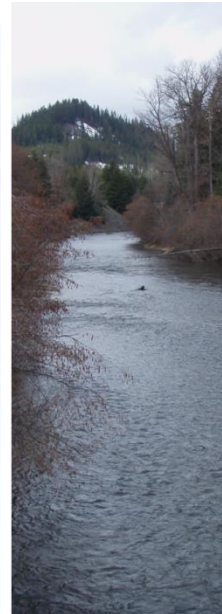
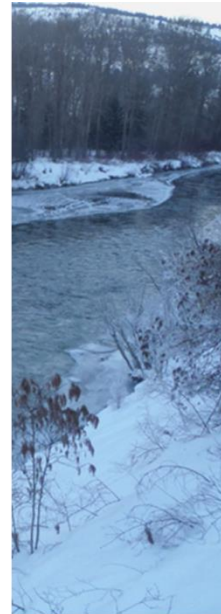


Yakima River Spring Chinook Competition and Capacity

Christopher Johnson, Trenton De Boer,
Nick Mankus, Tim Webster

Washington Department of Fish and Wildlife
Ecological Interactions Team
Ellensburg, Washington



Spring Chinook competition and capacity history/project goals

- Monitor for density dependant constraints to the population following supplementation.
 - Identify factors which are potentially limiting to the population
-

Life-stage specific



krisweb.com



Worldofstock.com



Egg-to-fry

Fry-to-parr

Parr-to-smolt

Comp-Capacity

- Early survival, developmental rates, emergence timing
 - WDFW/NOAA; Johnson et. al (2012); Roni et. al (2016)



- Post-emergence movement and spring growth trajectories; Summer habitat utilization; Territorial response
 - BPA reports: C. Johnson; T. De Boer; N. Mankus, T. Pearsons



- Fall PIT-tagging (today's presentation)



Fall PIT-tagging

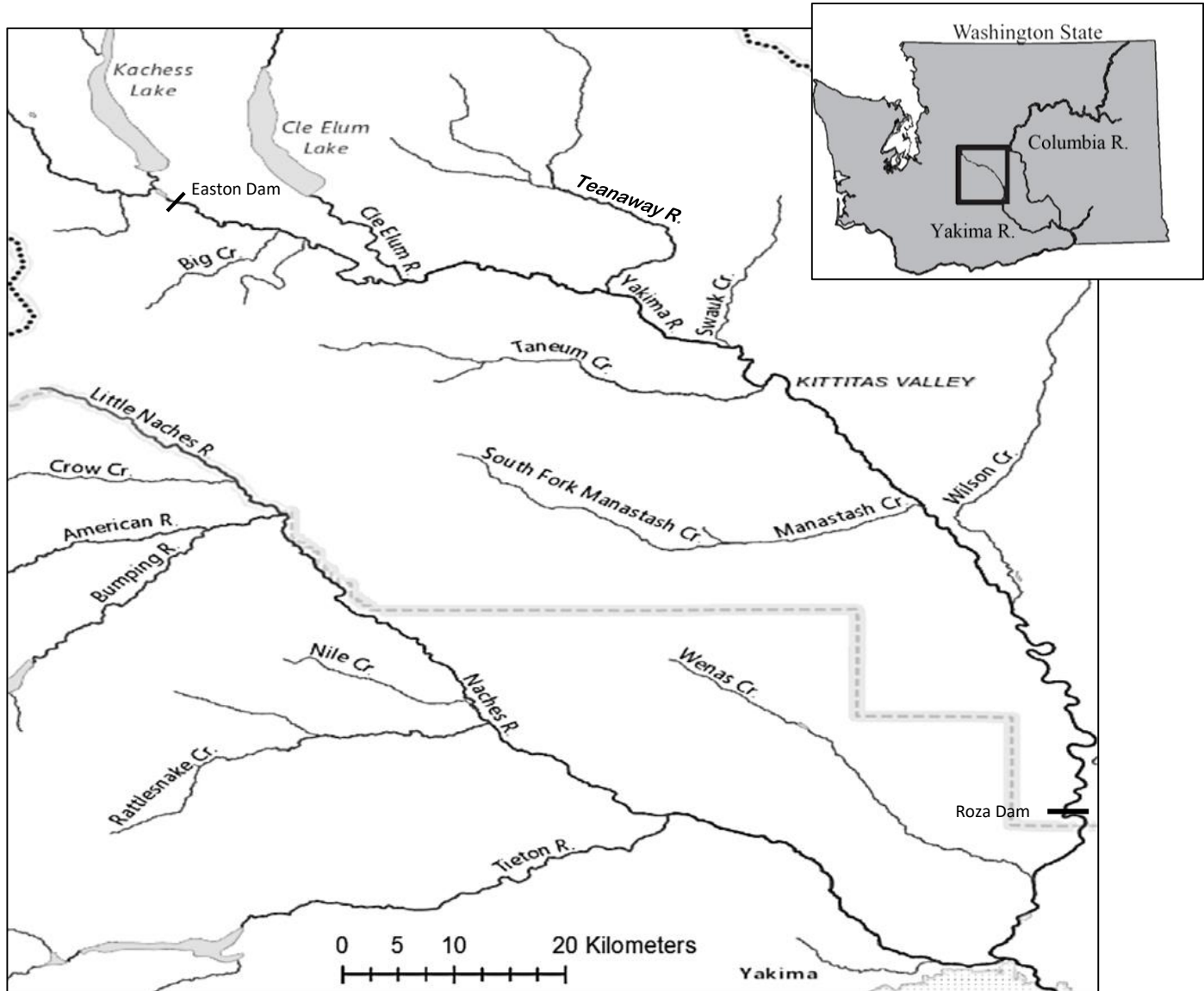
Overall goals:

- Investigate potential differences in fall tagging size and condition, migration timing, or survival-to-adult of Yakima River spring Chinook salmon, attributable to spatial differences in pre-tagging emergence and/or areas of rearing.
-

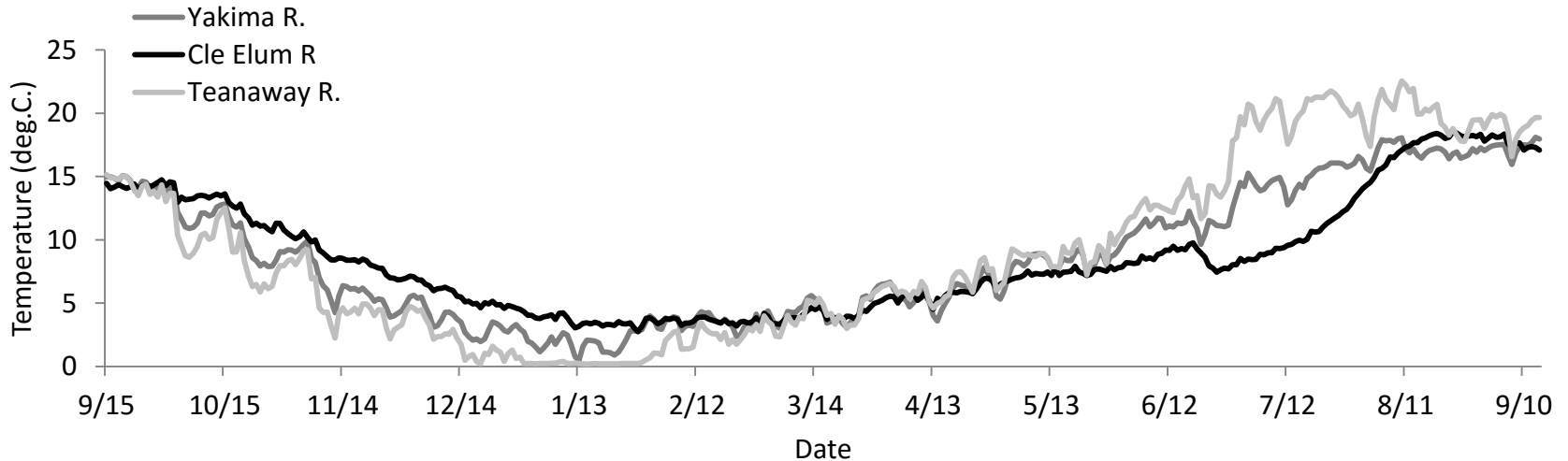
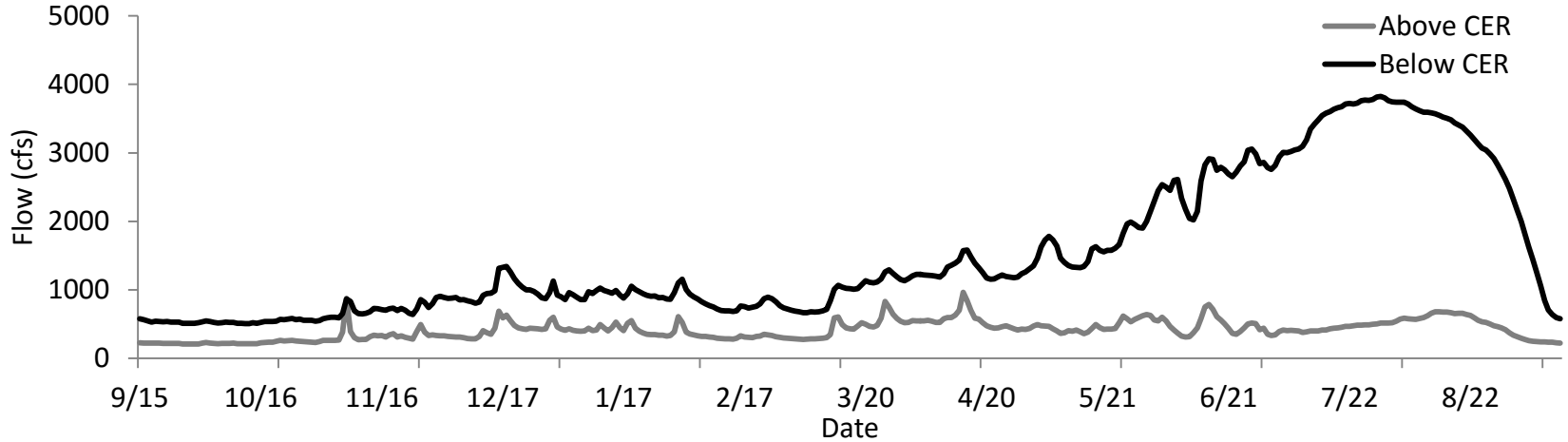
Specific metrics:

- Size and condition at tagging (fall)
- Migration timing by reach
- Seasonal migration (winter migrants)
- Relative adult return rate, by reach, and also between the Yakima and Naches basins.

Study Area



Key environmental factors



Chinook tagging

- ~ 4500 tags/year
- 151 main-stem Yakima/Naches and primary tributary collection sites; at 1.0 km intervals
- Years: 2011-2015

Reach	2011	2012	2013	2014	2015
CLE	222	200	207	200	218
MST	247	195	200	200	231
NACH	534	2157	1957	1916	1665
YAK	3136	2228	2291	2033	2606

Total	4139	4780	4655	4349	4720
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Downstream detection

Dam.Predation.Array.Location	N	Julian	ci	Diff from Roz	Columbia rkm
Roza	46	70.8	5.6	0	753.5
Prosser	170	108.5	3.2	37.7	615.3
McNary	132	120.5	1.8	49.6	470
John Day	113	124.1	1.9	53.3	348
Bonneville (BCC)	16	122.8	6.0	52.0	234
Bonneville (B2J)	24	130.7	3.9	59.9	234



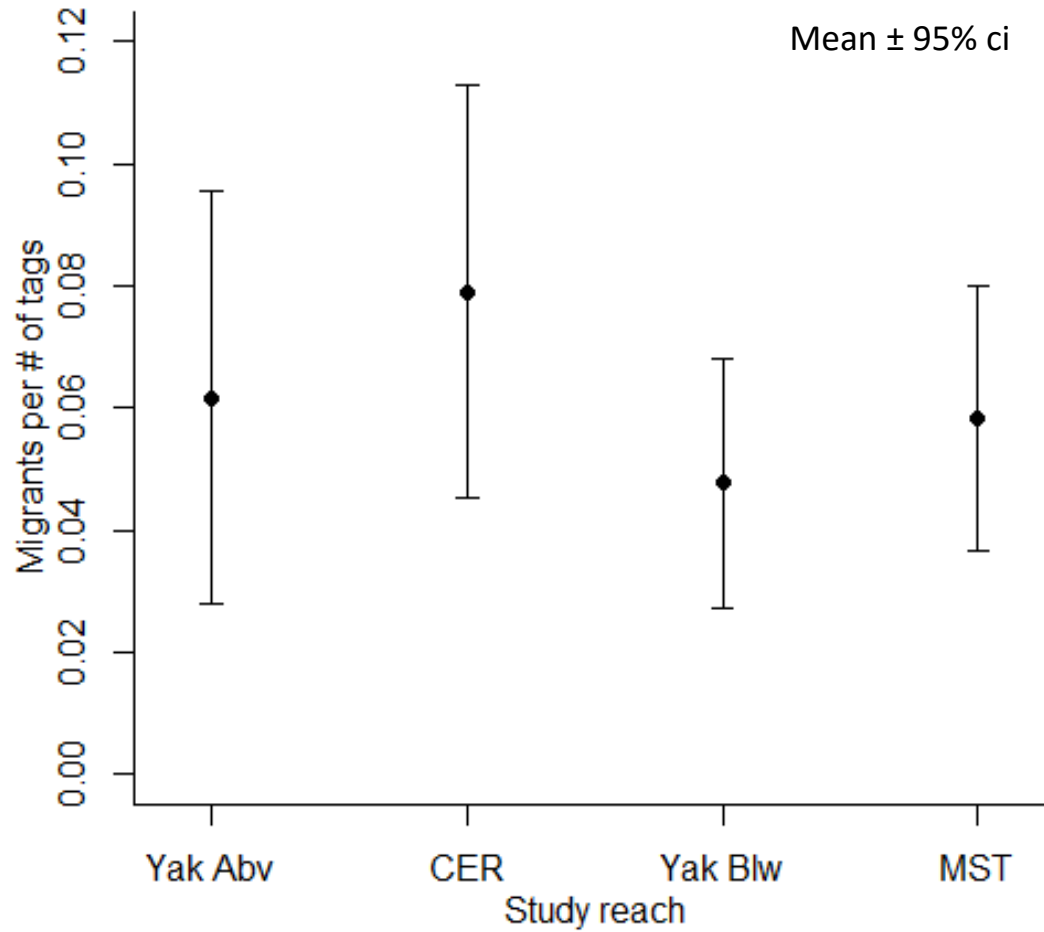
Initial assumptions:

- Single age-class migration
- Equal effects of variable detection efficiency with similar migration timing
- High detection probability of returning adults

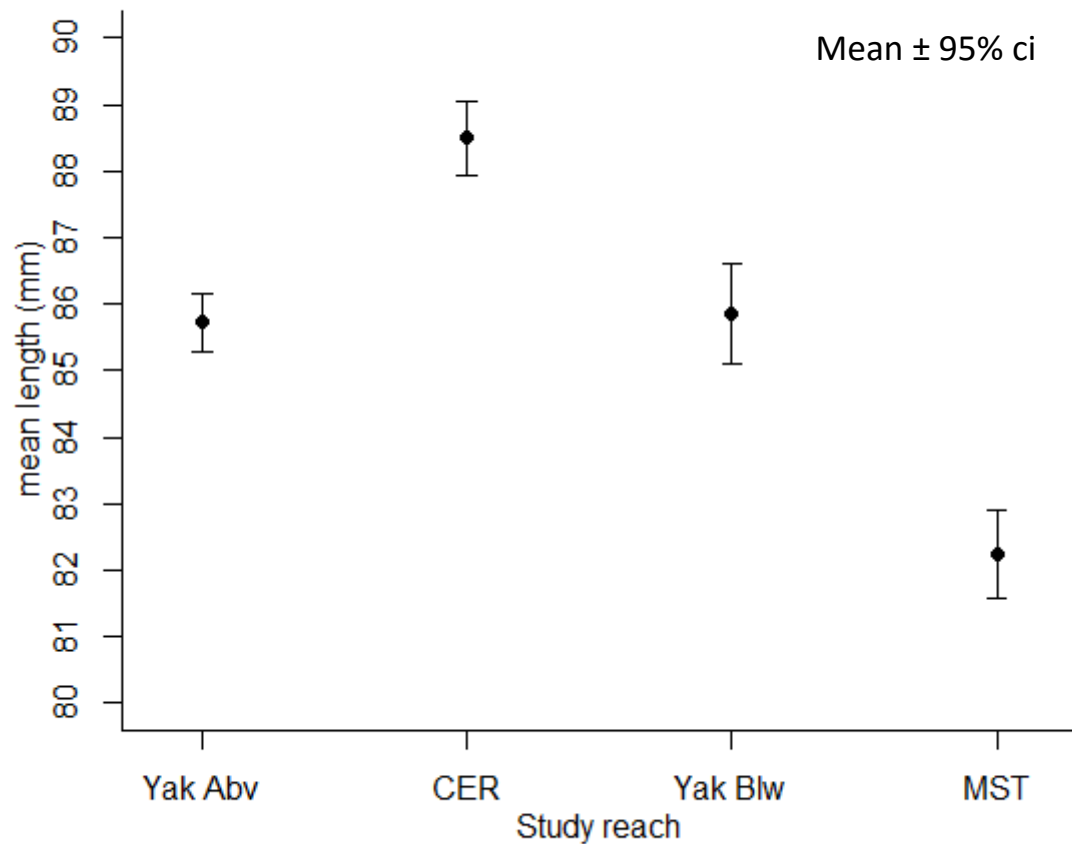
Interpretive context:

- Data do not account for pre-tagging movement.
- Results are preliminary as the analysis is ongoing

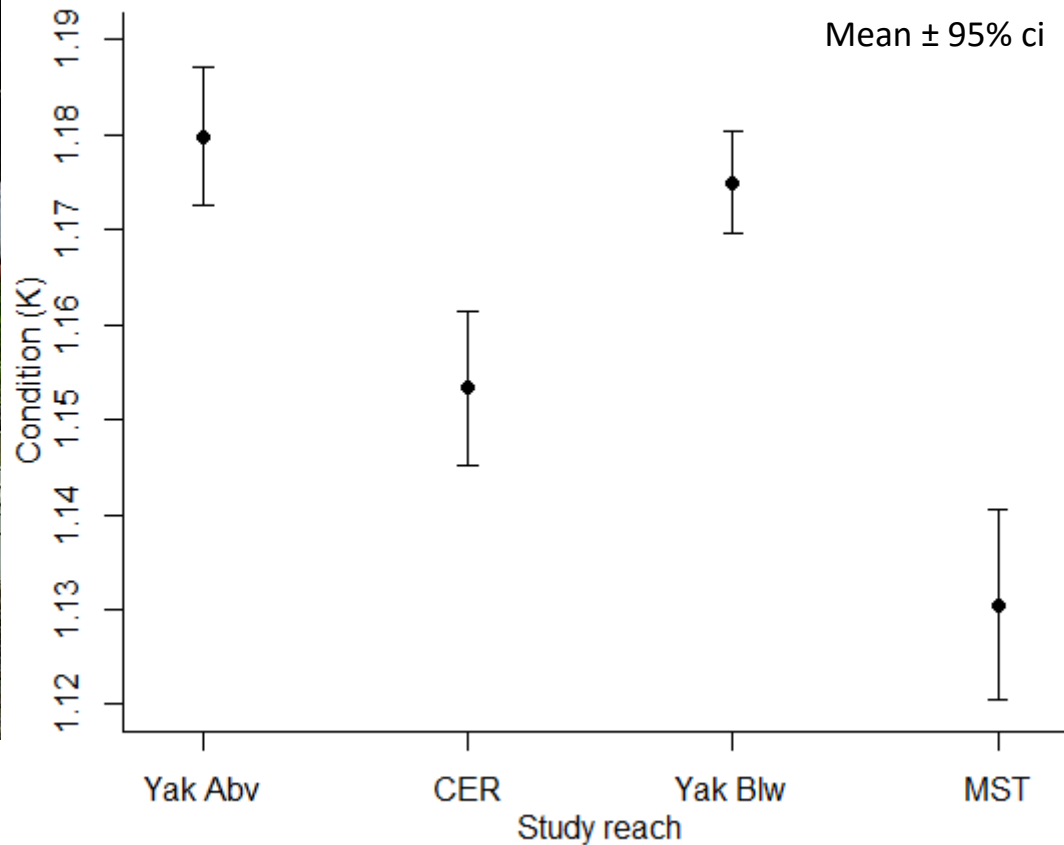
Detection Rates



Length -fall tagging



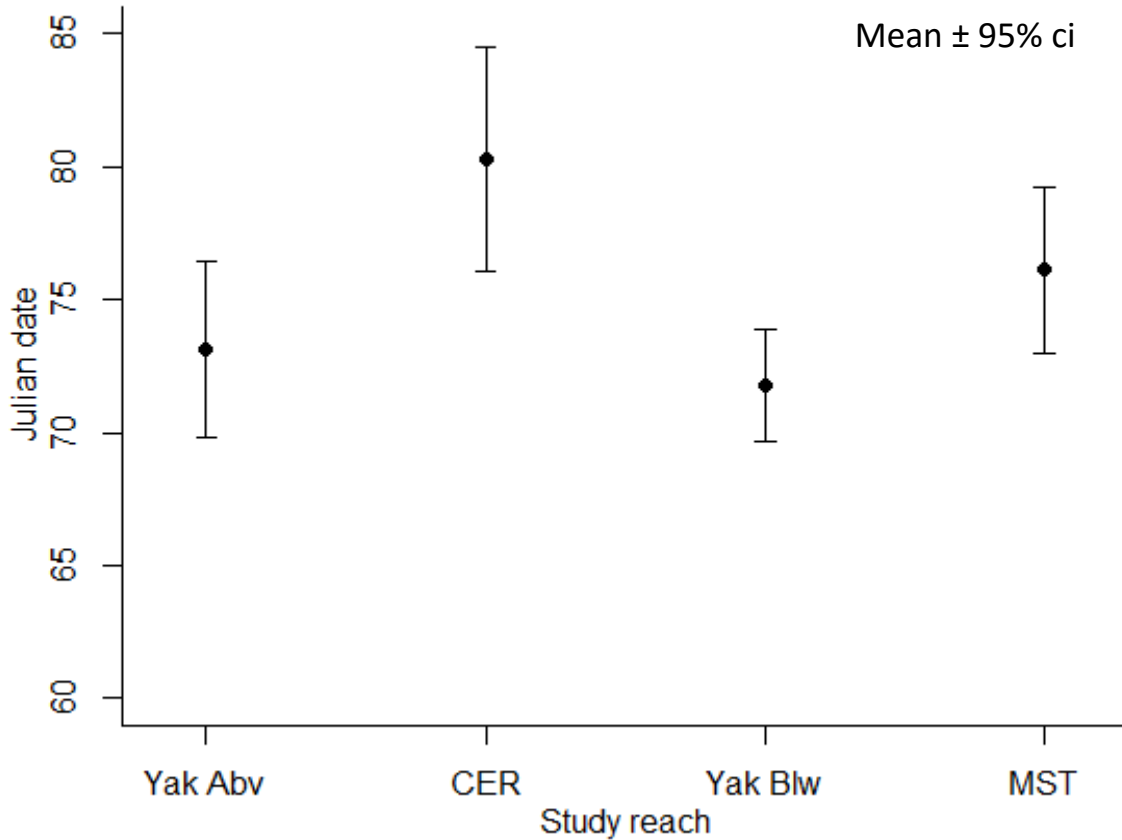
Condition -fall tagging



Migration Timing



Photo: salmonrecovery.gov

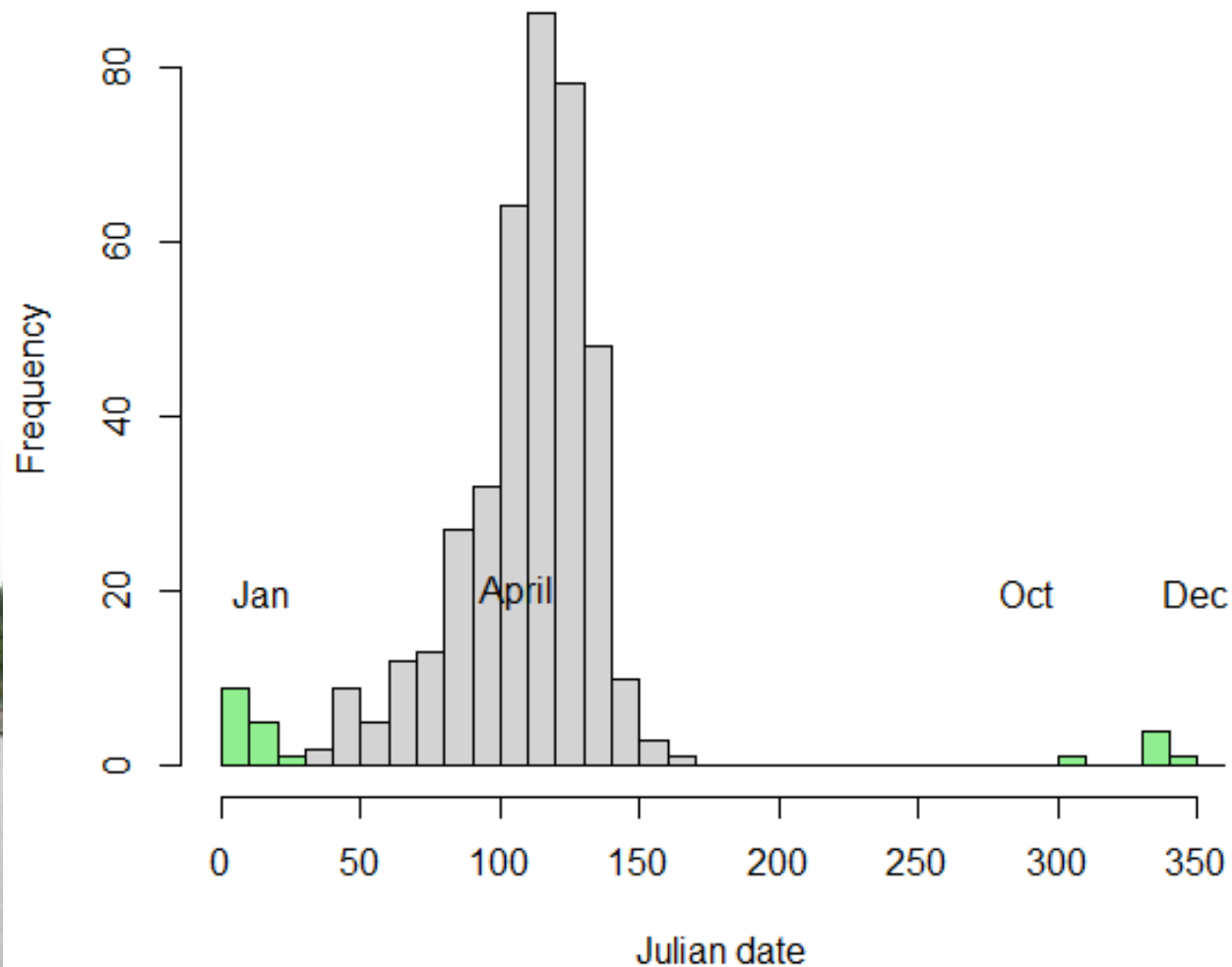


	2012	2013	2014	2015	2016
Yak.upper	73.79255	72.83592	71.54479	76.84455	61.8557
Cle.elum	83.22187	75.44606	88.93566	79.49582	65.43113
Yak.lower	76.01057	67.33603	77.42469	73.18234	59.98601
MST	77.627	71.22514	78.28526	75.62481	66.58302

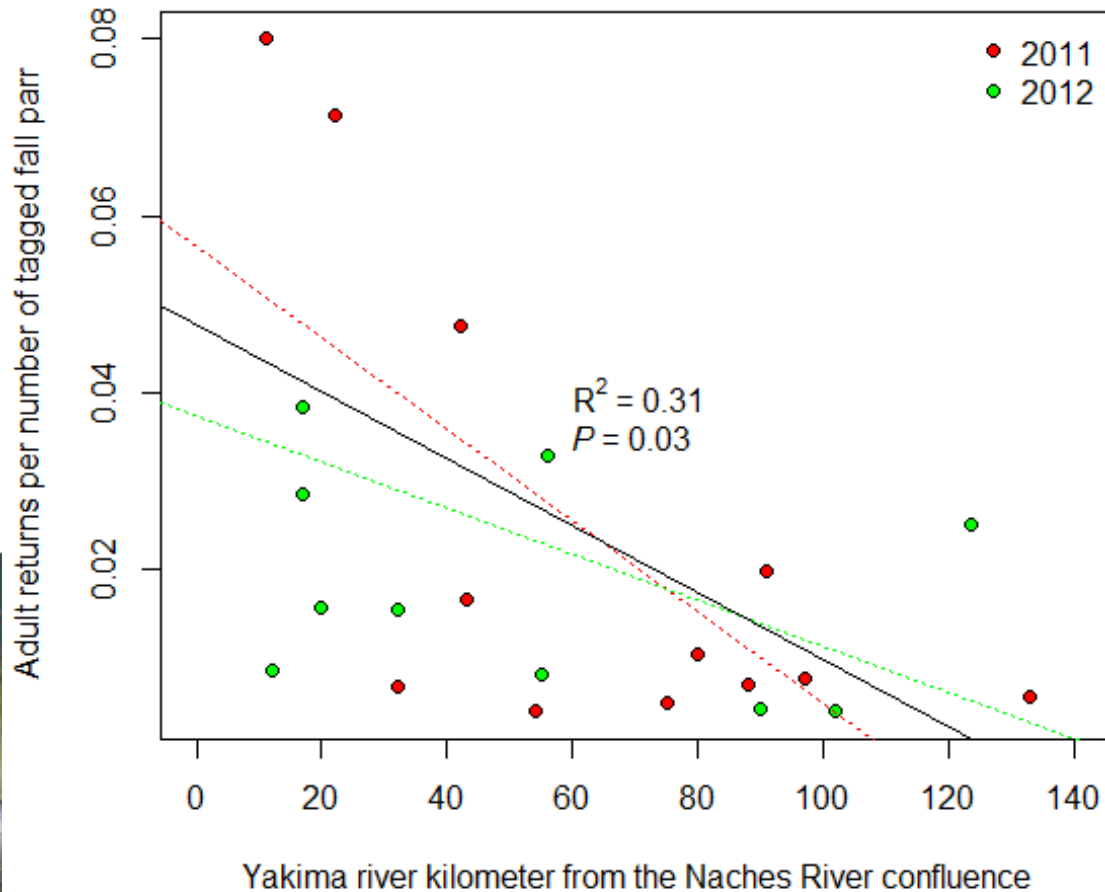


Photo: www.salmonrecovery.gov

Migration Timing



Yakima River Adult Returns



Return Rate

Yakima vs. Naches Basin

Year	System	Tag count	Adult count	Detected return rate (%)
2011	Naches	534	0	0
2011	Yakima	4319	24	0.556
2012	Naches	2485	11	0.443
2012	Yakima	3123	16	0.512

2012 Naches vs. Yakima,
Fisher's test; $P = 0.85$



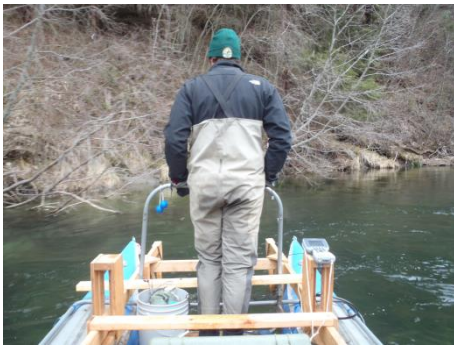
Preliminary Results

- Fall size and condition differ at the reach scale
- Migration timing also appears to differ significantly, and consistently at the reach scale
- A significant number of parr may overwinter below Prosser.
- Adult return data suggest some relation between tagging location and survival to adult
- Low number of tagged adult returns suggest the need for additional tags for any future Naches/Yakima system comparisons.



Future Work

- Further investigation of reach-scale spatial and temporal size and migration trends
- Evaluate additional adult returns from 2013-15 tagging efforts
- Passive fall and winter detection of tagged in-basin parr to evaluate movement and overwintering habitat



Acknowledgments

- WDFW: Anthony Fritts, WDFW tagging crews: Scott Coil, Zach Lessig, Cade Linquist, Alex Hedrick, Ryan Steele, Ryan Fifield, Tommy Wachholder, Jeff Bates, Jonathan Hegna, Casey Green, Dan Skillman, Seth Shy, Charles Coon, Zack Mays, Dylan Tipps, Kyle Hatch.
- YN: Dave Fast, Mark Johnston
- BPA: Patty Smith, Michelle O'Malley



End

