

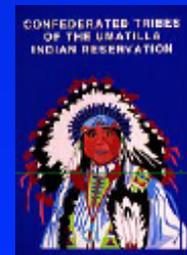
Reproductive success of Chinook jacks and precocial males in natural streams



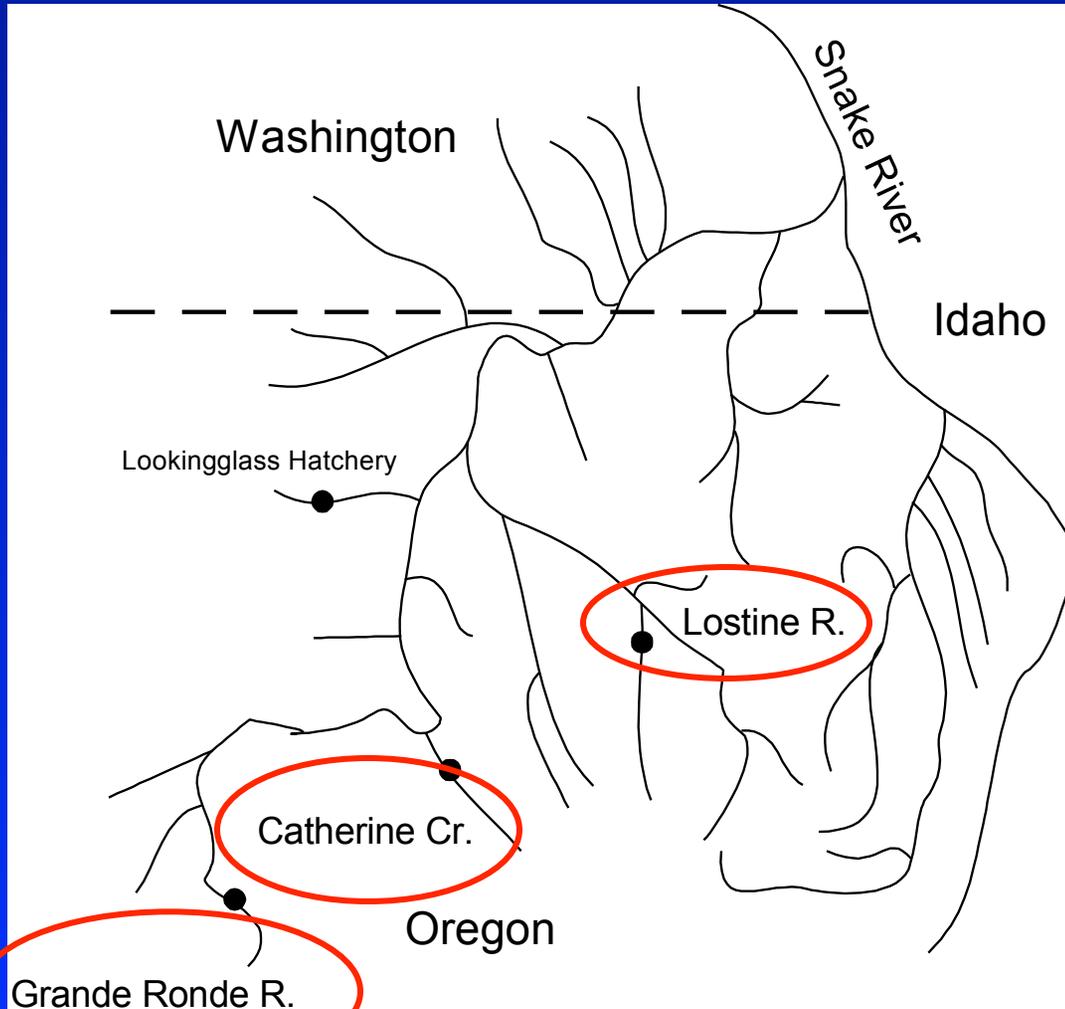
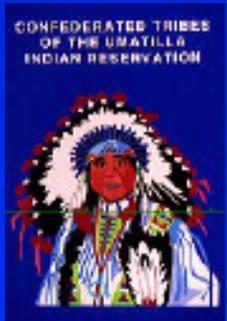
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¹ National Marine Fisheries Service, Northwest Fisheries Science Center

² Oregon Department of Fish and Wildlife



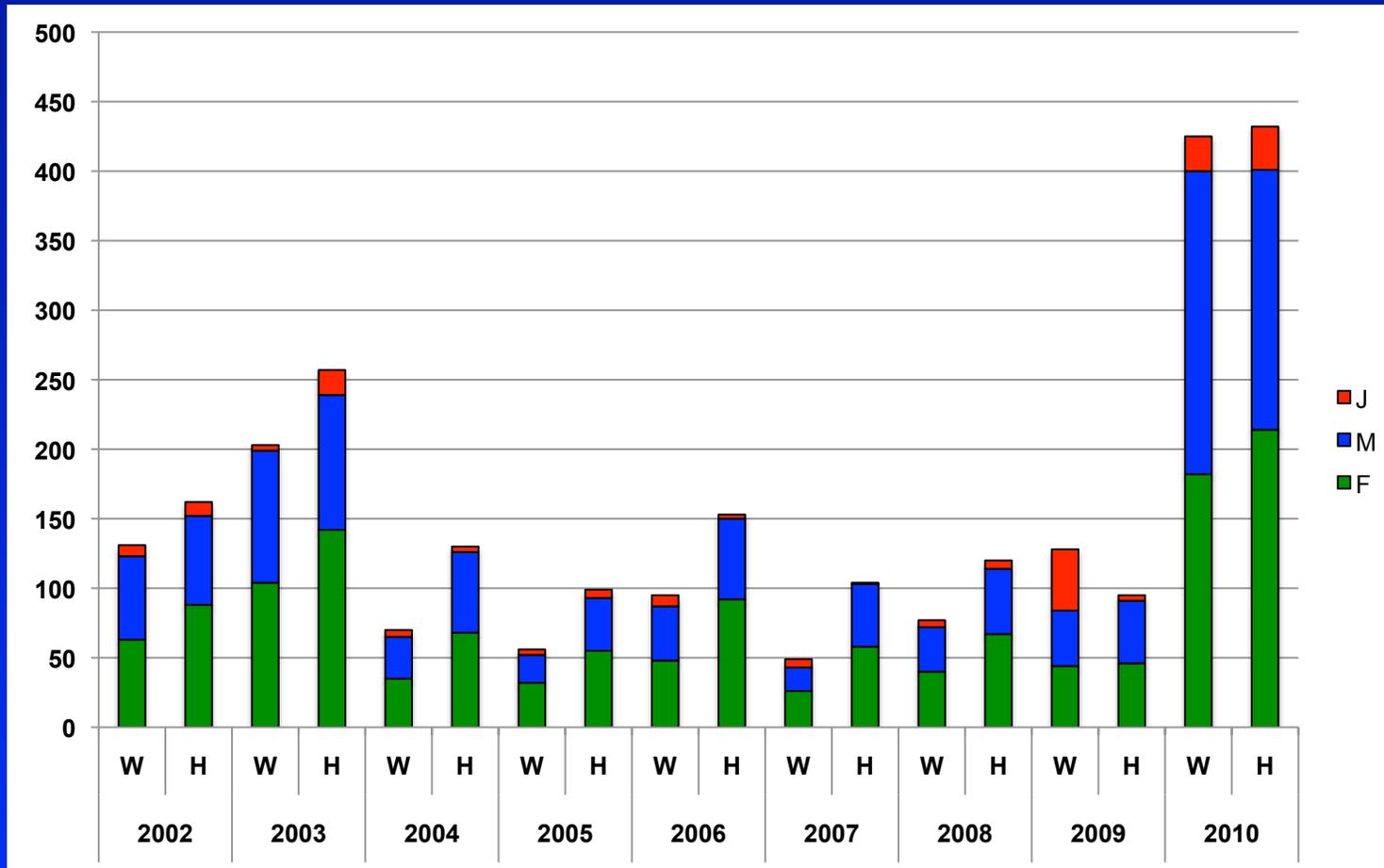
Northeast Oregon captive broodstock programs



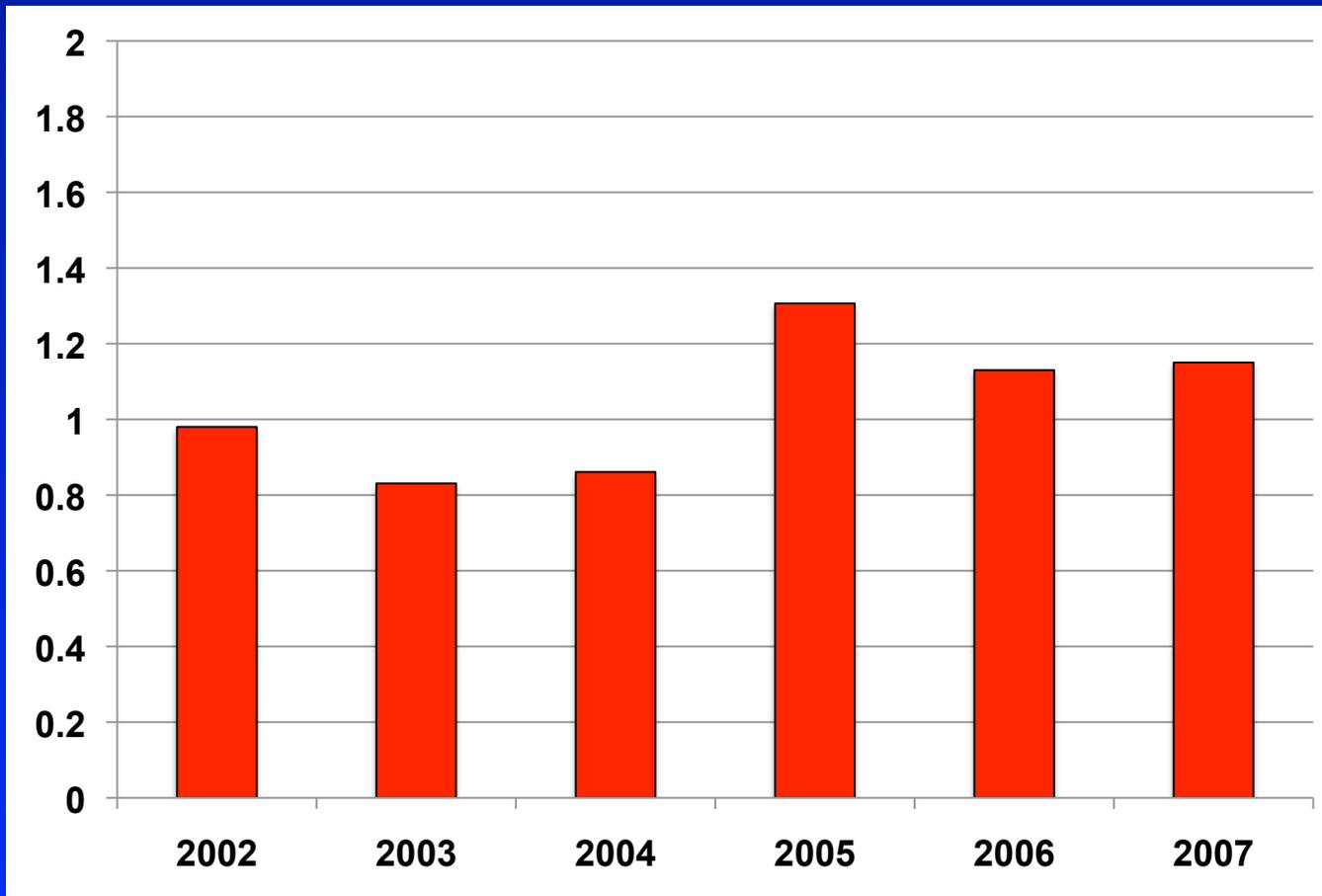
Methods—parentage

- Sampled returning adults, parr, and migrants
- Genotyped 10 microsatellites (of 13 GAPS loci)
- Pedigrees reconstructed by exclusion
- Relative Reproductive Success (RRS) calculated, normalized to wild
 - # offspring/# spawners

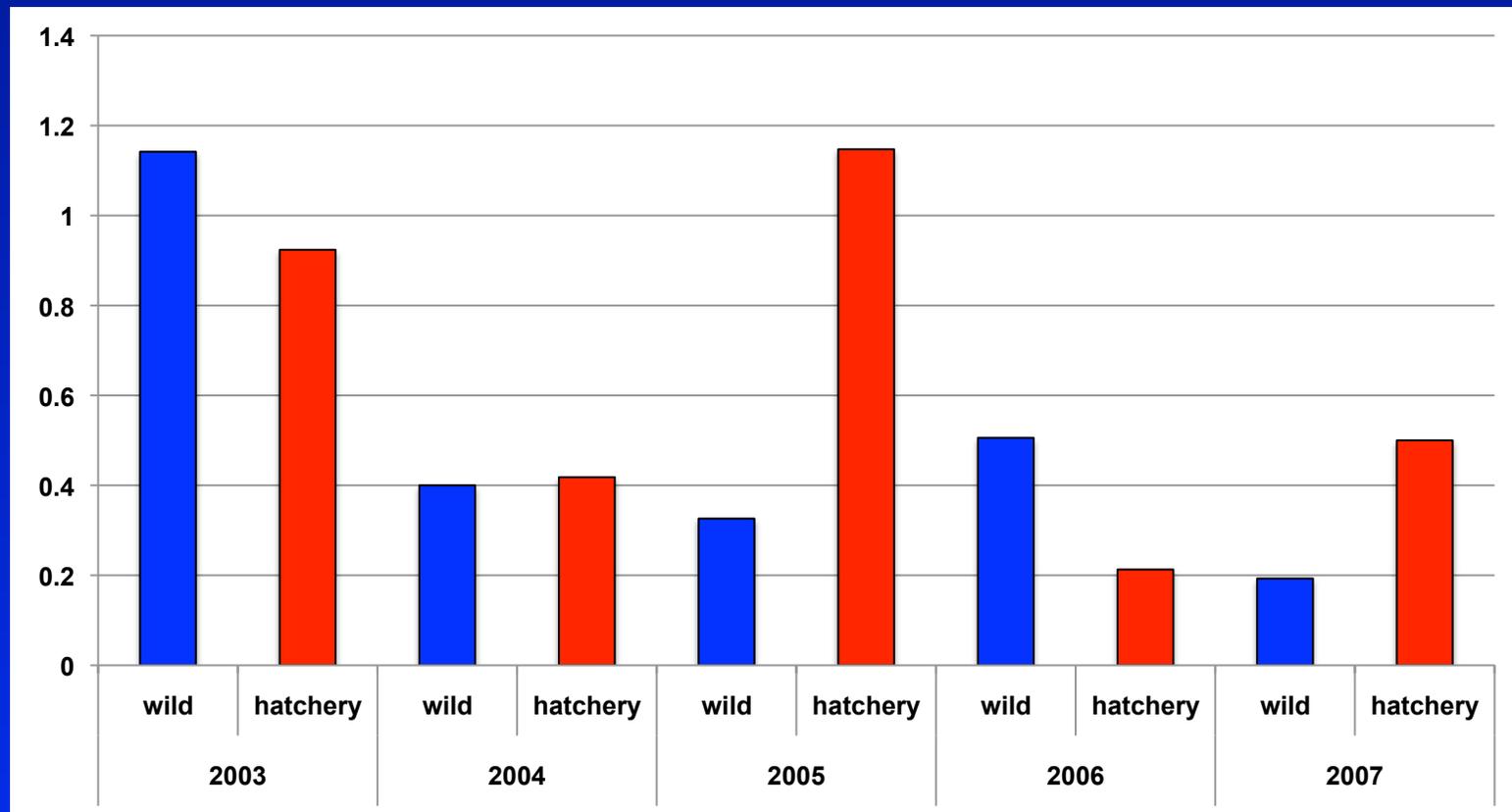
Catherine Creek adult spawners



Catherine Creek RRS hatchery to wild



Catherine Creek RRS jack/adult males



Geomean all jacks = 0.48

Geomean H jacks = 0.54

Geomean W jacks = 0.43

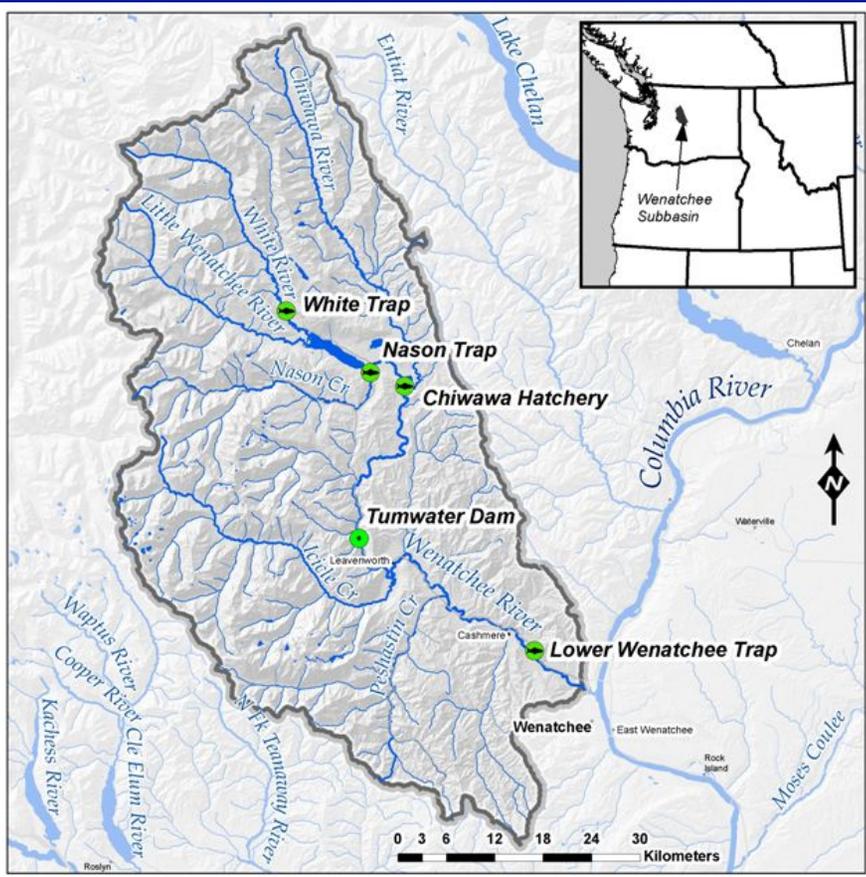
Precocial Parr (2's)

- Wild precocial parr collected in 4 years (no hatchery)
- Found parents of PParr
 - Most are 2-year-olds
 - Come from even mix of parents
- Found offspring from 2005 PParr (91 total PP)
 - 10 offspring total
 - 6 from 5 hatchery females, 4 from 4 wild females
- Precocials have low (but measurable) success
 - RRS Pparr vs. 3's = 0.15
 - RRS Pparr vs. 4/5's = 0.05

Relatedness

		<u>Origin</u>	<u>N</u>	<u>Average R</u>
Jacks	BY 1999 3s	W	7	0.005
		H	10	0.005
	BY 1999 4s	W	68	0.042
		H	176	0.044
	BY 1999 5s	W	6	0.000
		H	15	0.022
Jacks	BY 2005 3s	W	43	0.046
		H	52	0.048
Precocials	BY 2003 2s	W	90	0.038

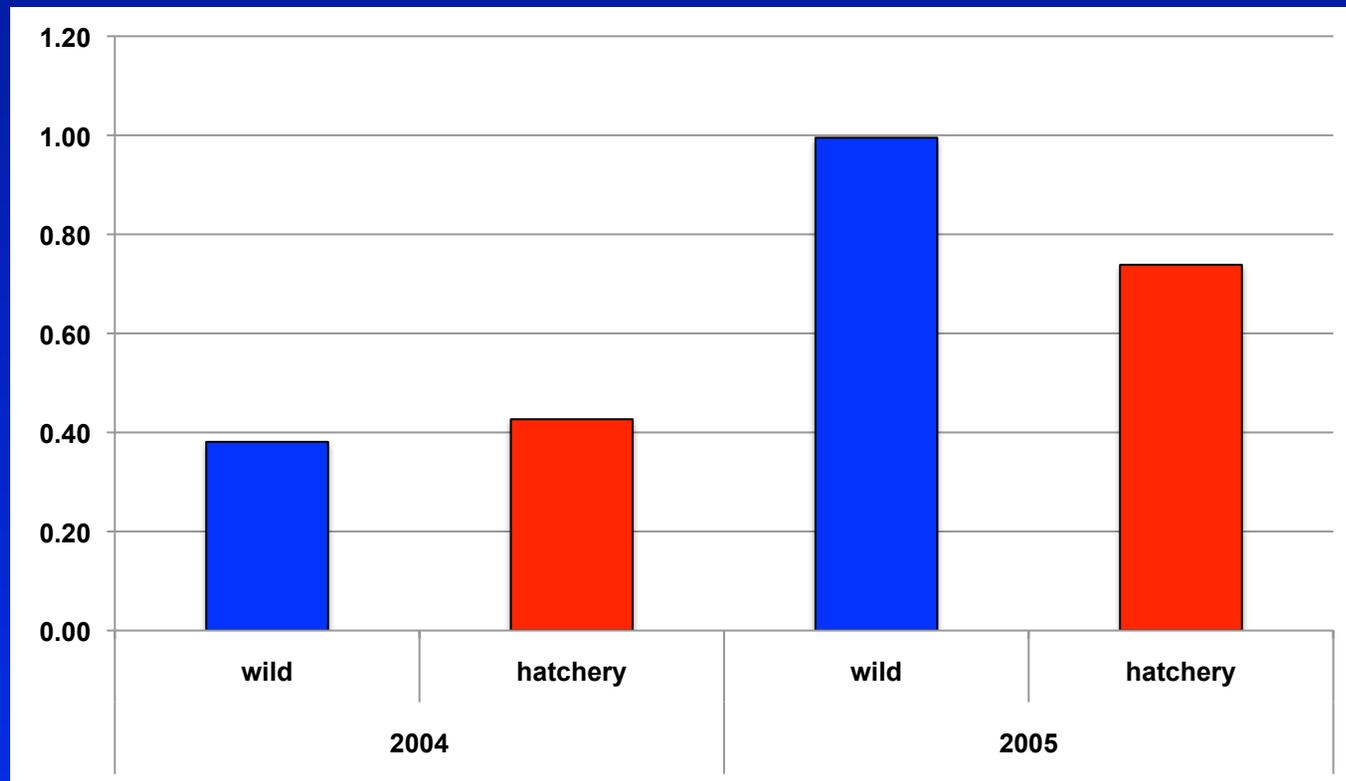
Wenatchee River spring Chinook salmon



- ESA listed in 1999
- Hatchery supplementation started in 1989
- Local broodstock, captured at Chiwawa weir
- Captive brood program on White River

Williamson et al. (2010) CJFAS 67:1840-1851

Wenatchee RRS of jack/adult males



Geomean all jacks = 0.59

Geomean W jacks = 0.62

Geomean H jacks = 0.56

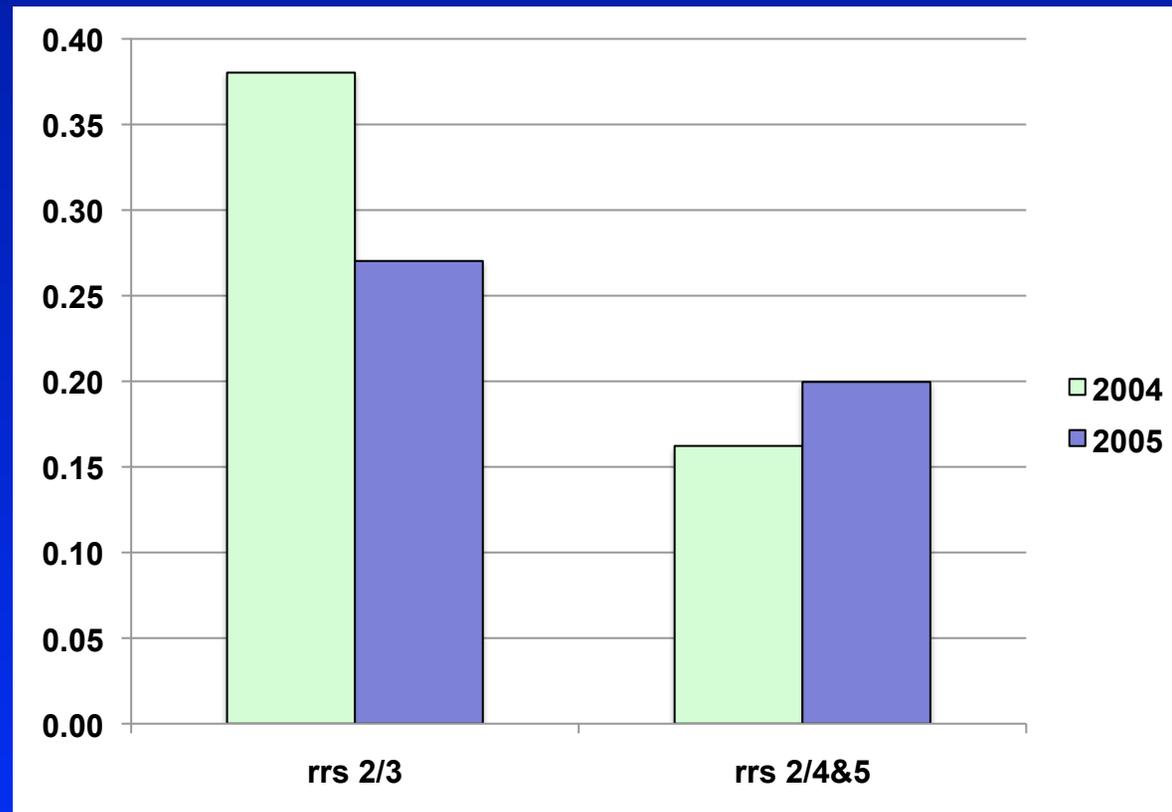
Age at return (male)

	<u>Hatchery</u>	<u>Natural</u>
2004		
2 yrs	626	0
3 yrs	740	28
4 yrs	96	403
5 yrs	2	4
2005		
2 yrs	290	0
3 yrs	129	9
4 yrs	1111	185
5 yrs	6	39

Wenatchee precocial parr

- Large numbers of 2's, hatchery-origin
 - 2004: 43% of total male spawners
 - 2005: 19% of total male spawners
- Wild 2's present, not collected

RRS precocial parr



Conclusions

- Jacks and precocial parr do contribute to production in Wenatchee and Catherine Creek
- Lower RS than older/larger males (~50-60%)
 - Wenatchee—jacks more successful than size suggested
 - Wenatchee—higher success of hatchery 2's than wild 2's in Catherine Creek
 - Success of wild 2's in Wenatchee?
- Opposite patterns in H/W jack RS
 - Wenatchee: wild jacks > hatchery jacks
 - Catherine Creek: hatchery jacks > wild jacks

Significance?

- Jacks have lower RS than older/larger males
 - Hatchery production yields higher rates of jacks than in wild
 - Are we therefore reducing the overall RS of the population?
- *BUT*, jacks and precocials more successful than predicted by size
 - Divergent selection for mating strategies
 - Advantage to increased overlap of generations?
- Precocial parr?
 - Difficult to quantify in most systems
 - Primarily anecdotal evidence

Acknowledgements

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