UPPER WILLAMETTE RIVER SPRING CHINOOK ABUNDANCE, DISTRIBUTION AND SURVIVAL: McKenzie Addendum

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Oregon Department of Fish and Wildlife
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Willamette Biological Opinion
Hatchery Research, Monitoring, and Evaluation

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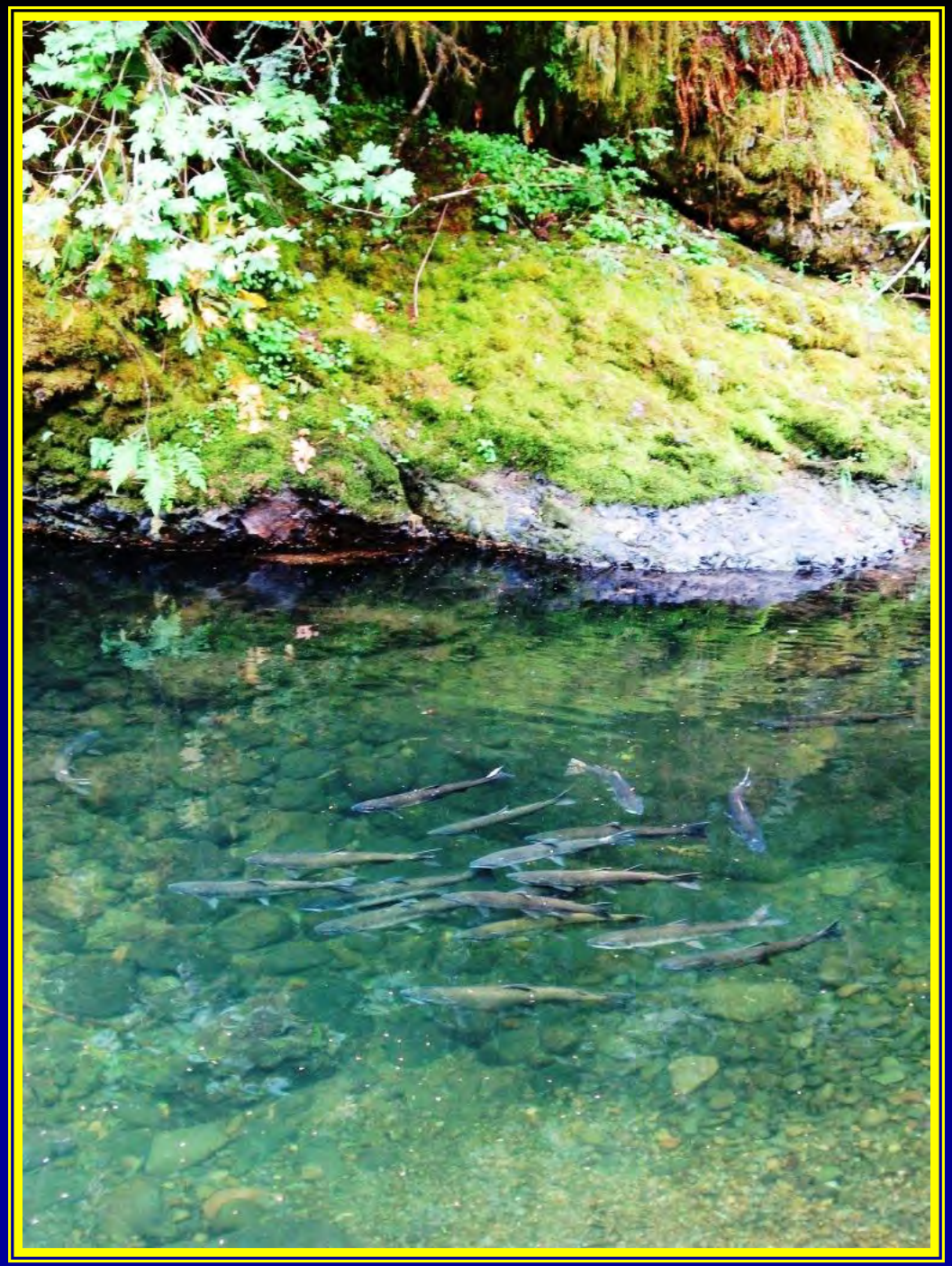


- Hatchery RME Activities
  - Monitoring hatchery operations and conducting research focused on hatchery programs
  - Spawning ground surveys (upstream & downstream of dams),
    - Distribution & abundance of redds, carcass sampling, proportion hatchery-origin spawners (PHOS) prespawn mortality, straying, diversity

VSP Monitoring Guidelines
(Crawford and Rumsey 2011)

- Adult Spawner Abundance and Productivity
- Spatial Distribution
- Species Diversity

Methods

Redd Surveys

Carcass Sampling

REDDS

AUGUST: SPAWNING COMMENCES

SEPTEMBER: REDDS ACCUMULATE, PEAK SPAWNING LATE

OCTOBER: SPAWNING ENDS, PEAK COUNT OBTAINED

SPAWNER ABUNDANCE (N_T) = PEAK COUNT/REACH * 2.5

N_W = N * (1 – pHOS)

N_H = N_T * pHOS

DEADS

PROCESSABLE CARCASSES/REACH

CLIPPED

UNCLIPPED

OTOLITHS

THERMAL MARKS

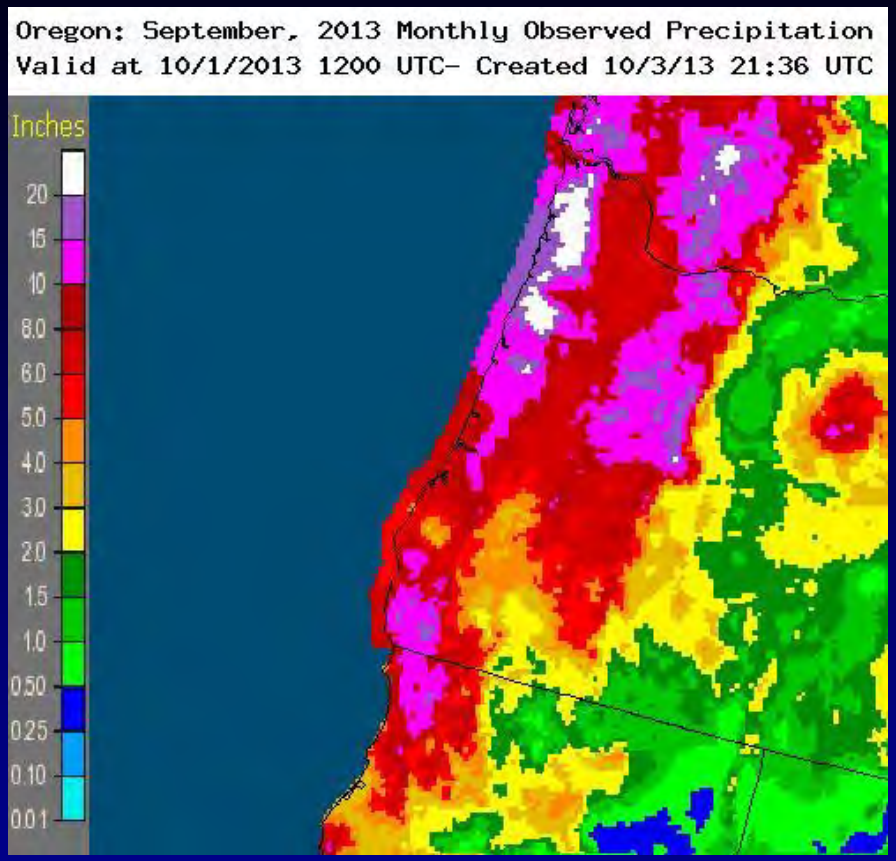
NO THERMAL MARKS

HATCHERY-ORIGIN (H)

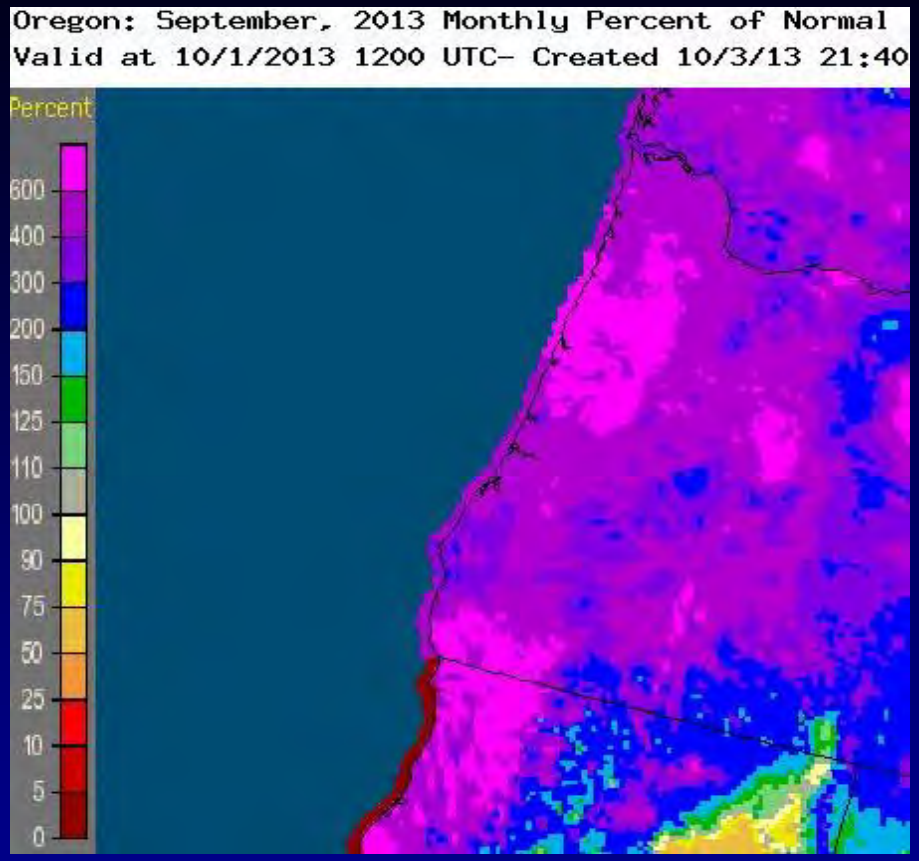
NATURAL-ORIGIN (W)

pHOS = H/(H + W)

September 2013 Precip.



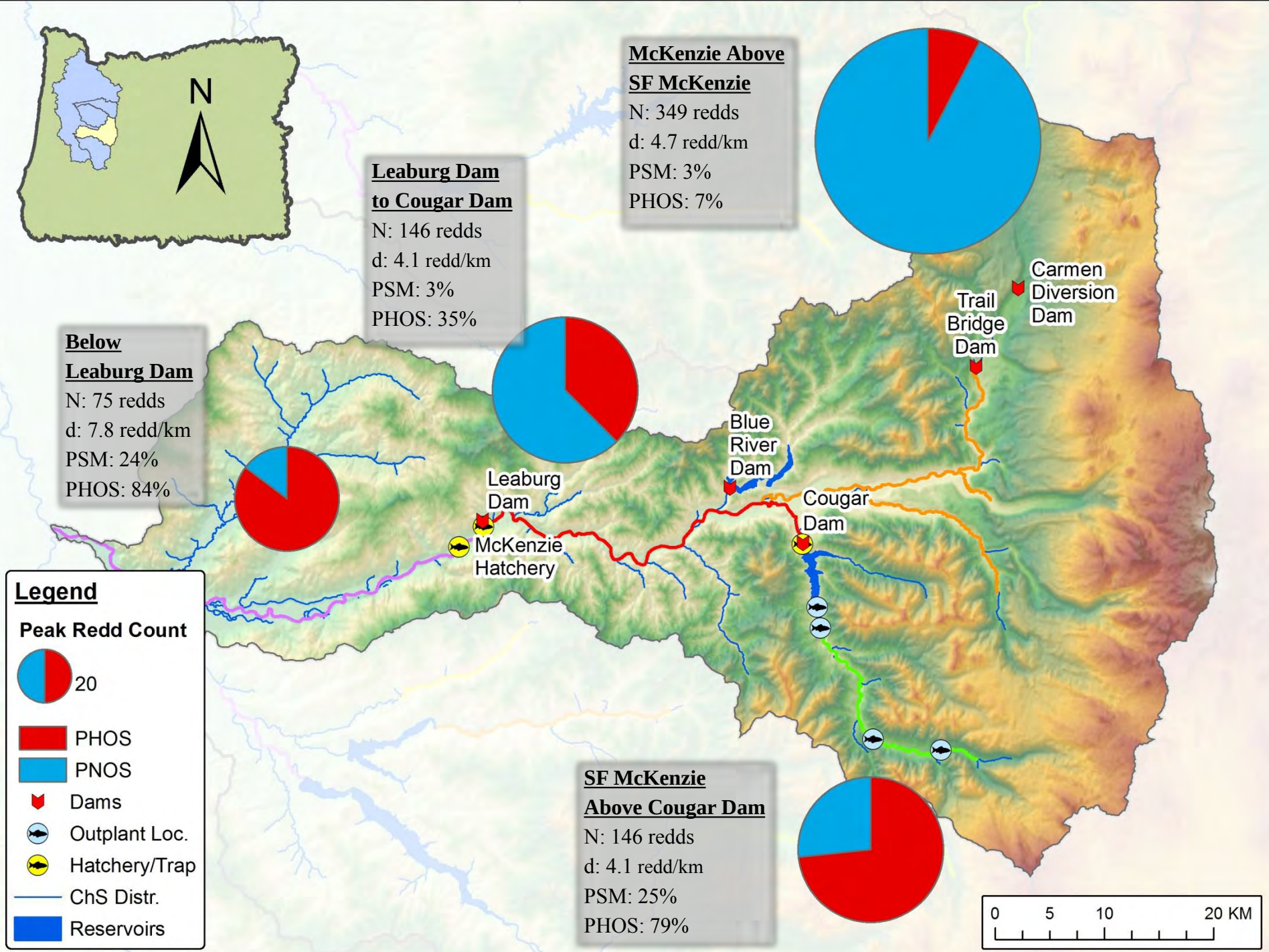
Percent of Normal

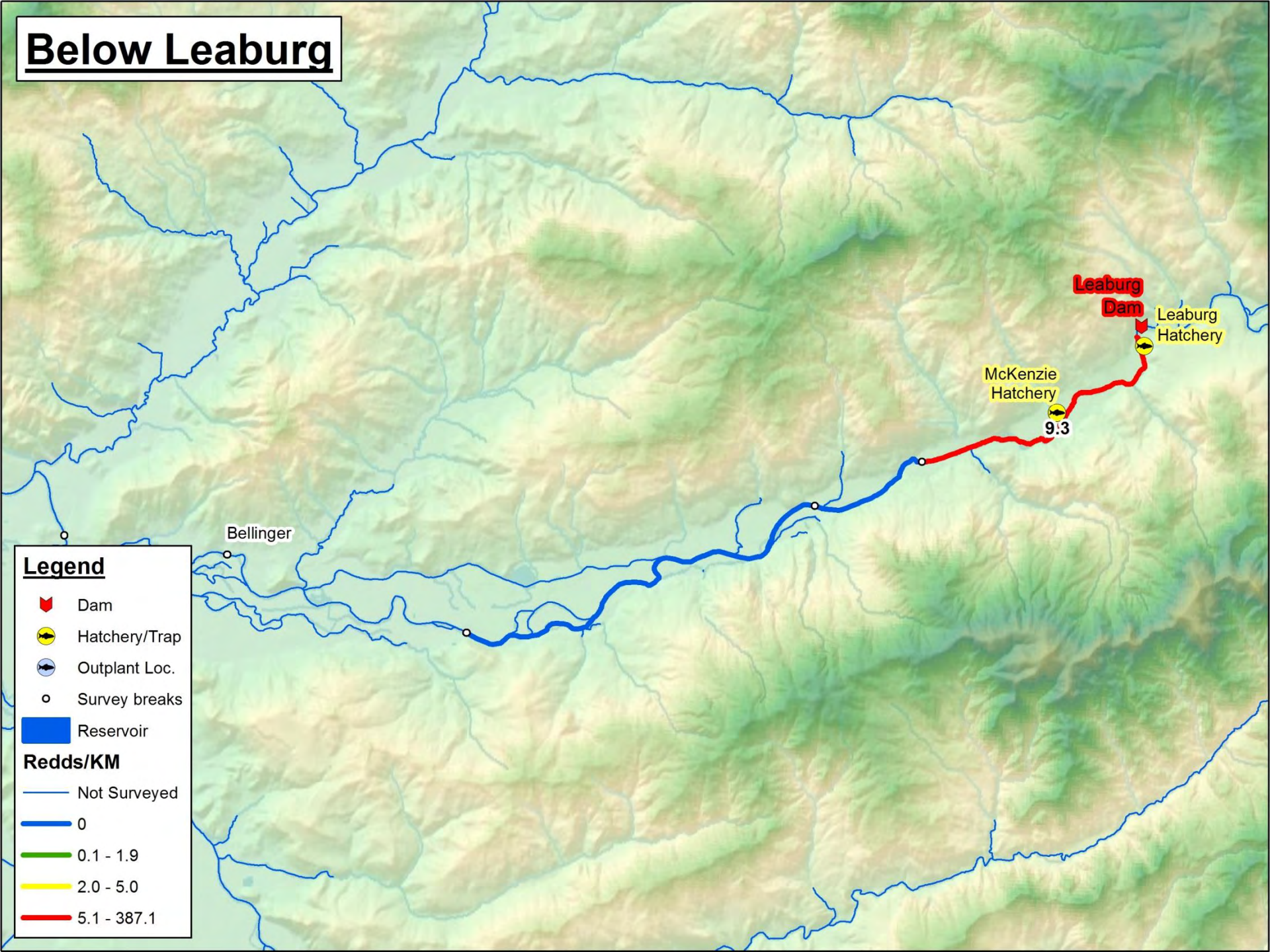


- **Redds under-counted**
- **Spawned carcasses under-sampled**

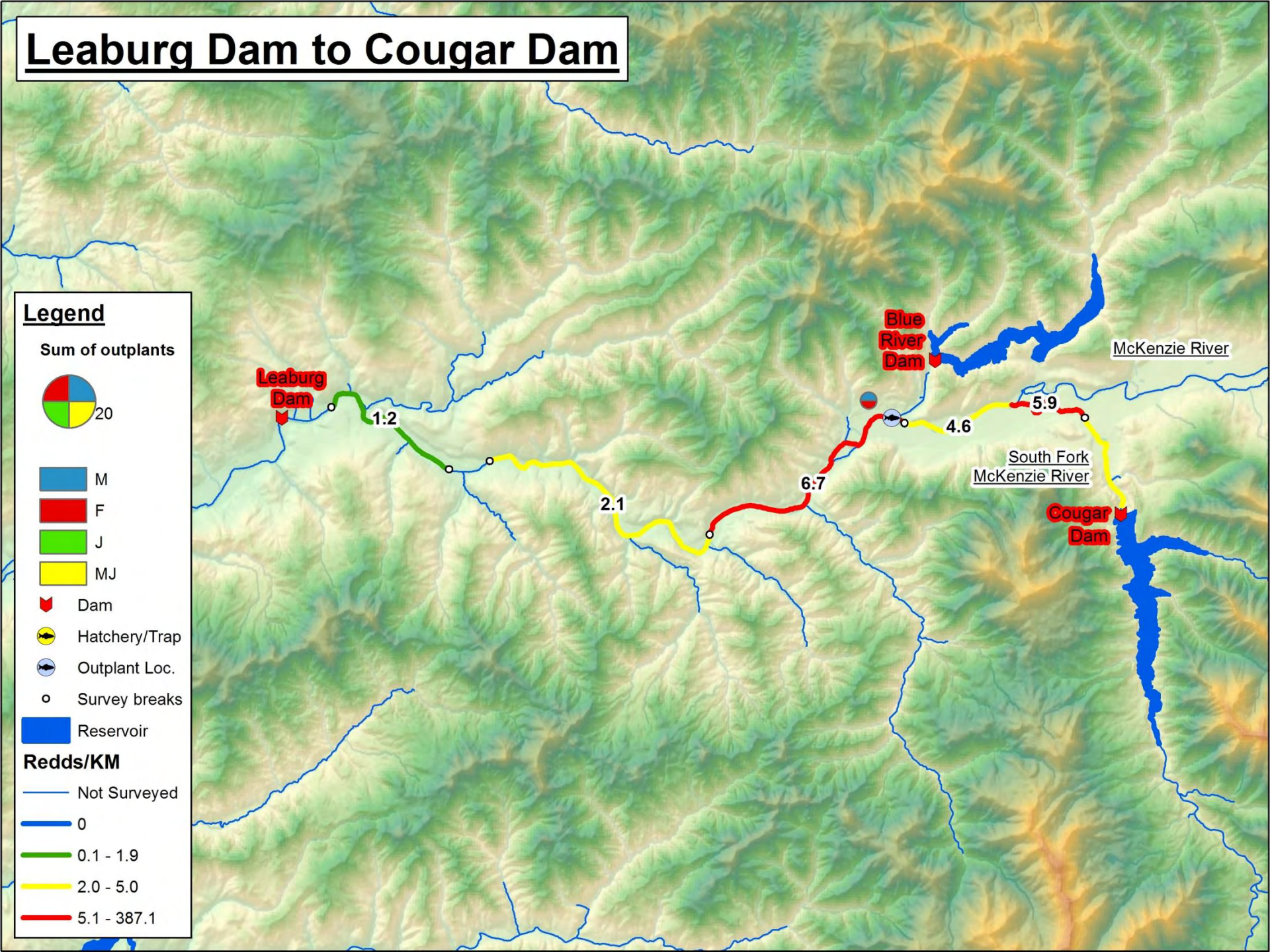
Implications

- Peak Redd Counts May Be Biased LOW
  - More reliance on relative abundance and distribution
- PSM Estimates May Be Biased HIGH
  - High estimates are suspect
  - Low estimates acceptable
- Assume run composition (pHOS, size, age, mark rates) are unbiased

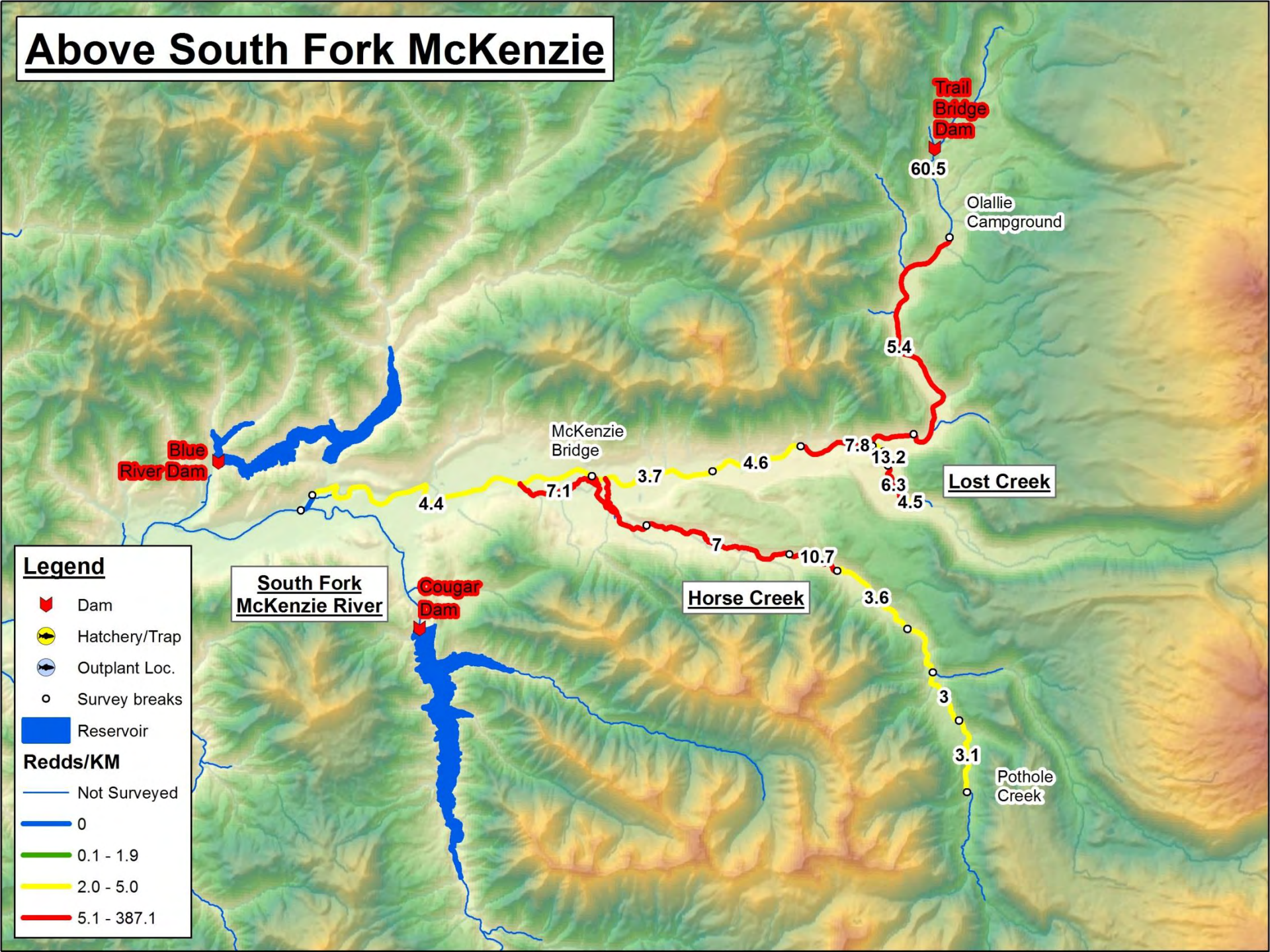

N
McKenzie Above SF McKenzie
N: 349 redds
d: 4.7 redd/km
PSM: 3%
PHOS: 7%
Leaburg Dam to Cougar Dam
N: 146 redds
d: 4.1 redd/km
PSM: 3%
PHOS: 35%
Below Leaburg Dam
N: 75 redds
d: 7.8 redd/km
PSM: 24%
PHOS: 84%
SF McKenzie Above Cougar Dam
N: 146 redds
d: 4.1 redd/km
PSM: 25%
PHOS: 79%
Carmen Diversion Dam
Trail Bridge Dam
Blue River Dam
Leaburg Dam
Cougar Dam
McKenzie Hatchery
Legend
Peak Redd Count
20
PHOS
PNOS
Dams
Outplant Loc.
Hatchery/Trap
ChS Distr.
Reservoirs
0
5
10
20 KM


Below Leaburg
Leaburg Dam
Leaburg Hatchery
McKenzie Hatchery
9.3
Bellinger
Legend
Dam
Hatchery/Trap
Outplant Loc.
Survey breaks
Reservoir
Redds/KM
Not Surveyed
0
0.1 - 1.9
2.0 - 5.0
5.1 - 387.1

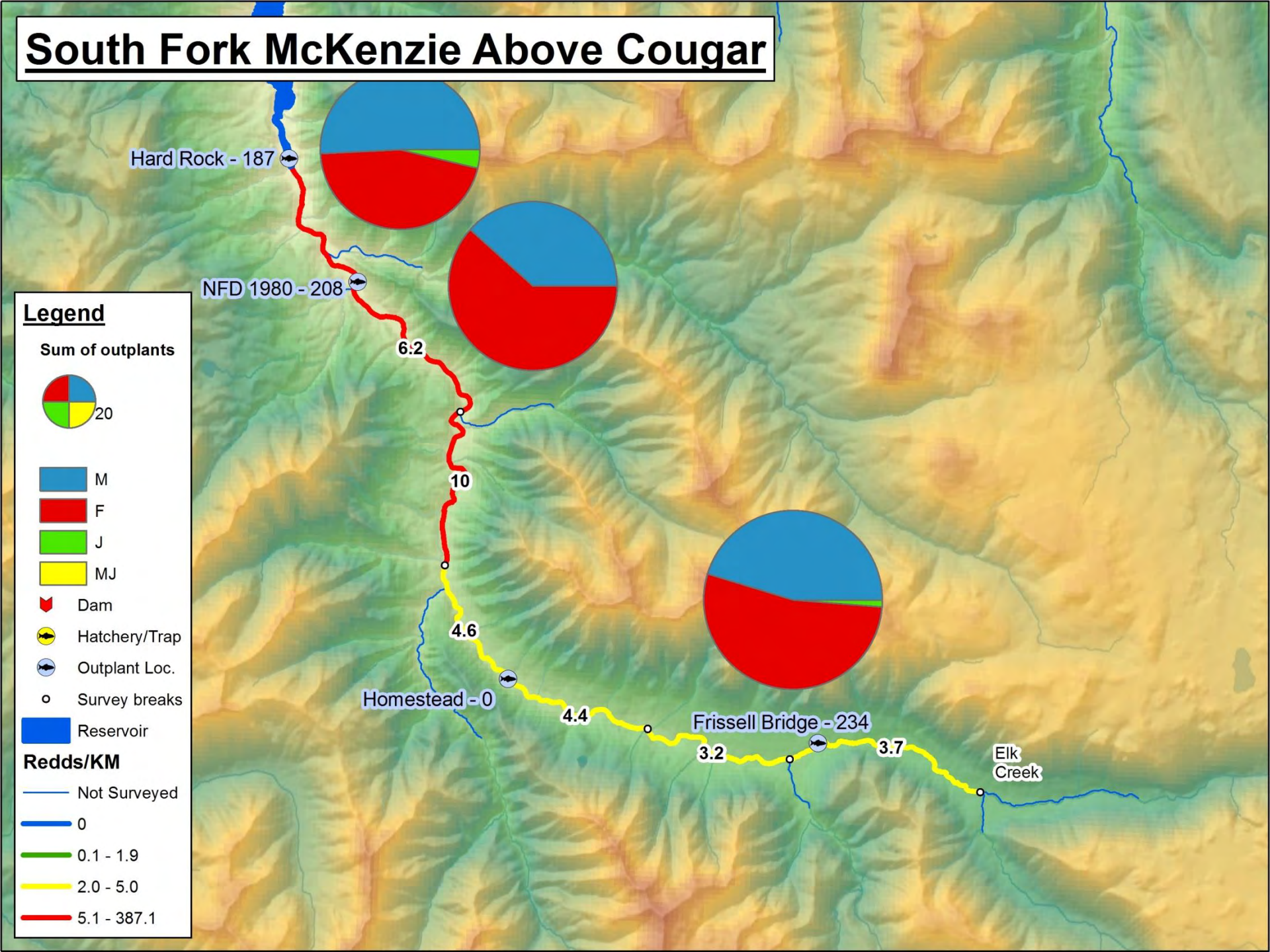
Leaburg Dam to Cougar Dam



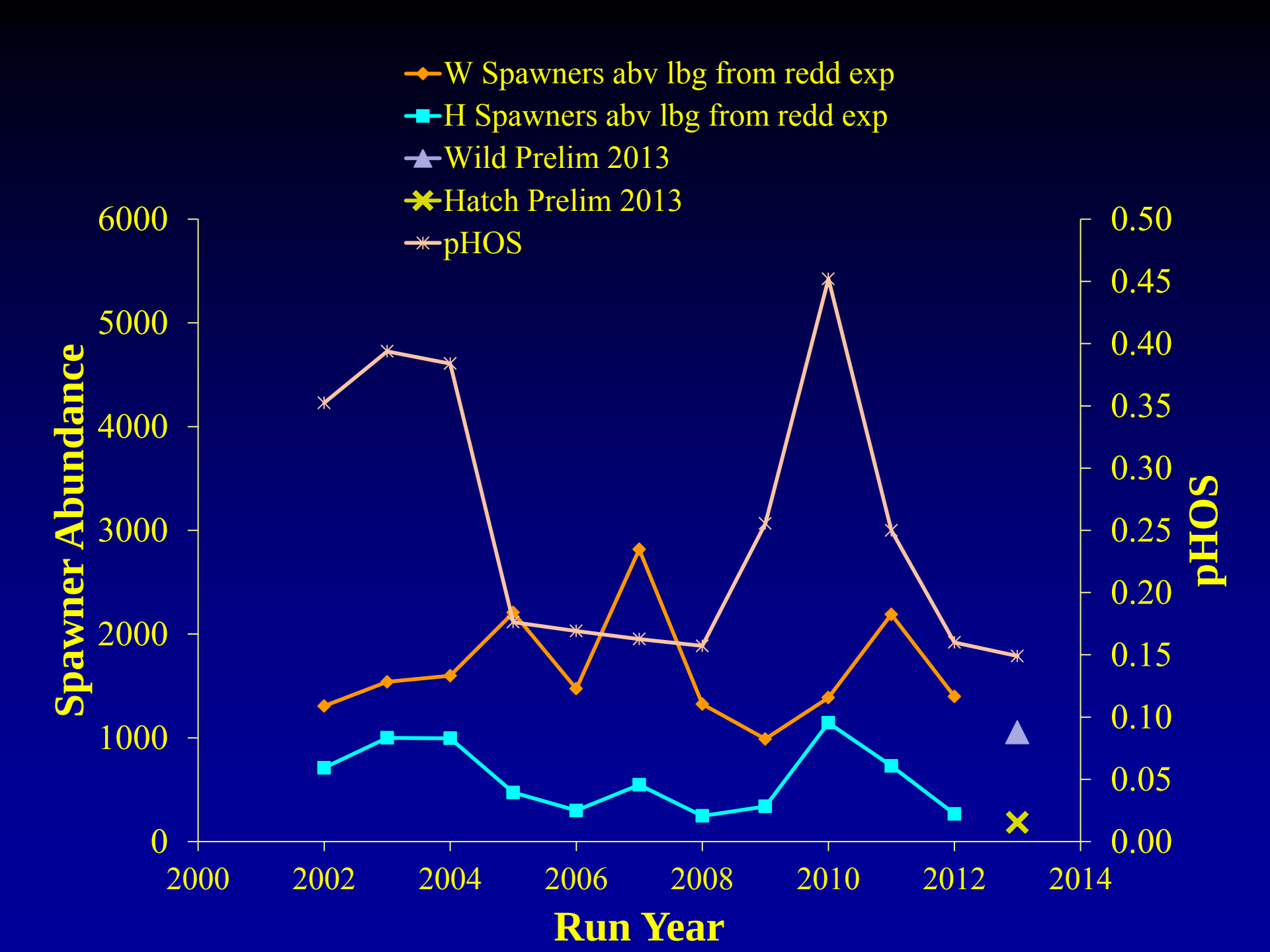
Above South Fork McKenzie



South Fork McKenzie Above Cougar



natural origin spawners Below Leaburg
hatchery origin spawners Below Leaburg
Wild Prelim 2013
Hatch Prelim 2013
pHOS
Spawner Abundance
pHOS
Run Year
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2000
2002
2004
2006
2008
2010
2012
2014


W Spawners abv lbg from redd exp
H Spawners abv lbg from redd exp
Wild Prelim 2013
Hatch Prelim 2013
pHOS
Spawner Abundance
6000
5000
4000
3000
2000
1000
0
pHOS
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
2000
2002
2004
2006
2008
2010
2012
2014
Run Year

Net movement of fish a counted on video at Leaburg Dam on the McKenzie River in 2013.

Month	Unmarked Steelhead	Hatchery Summer Steelhead	Unclipped ("Wild") Chinook	Hatchery Chinook	Lamprey
January	0	0	0	0	0
February	-1	0	0	0	0
March	1	2	1	0	0
April	1	25	1	0	0
May	5	126	111	6	0
June	26	288	652	108	3
July	20	191	318	47	19
August	1	50	63	14	7
September	3	27	86	86	2
October	1	34	4	0	1
November	0	0	0	0	0
December	0	0	0	0	0
Total 2013	57	743	1,236	261	32

2013 Redds & Carcasses		
ITM Section	Peak Redd Count	Total Carcasses Processed
Below Leaburg	75	61
Leaburg to Cougar	146	64
Above South Fork McKenzie	349	66
South Fork McKenzie Above Cougar	146	32

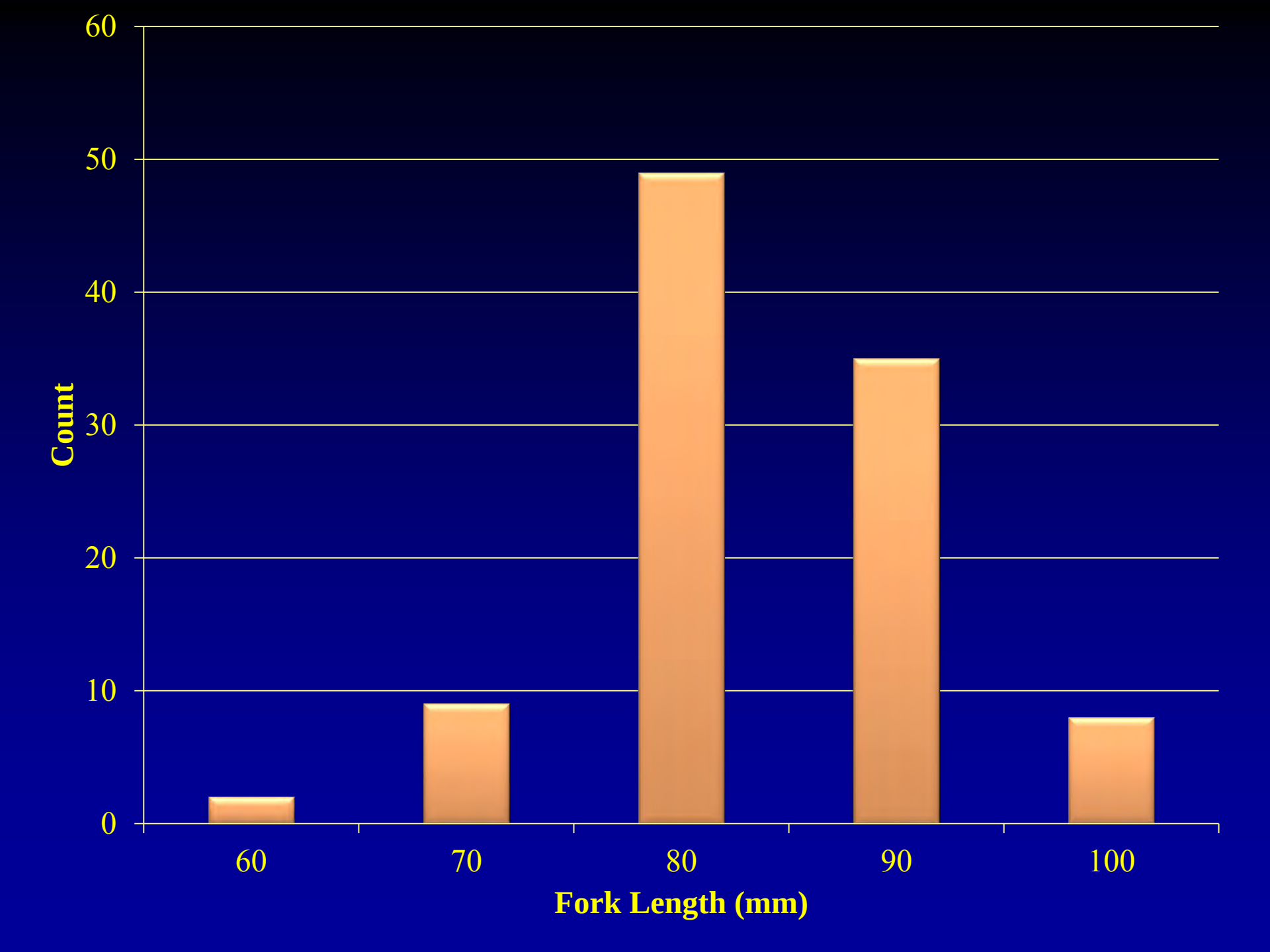
Redd Distribution vs Carcass Distribution	
G (adj)	48.36
df	2
P-value	3.14E-11
Error report	No errors encountered
G(crit)	5.99

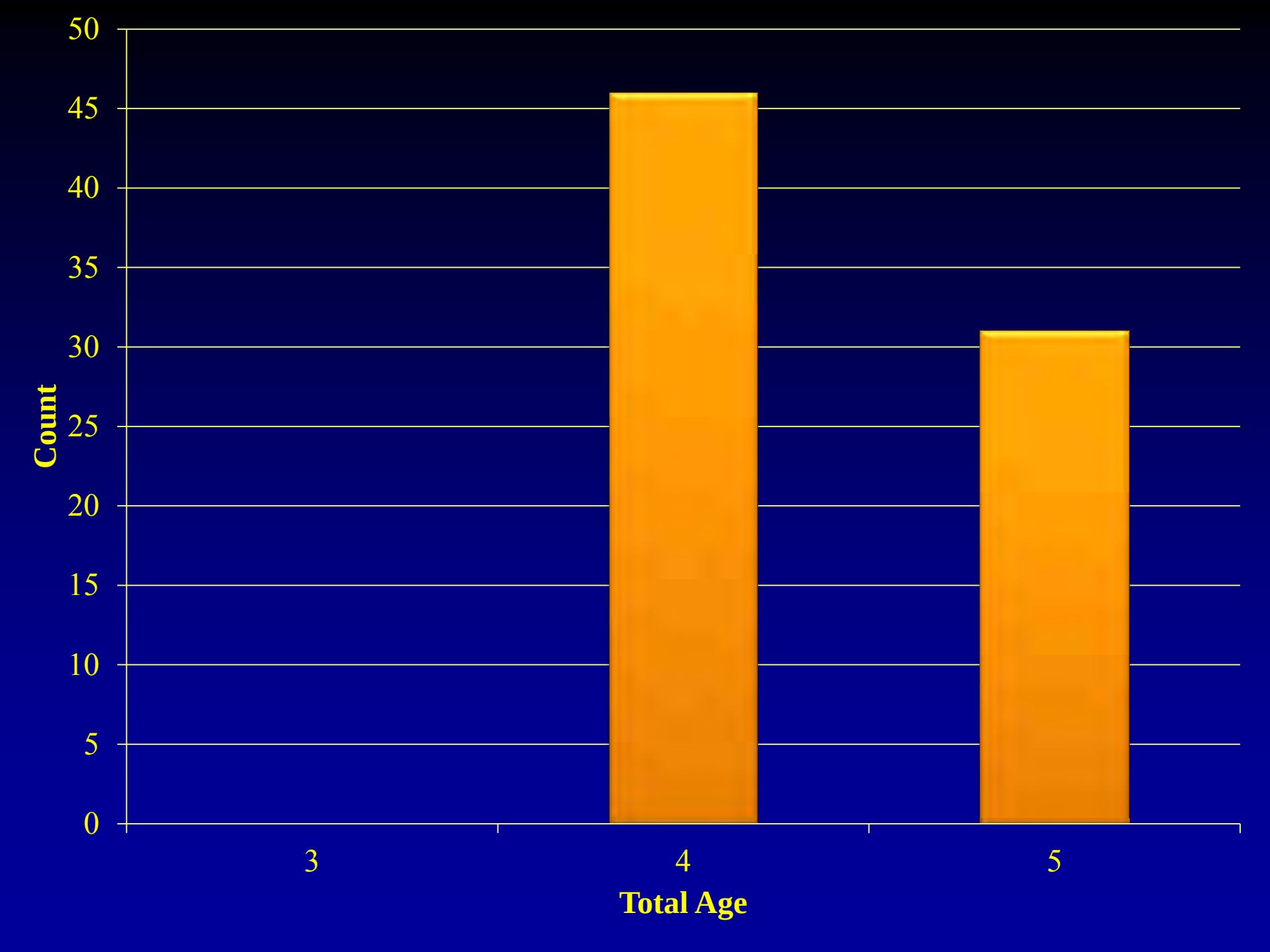
ITM Section	Count Clipped	Count Unclipped	% Thermally Marked	Wild Est	Hatch Est
Below Leaburg	49	12	0.19	10	51
Leaburg to Cougar	20	44	0.05	42	22
Above South Fork McKenzie	1	65	0.05	62	4
South Fork McKenzie Above Cougar	25	7	0.05	7	25

5 y Avg Thermal Mark Rate		
Year	Abv Leaburg	Below Leaburg
2008	0.03	0.06
2009	0.05	0.18
2010	0.07	0.33
2011	0.04	0.10
2012	0.07	0.27
MEAN	0.05	0.19

ITM Section	Wild Est	Hatch Est	Unweighted pHOS
Below Leaburg	10	51	84.1%
Leaburg to Cougar	42	22	34.8%
Above South Fork McKenzie	62	4	6.6%
South Fork McKenzie Above Cougar	7	25	79.3%

ITM Section	Peak Redd Count	Unweighted pHOS	Above Leaburg without Above Cougar	Basinwide
Below Leaburg	75	84.1%		
Leaburg to Cougar	146	34.8%	14.9%	39.4%
Above South Fork McKenzie	349	6.6%		
South Fork McKenzie Above Cougar	146	79.3%		


60
50
40
30
20
10
0
Count
60
70
80
90
100
Fork Length (mm)

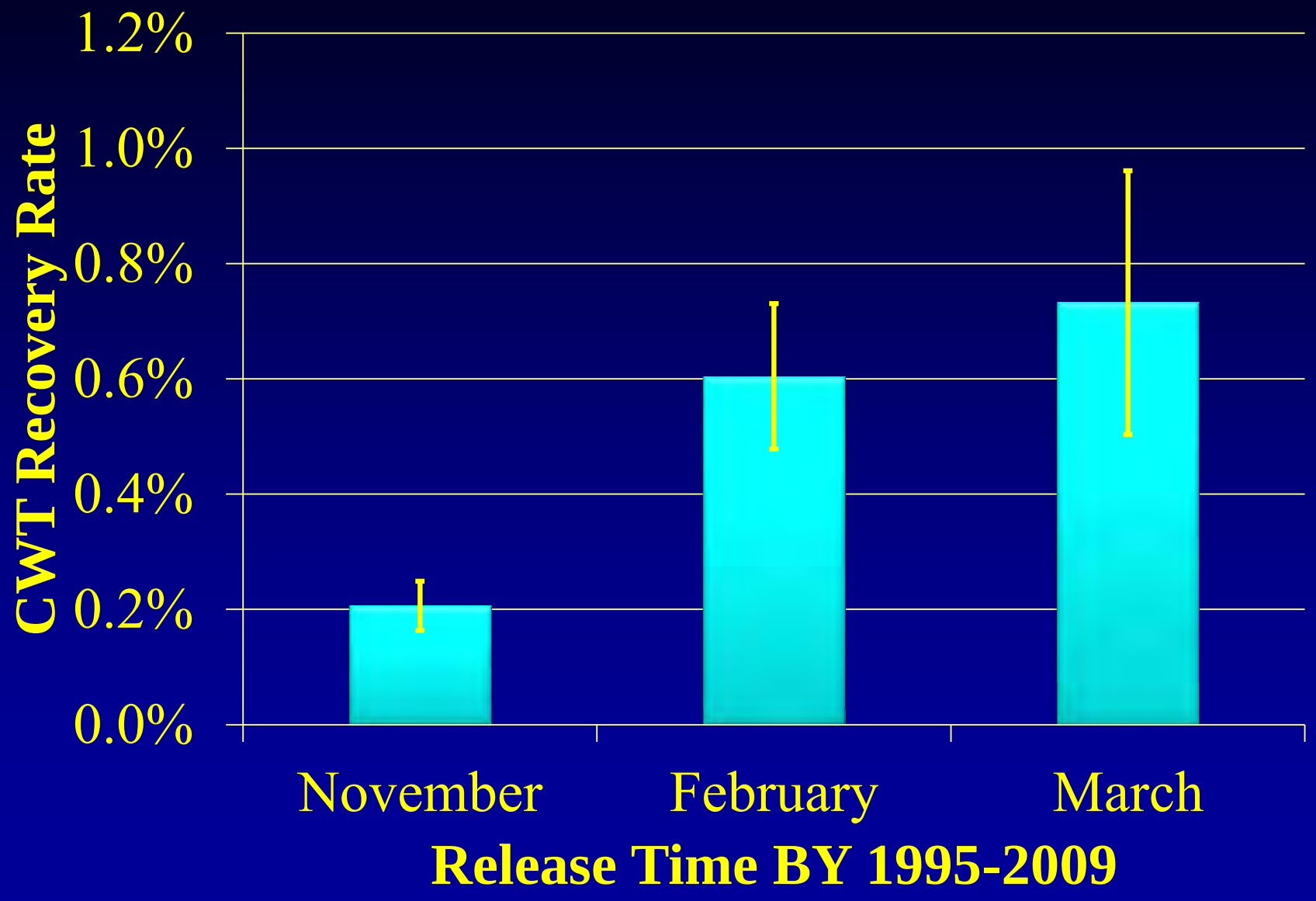

50
45
40
35
30
25
20
15
10
5
0
Count
3
4
5
Total Age

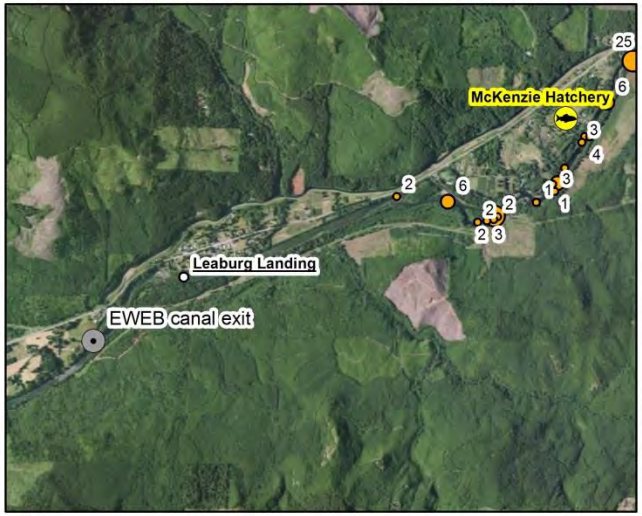
Age	CWT Age	Scale Age
3	1	0
4	47	44
5	7	10
6	0	1

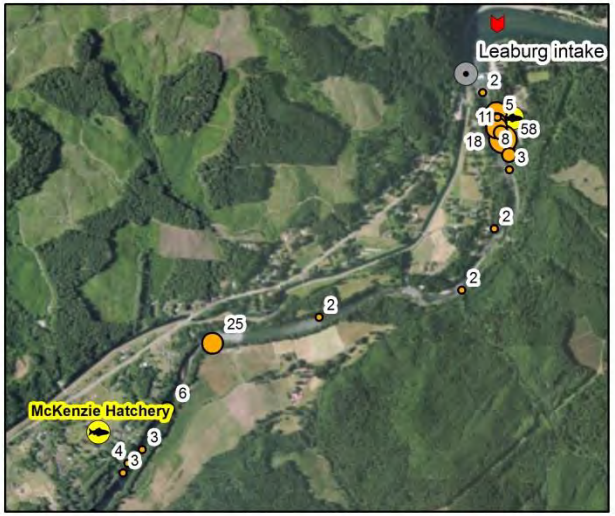
Age Validation

Age	CWT Age	Scale Age
3	1	0
4	47	44
5	7	10
6	0	1

CWT Recovery Rates (BY1995-2009)



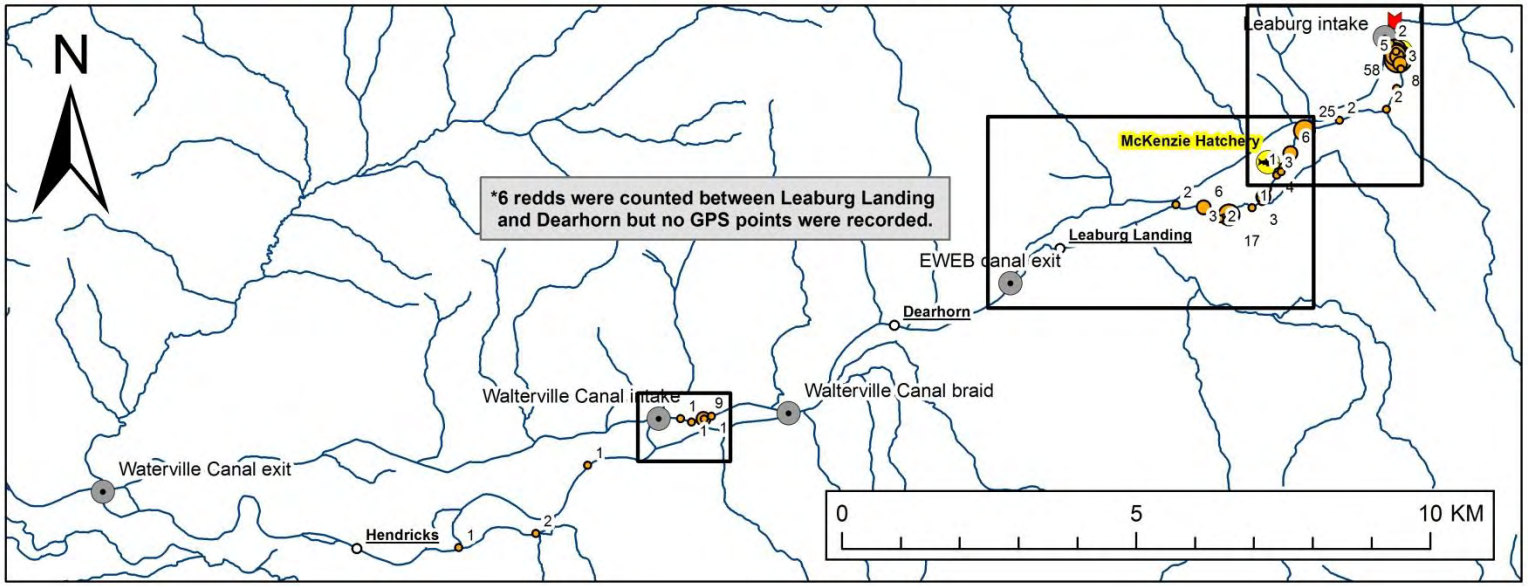




Legend

2012 Peak Redd Count

- 1 - 5
- 6 - 12
- 13 - 27
- 28 - 58
- 59 - 100
- Points of Interest
- Survey Section Breaks
- Dams
- Hatcheries
- Streams



Questions?