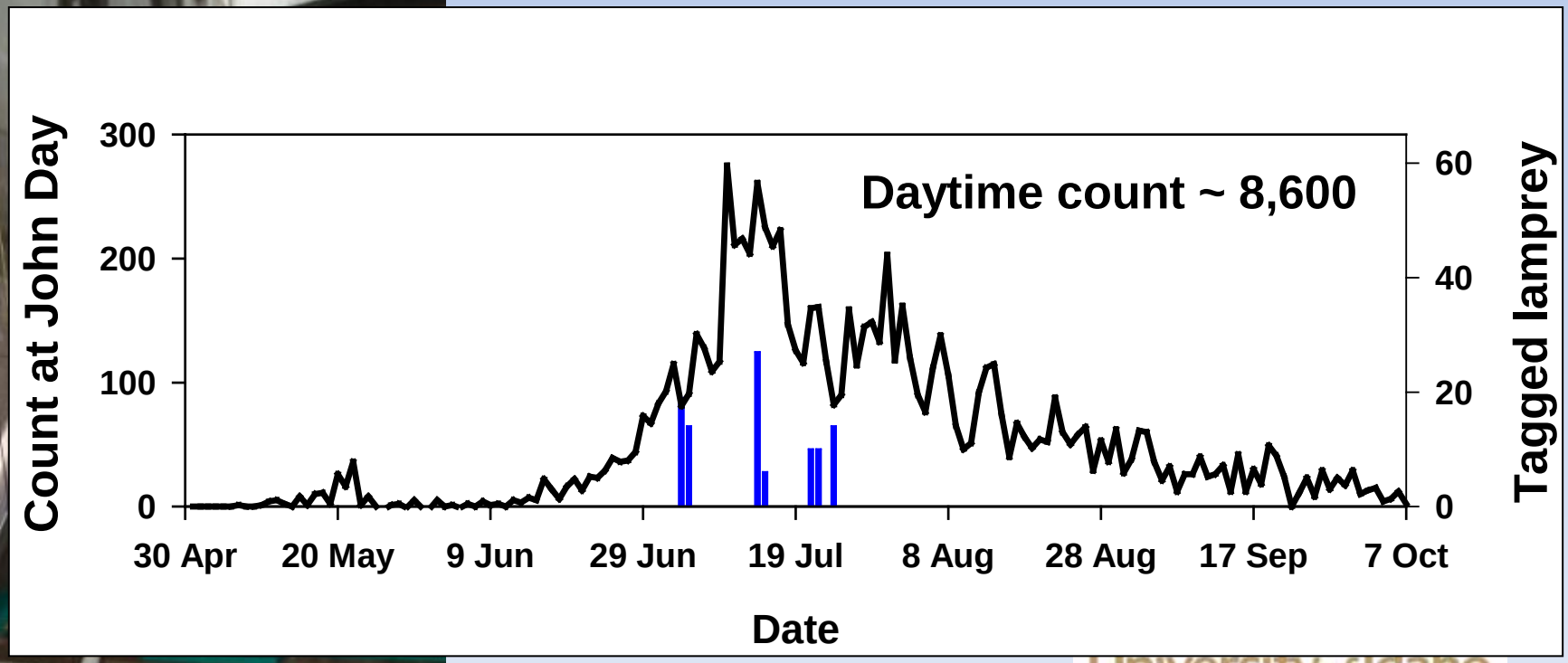




2014 HD Tagging at John Day

- 100 lamprey collected at LPS in North fishway
- Released in the John Day forebay





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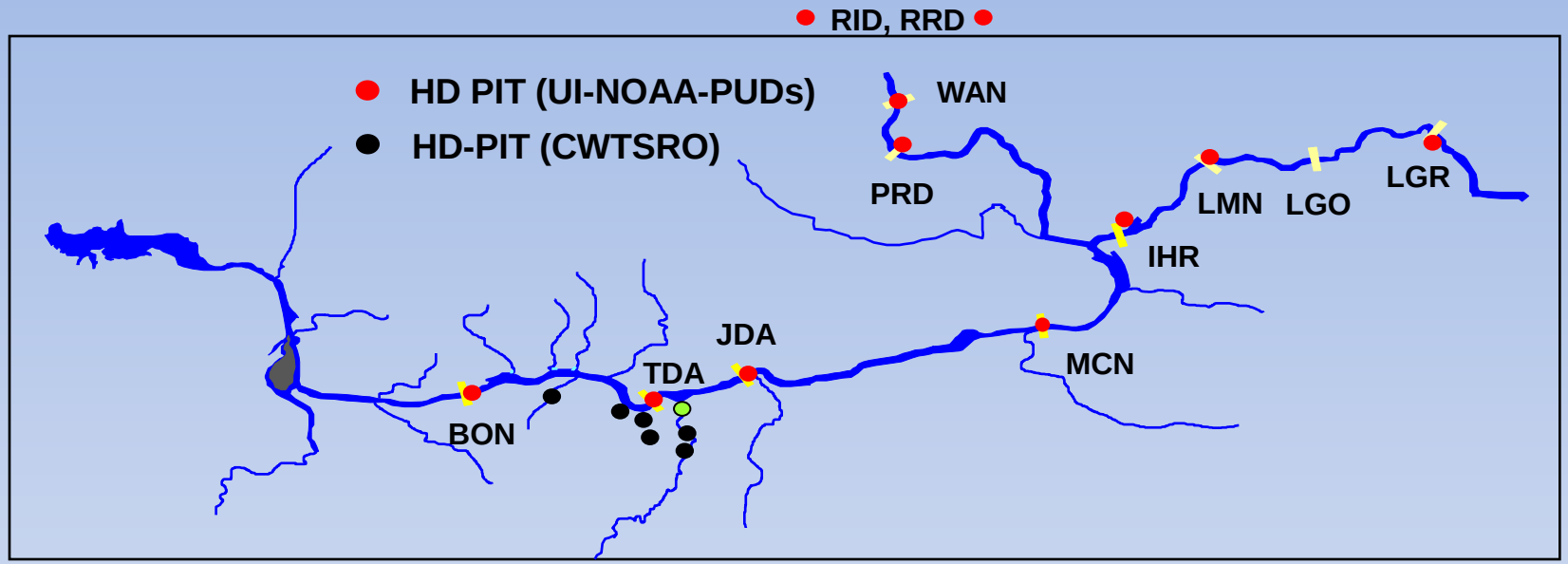
2014 HD PIT monitoring



Half-Duplex PIT antennas

- **Ladder exits**
- **Lamprey passage structures (LPS's)**
- **Additional fishway sites (BON, JDD, MCN, IHR, PRD, WAN, RID, RRD)**
- **Tributaries: Hood River, Mill, Fifteenmile & Eightmile creeks, Warm Springs River & Shitike creeks (CTWSRO)**
- **Deschutes River mouth: first full year**

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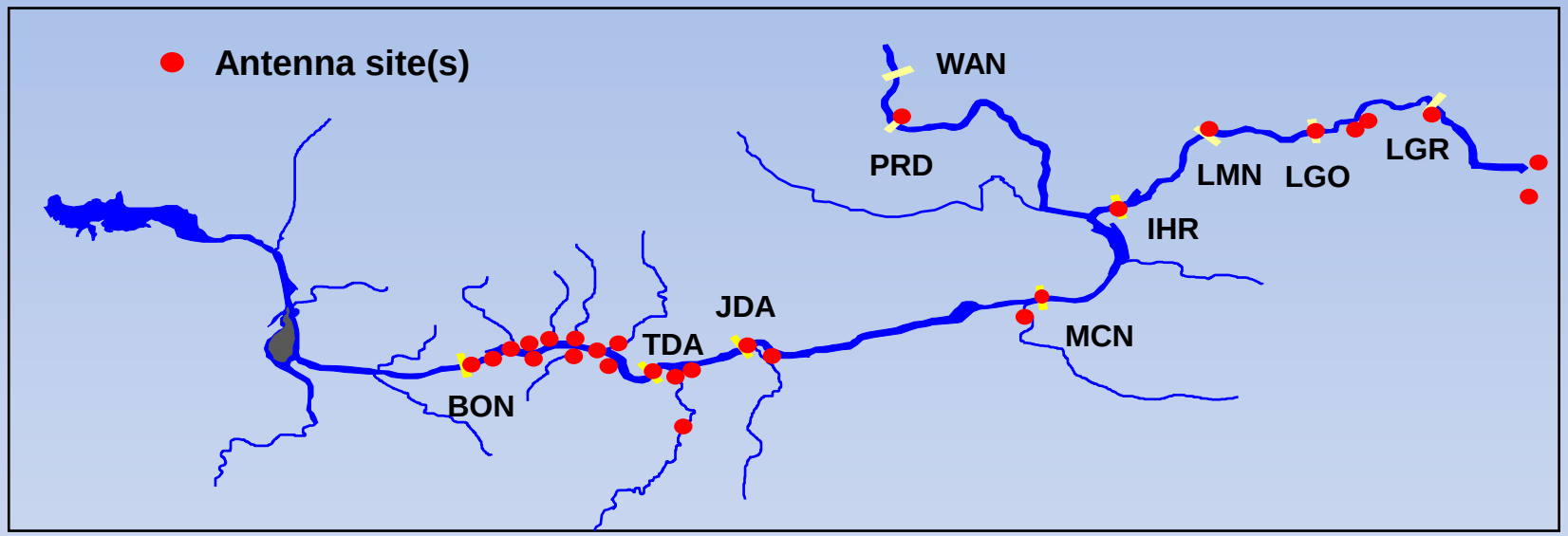
Methods: 2014 Radio monitoring



Tailraces, fishways, ladders at 9 dams

Lower Columbia reservoir sites

Most major tributaries

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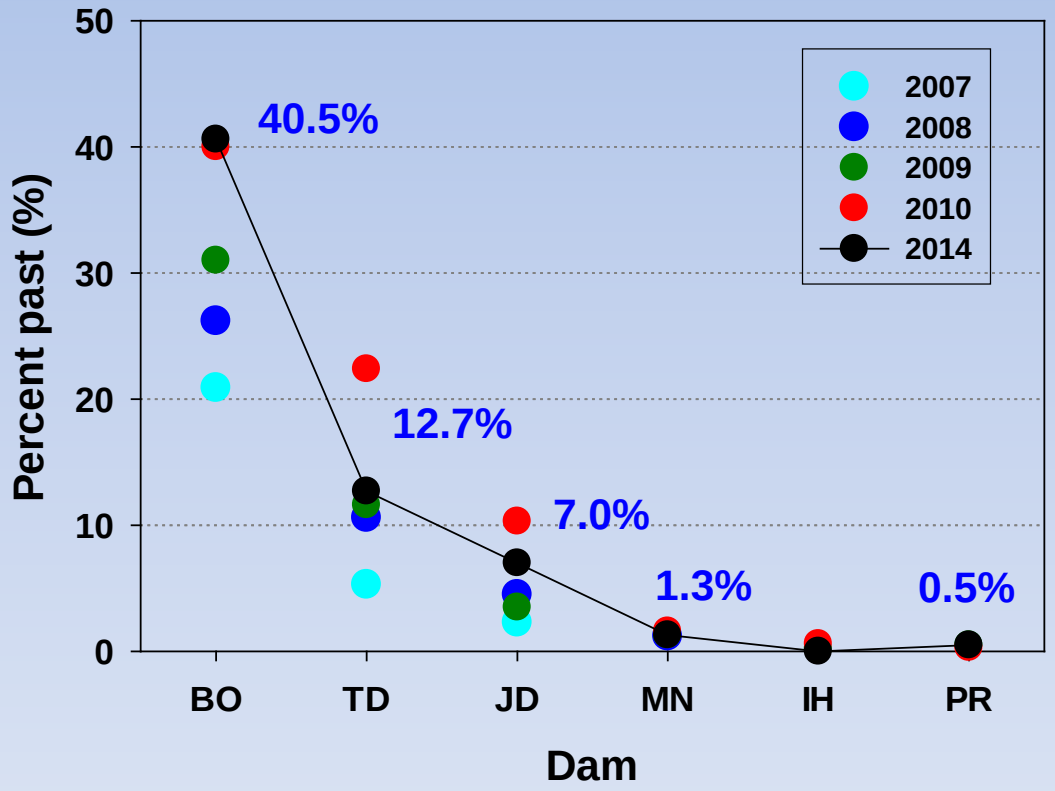
Escapement past dams: Radios

From release past dams (*n* = 599)



Ladder top – ladder top

	BO-TD	TD-JD
2007	25%	43%
2008	40%	43%
2009	34%	32%
2010	55%	46%
2014	31%	55%

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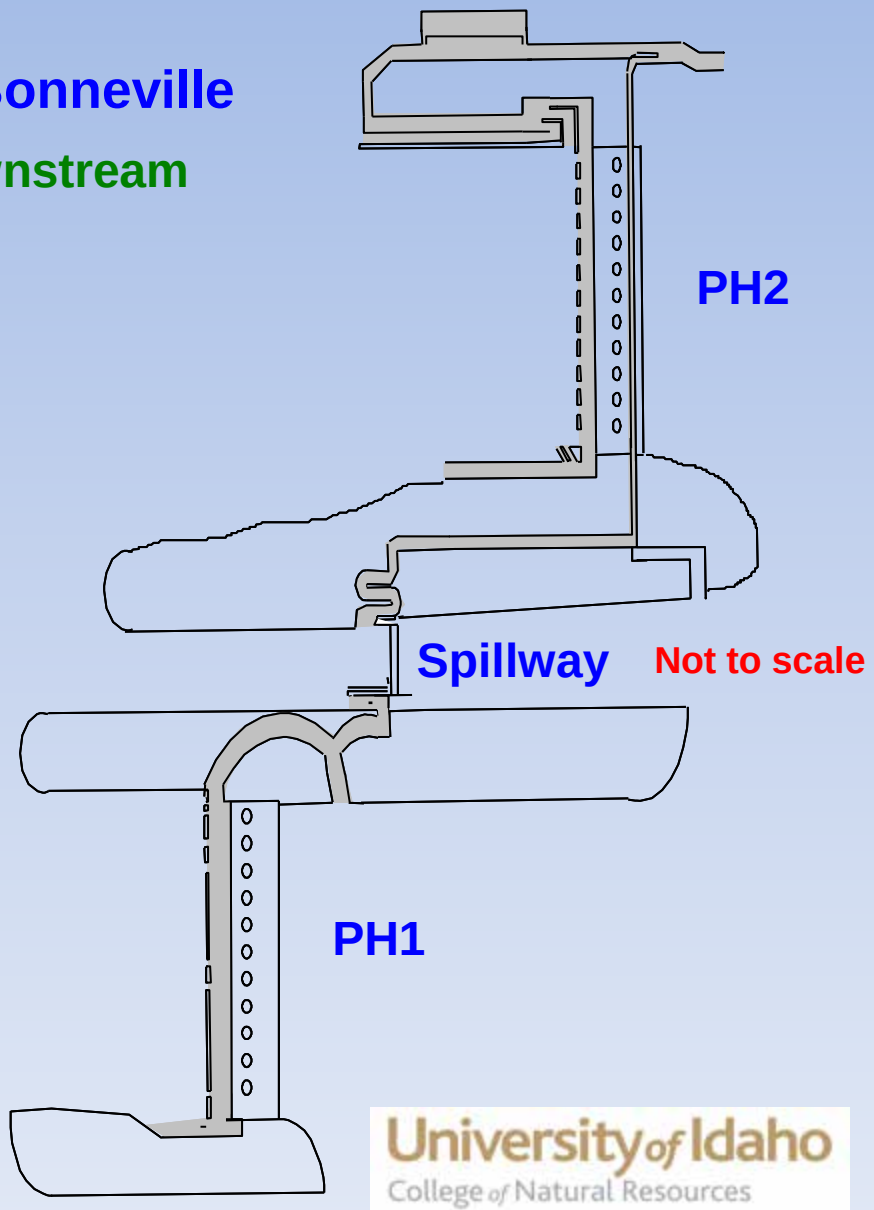
Final detections: Radios

356 radio-tagged fish did not pass Bonneville

34% (122) tailrace only or further downstream



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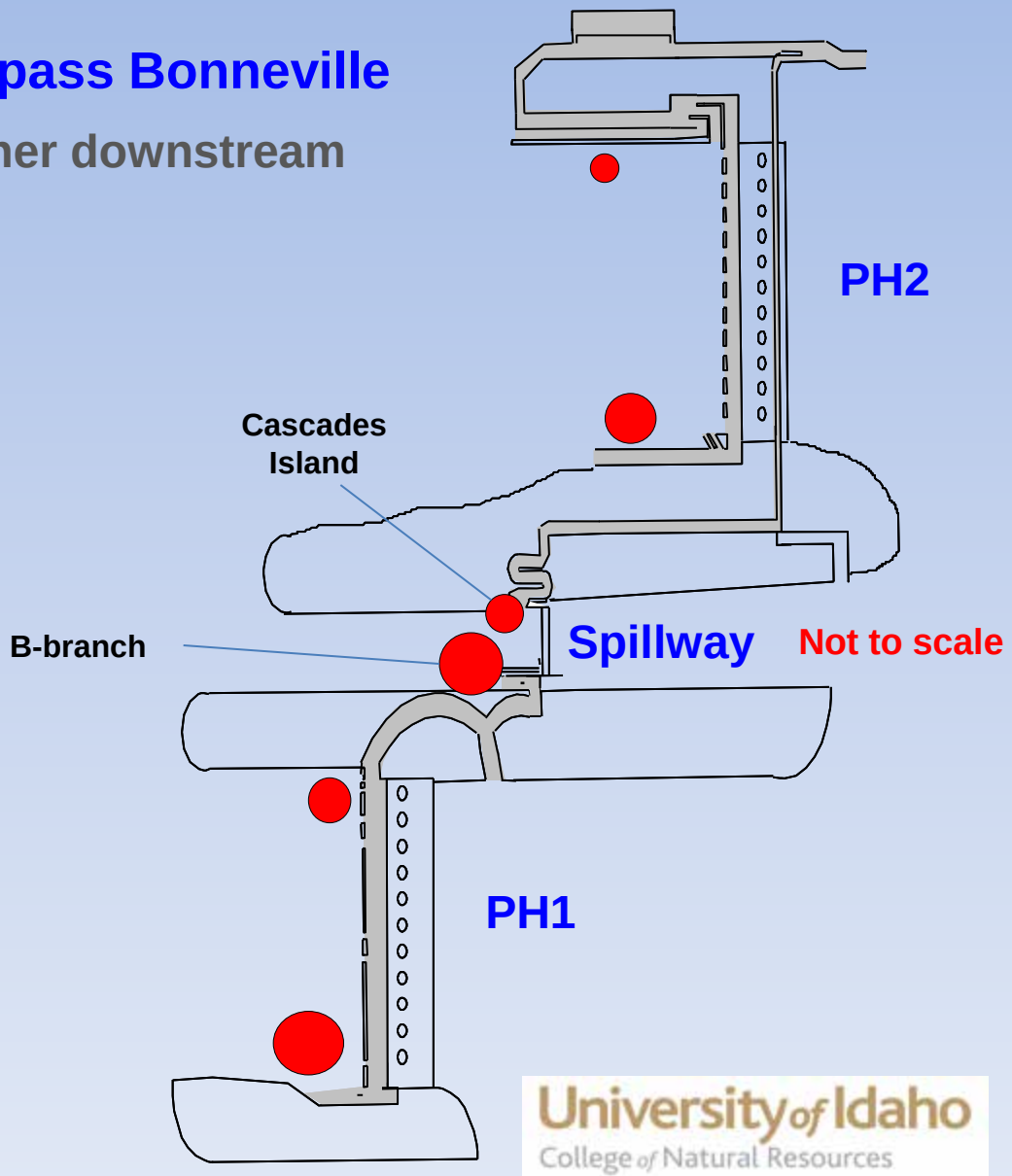
Final detections: Radios

356 radio-tagged fish did not pass Bonneville

- **34% (122) tailrace only or further downstream**
- **10% (35) approached fishway**
  - **10 PH1 – South**
  - **8 spillway – B-Branch**



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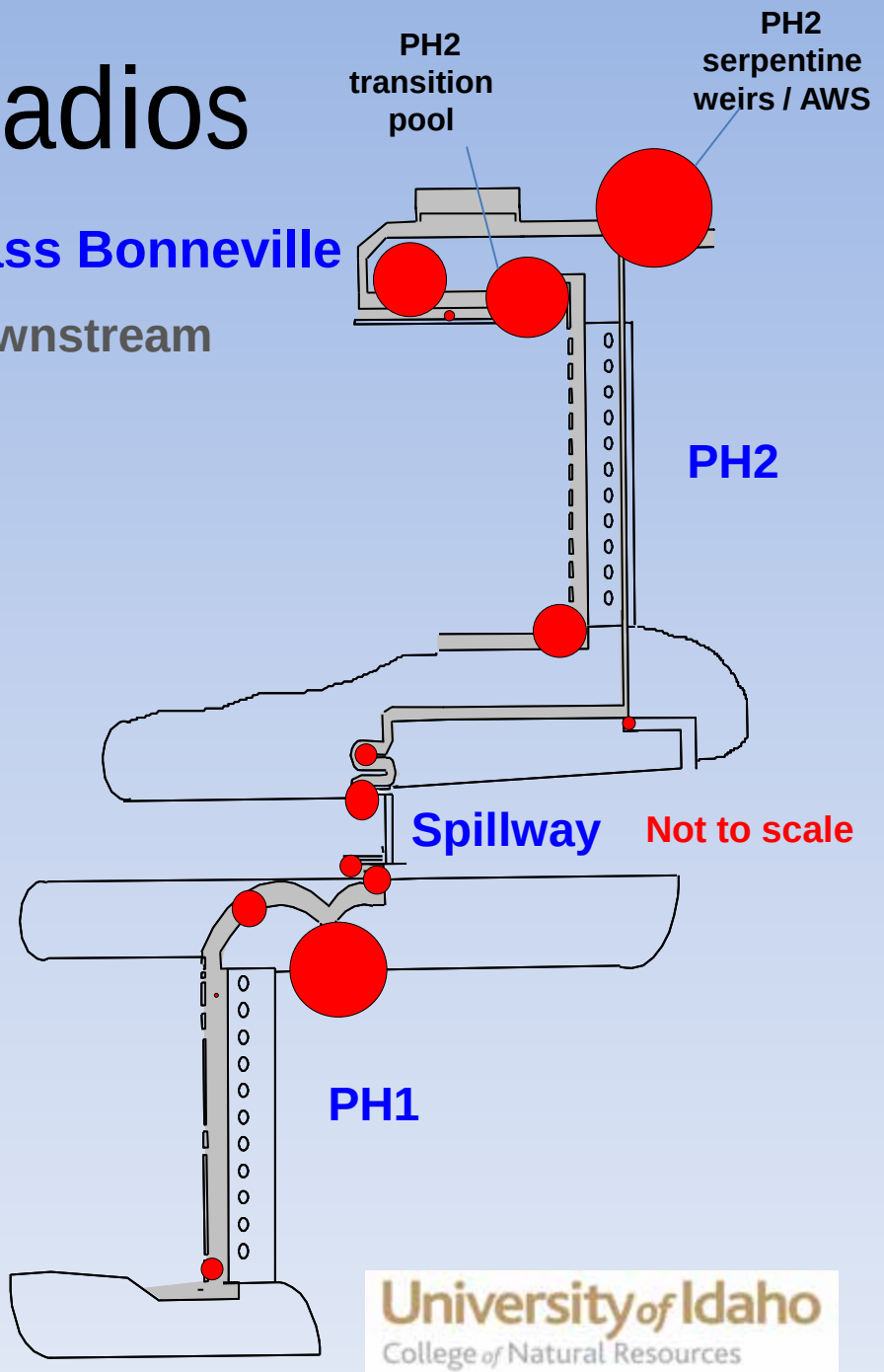
Final detections: Radios

356 radio-tagged fish that did not pass Bonneville

- 34% (1232) tailrace only or further downstream
- 10% (35) approached fishway
- 56% (199) entered fishway
  - 62 PH2 serp weirs / AWS
  - 48 PH1 serp weirs / AWS
  - 29 WA-shore junction pool
  - 27 WA-shore ladder



Serpentine weir video and flume experiments: Mark Kirk presentation

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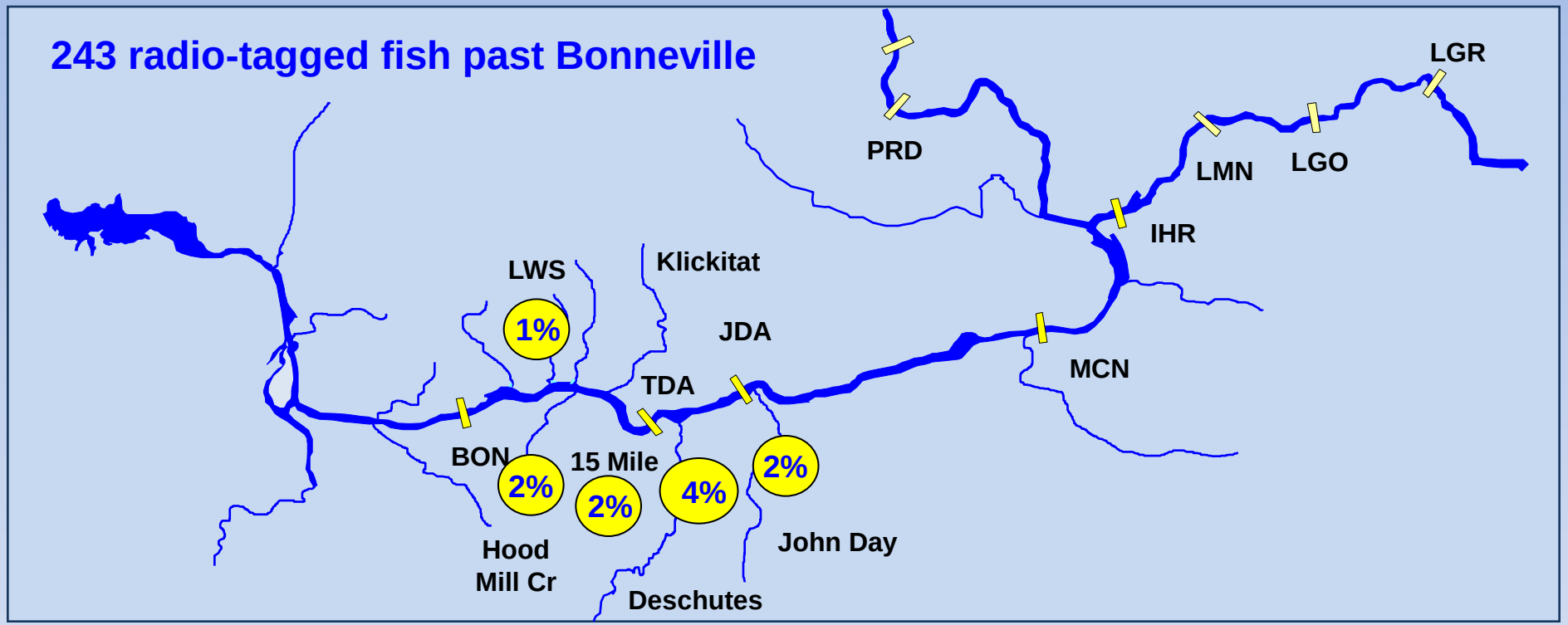
Final detections above BON: radio



Tributaries: 10%

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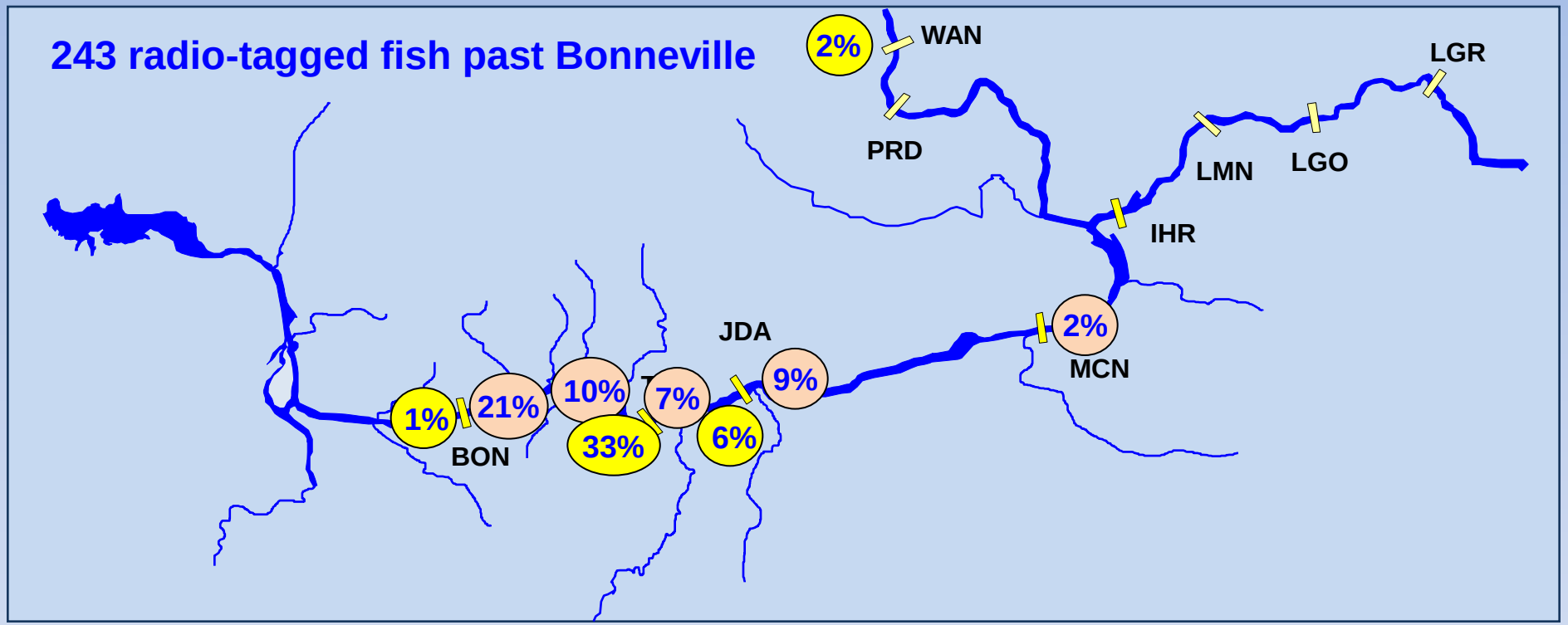
Final detections passed BON: radio



Tributaries: 10%

Main stem: 90%

At dams / in tailraces: 40%

Ladder exits / reservoirs: 50%

Reservoir story:
Chris Noyes presentation

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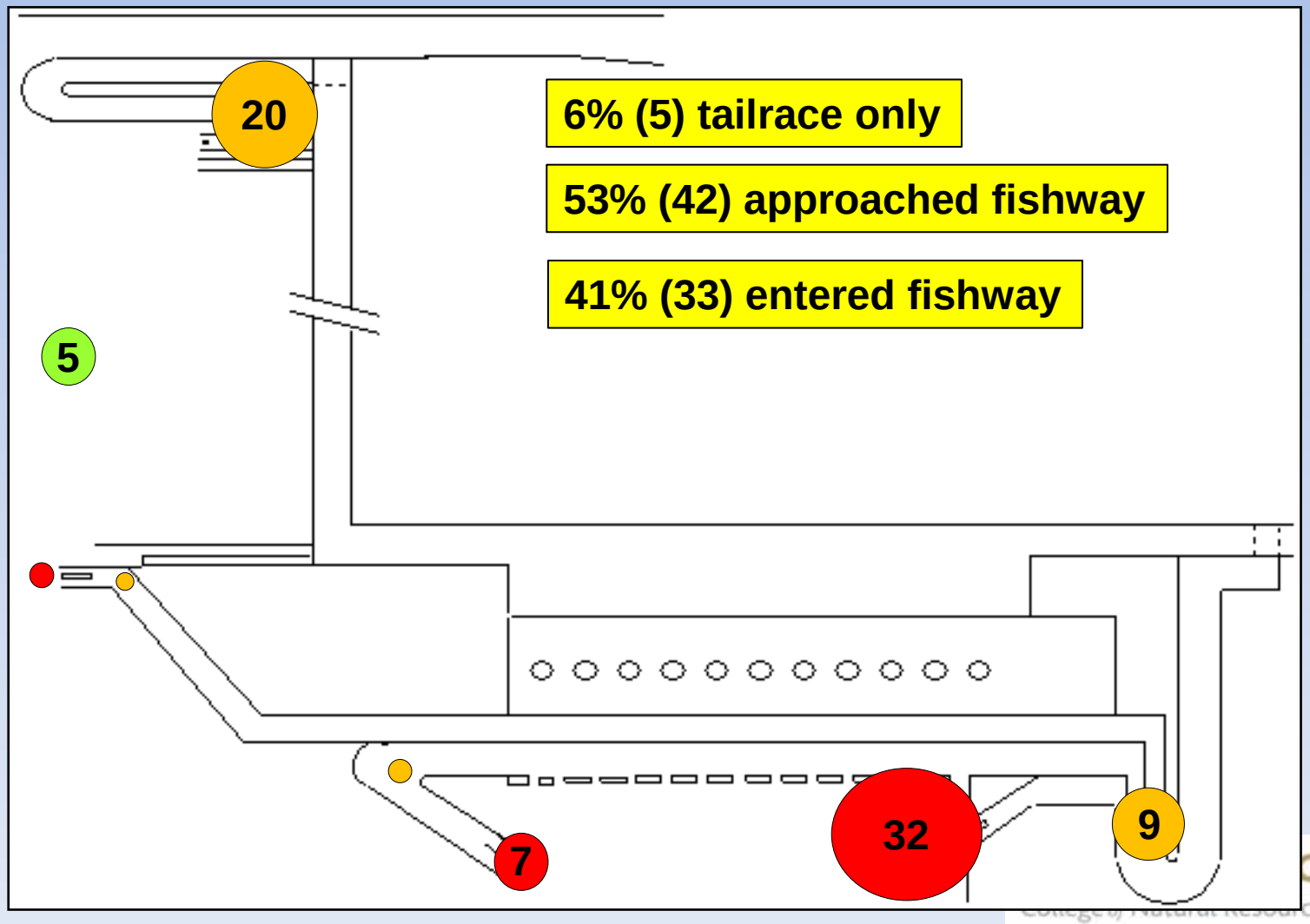
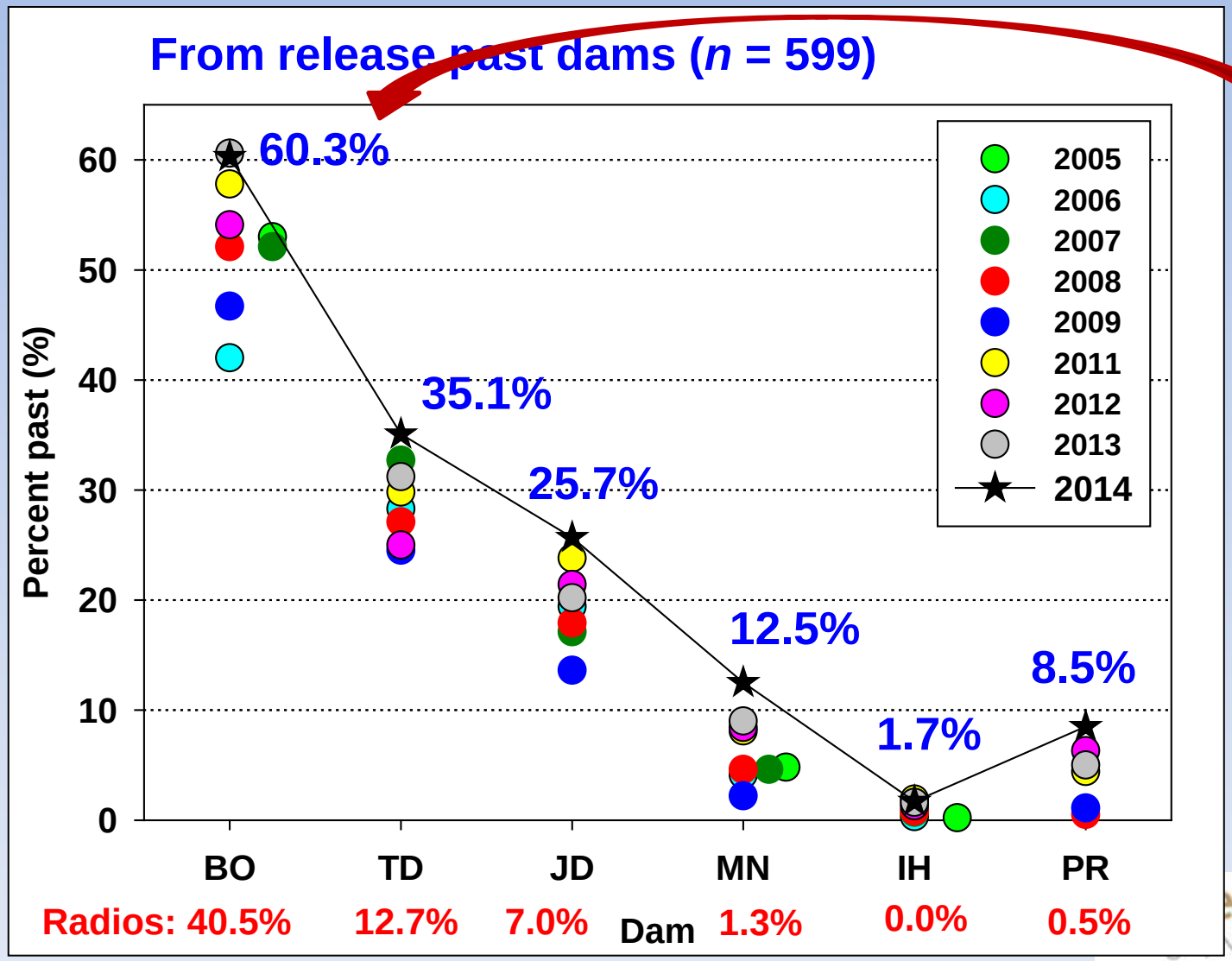
Most upstream detections: radios

80 radio-tagged fish that did not pass The Dalles



Escapement past dams: HD PIT



58.4% when 27 BON recaptures censored

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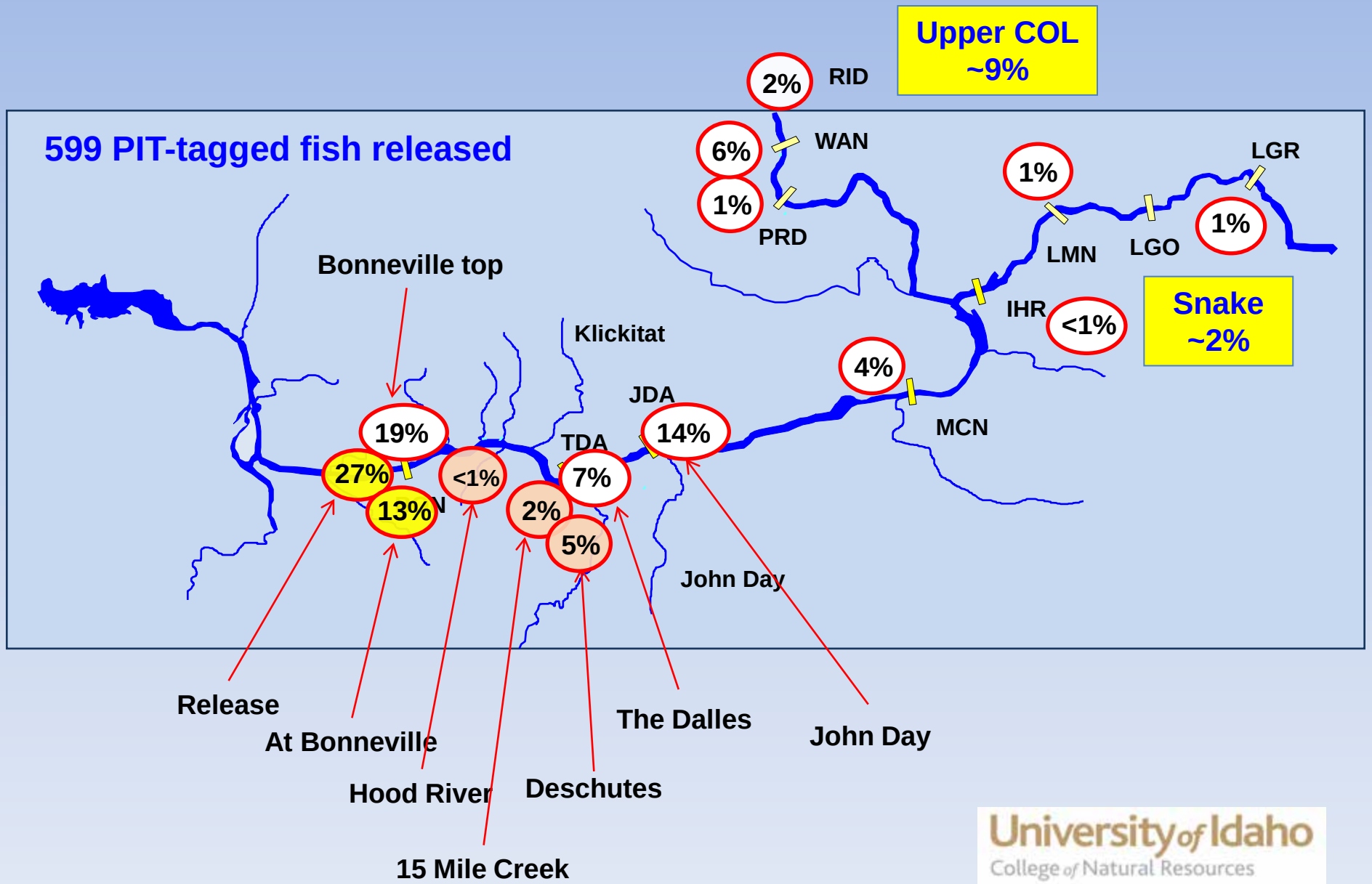
Last detections: Bonneville HD-PIT



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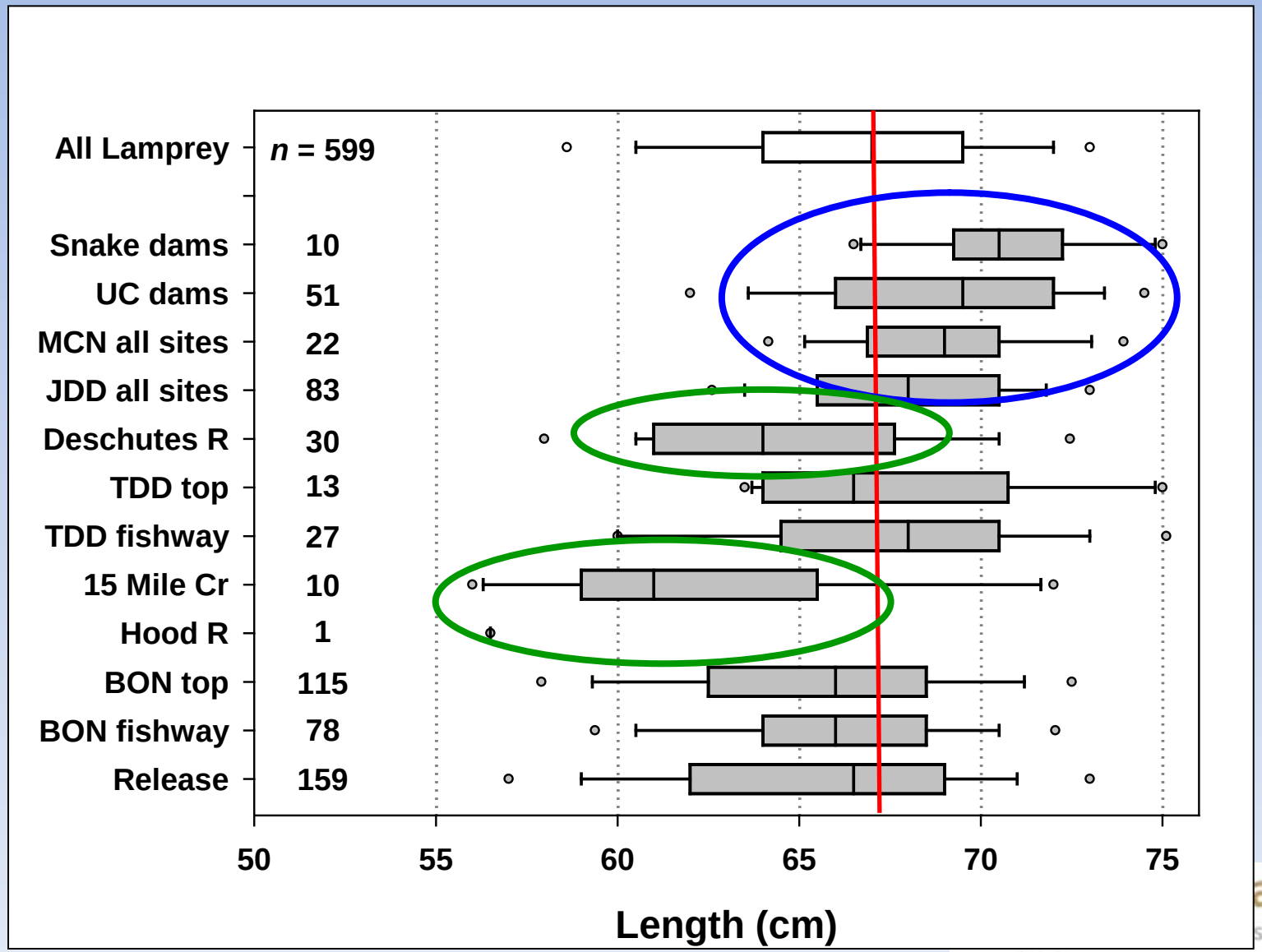
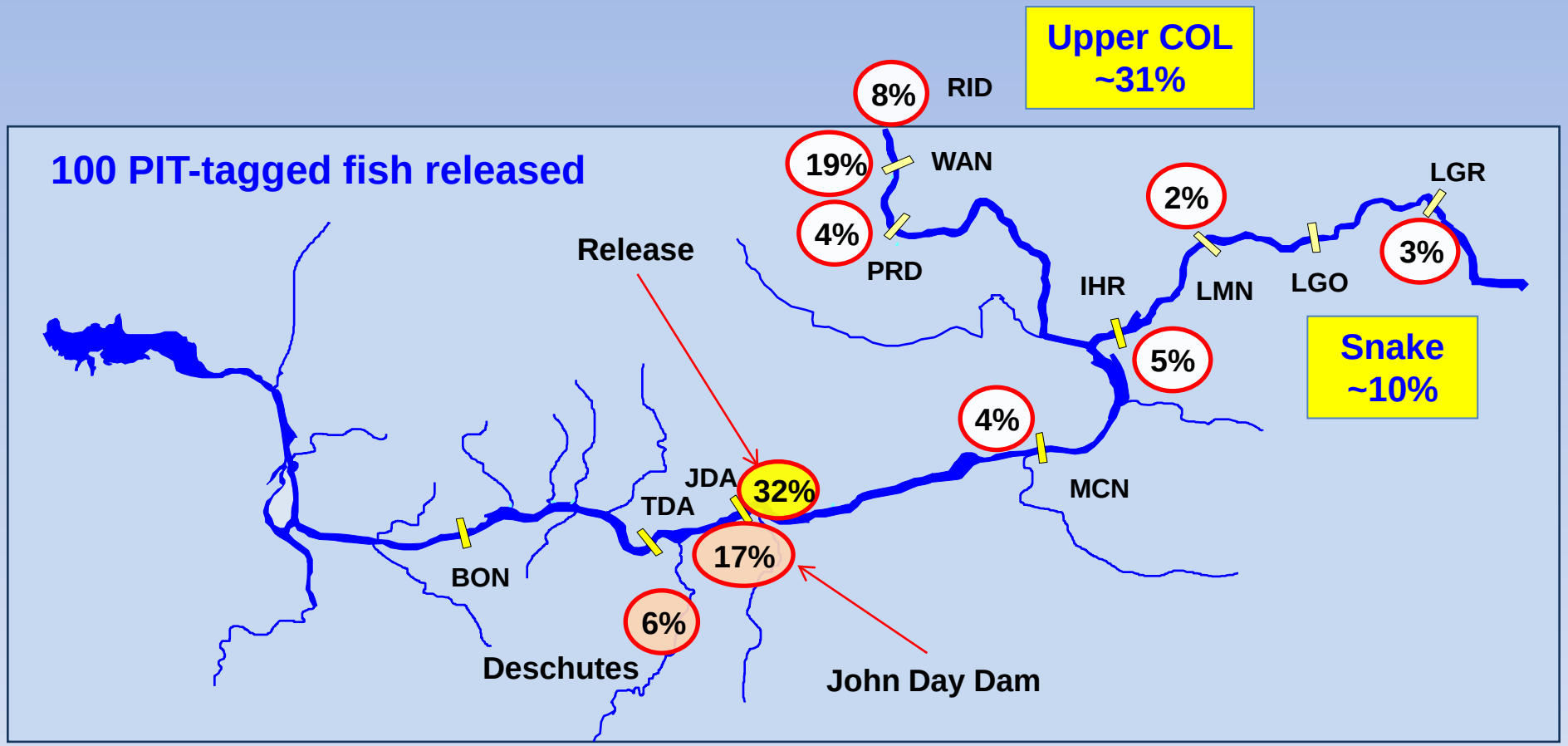
Size × Fate: Bonneville PIT



Upriver →

Last detections: John Day HD-PIT



John Day River:
No HD monitoring

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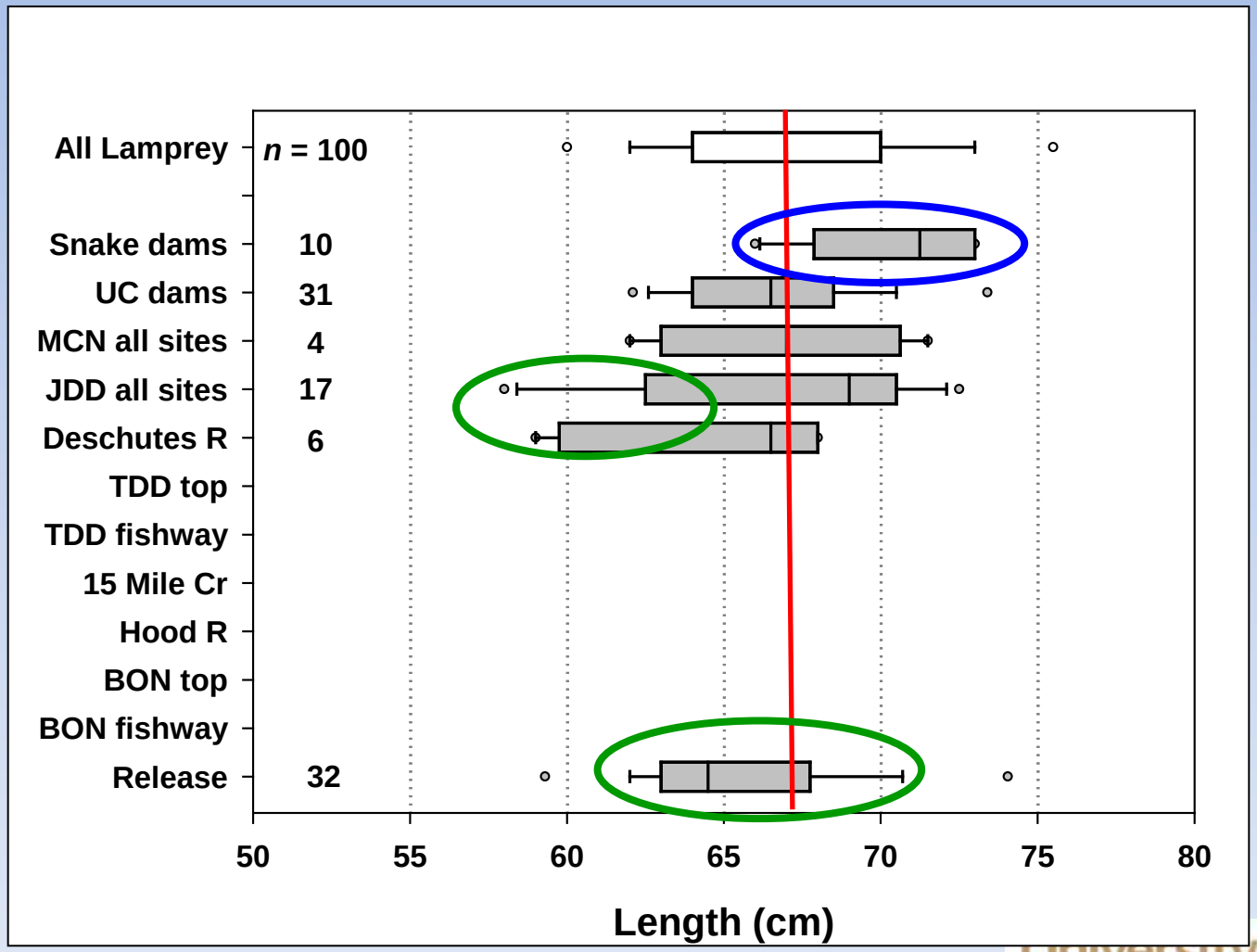
Size × Fate: John Day PIT



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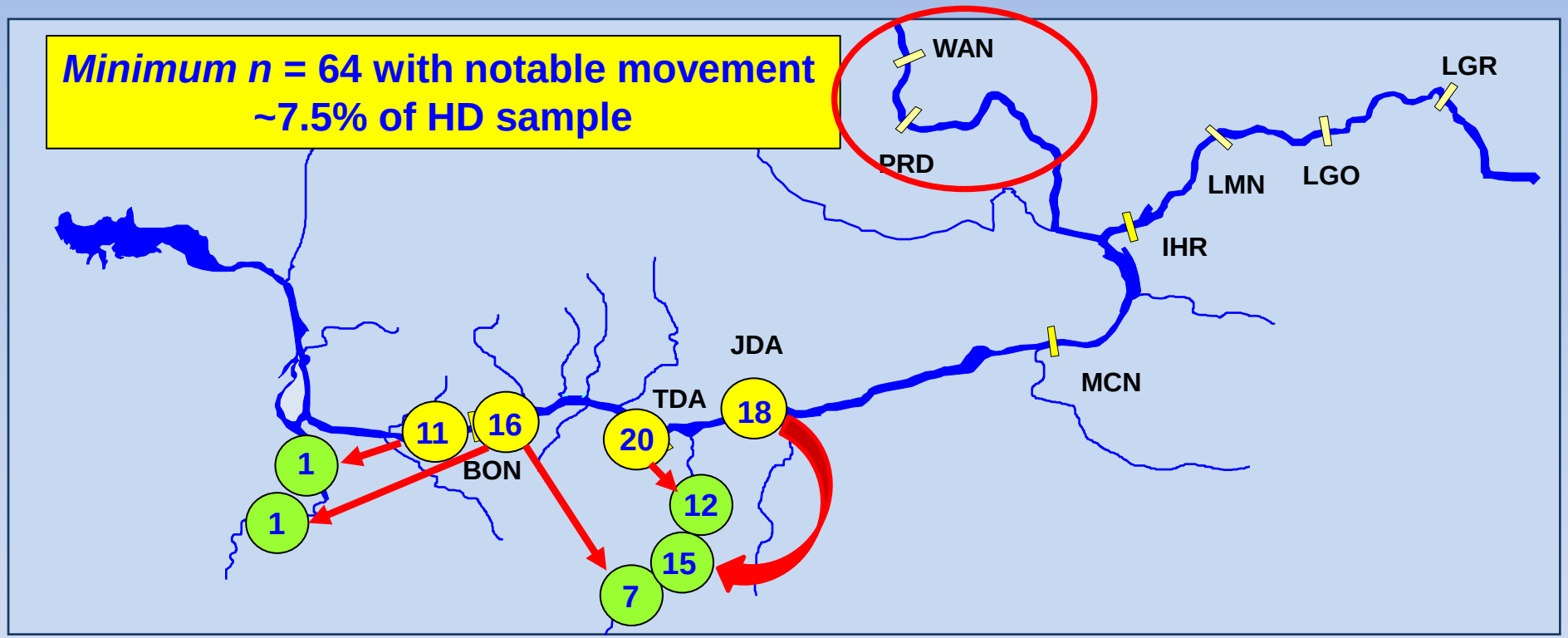
2013 Overwintering: lower COL



Entered Deschutes River: 53% (34)

Entered Willamette River: 3% (2)

Upstream from 2013 final dam detection: 44% (28)

23 of 28 passed at least one additional dam

Many additional unmonitored sites where post-overwinter fish may enter and spawn

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Conclusions: BON Radios

- 2013 escapement at high end of range
  - 41% passed Bonneville, but near-average escapement past upstream dams
- Many entered BON fishways, failed to pass
  - Serpentine weirs / Auxiliary water supply channel
  - WA-shore junction area
- Many at The Dalles, did not pass
  - East entrance area
  - North collection channel / transition area

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Conclusions: BON PITs

- Escapement past dams highest in time series
  - Incremental improvement: 60% past BON
  - 2% to Snake, 9% to upper Columbia
  - *Largest fish in sample entered Snake River*
- ~8% of 2013 sample overwintered, moved upstream in spring 2014
  - Deschutes R. = Valhalla
  - Willamette R. = confirmed suspicion

Willamette Falls Count window

Conclusions: JDD PITs

- 31% moved upstream to upper Columbia
- 10% entered Snake
  - Repeated pattern provides additional evidence for phenotypic / genetic structuring
- Some fish moved downstream to Deschutes
  - John Day River unmonitored
  - More detections expected

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ORIGINAL ARTICLE

Genes predict long distance migration and large body size in a migratory fish, Pacific lamprey

Jon E. Hess,[1] Christopher C. Caudill,[2] Matthew L. Keefer,[2] Brian J. McIlraith,[3] Mary L. Moser[4] and Shawn R. Narum[1]

CHAPTER 6

Migratory Behavior of Adult Pacific Lamprey and Evidence for Effects of Individual Temperament on Migration Rate

Mary L. Moser,[1,a,] Matthew L. Keefer,[2] Christopher C. Caudill[2] and Brian J. Burke[1]*

NRC Research Press

ARTIC

Fishway passage bottleneck identification and prioritization: a case study of Pacific lamprey at Bonneville Dam

Matthew L. Keefer, Christopher C. Caudill, Tami S. Clabough, Michael A. Jepson, Eric L. Johnson, Christopher A. Peery, and Mary L. Moser

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NOTE

Fishway Bottleneck Relief Models: a Case Study using Radio-Tagged Pacific Lampreys

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ECOLOGY OF FRESHWATER FISH

Factors affecting dam passage and upstream distribution of adult Pacific lamprey in the interior Columbia River basin

Matthew L. Keefer[1], Charles T. Boggs[1], Christopher A. Peery[2], Christopher C. Caudill[1]

Environ Biol Fish (2013) 96:691–700
DOI 10.1007/s10641-012-0059-5

Context-dependent diel behavior of upstream-migrating anadromous fishes

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But wait, there's more: UI FERL website