Productivity of Upper Yakima Spring Chinook Salmon Before and During Supplementation

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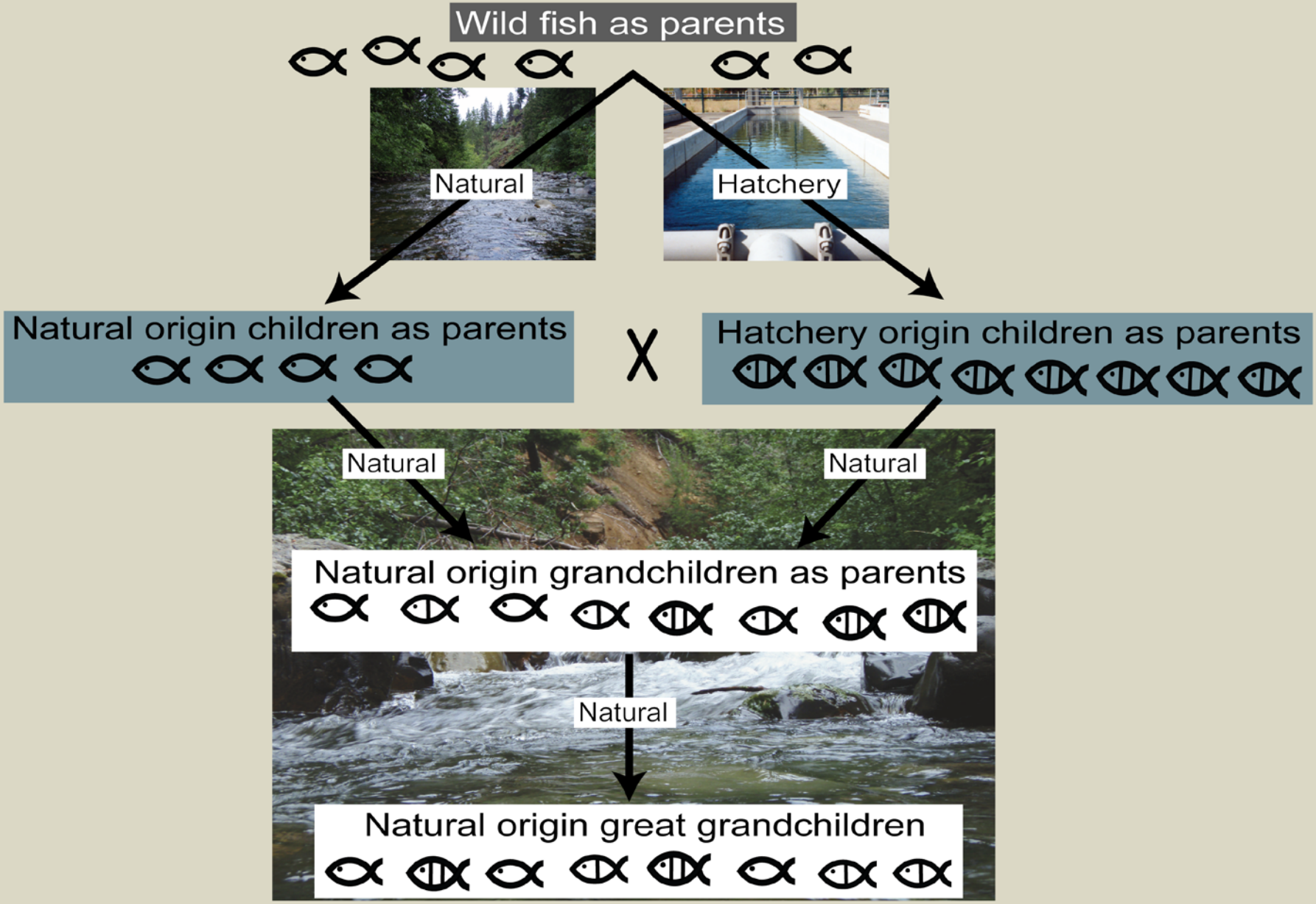
* This talk does not necessarily represent the views of WDFW, YN, YKFP, or BPA

Hatchery production to supplement natural production



State-of-the-art Hatchery

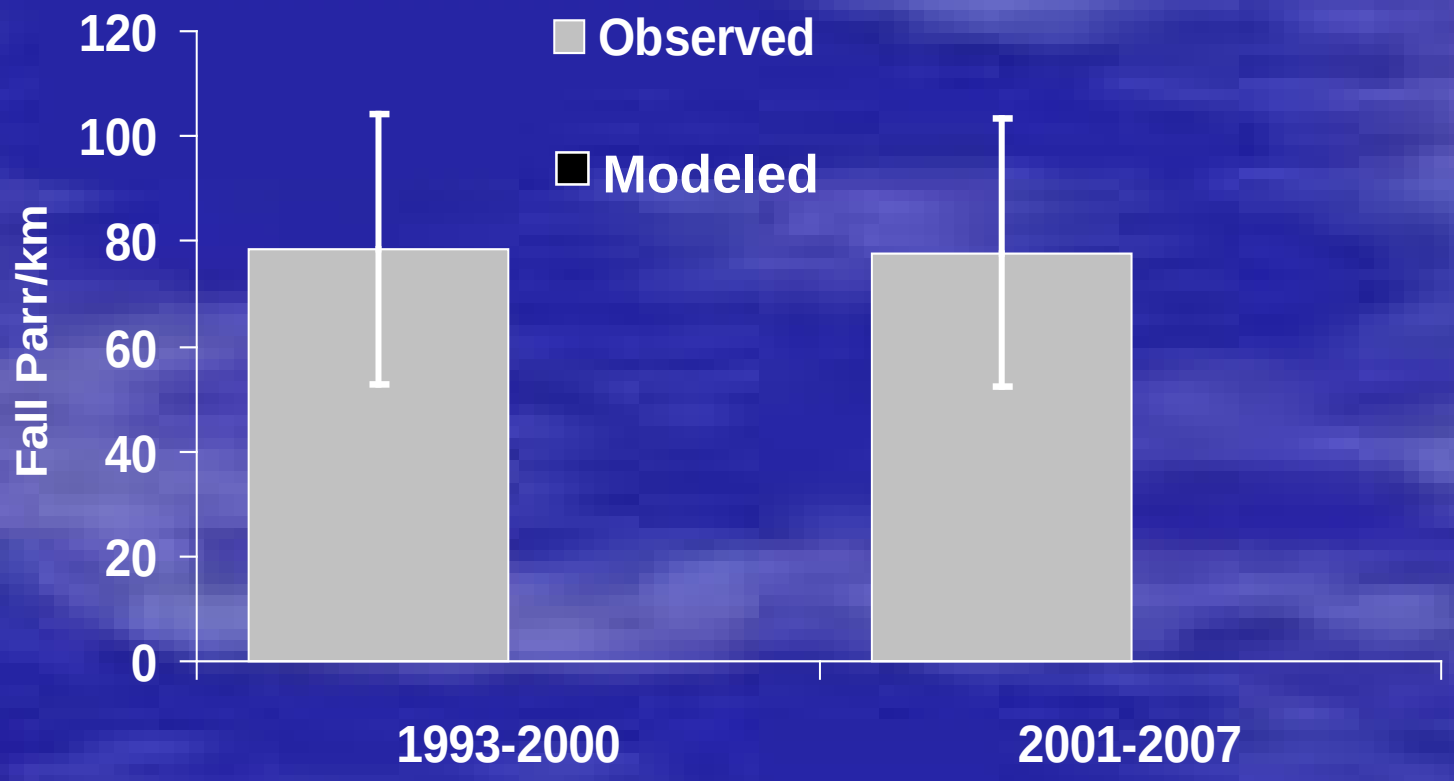
- Representative collection of 100% natural origin brood (first brood taken in 1997)
- Factorial mating
- Low rearing density
- Underwater feeding and overhead cover
- Strict disease management
- Volitional release from acclimation ponds

Hatchery Recruitment – More Redds

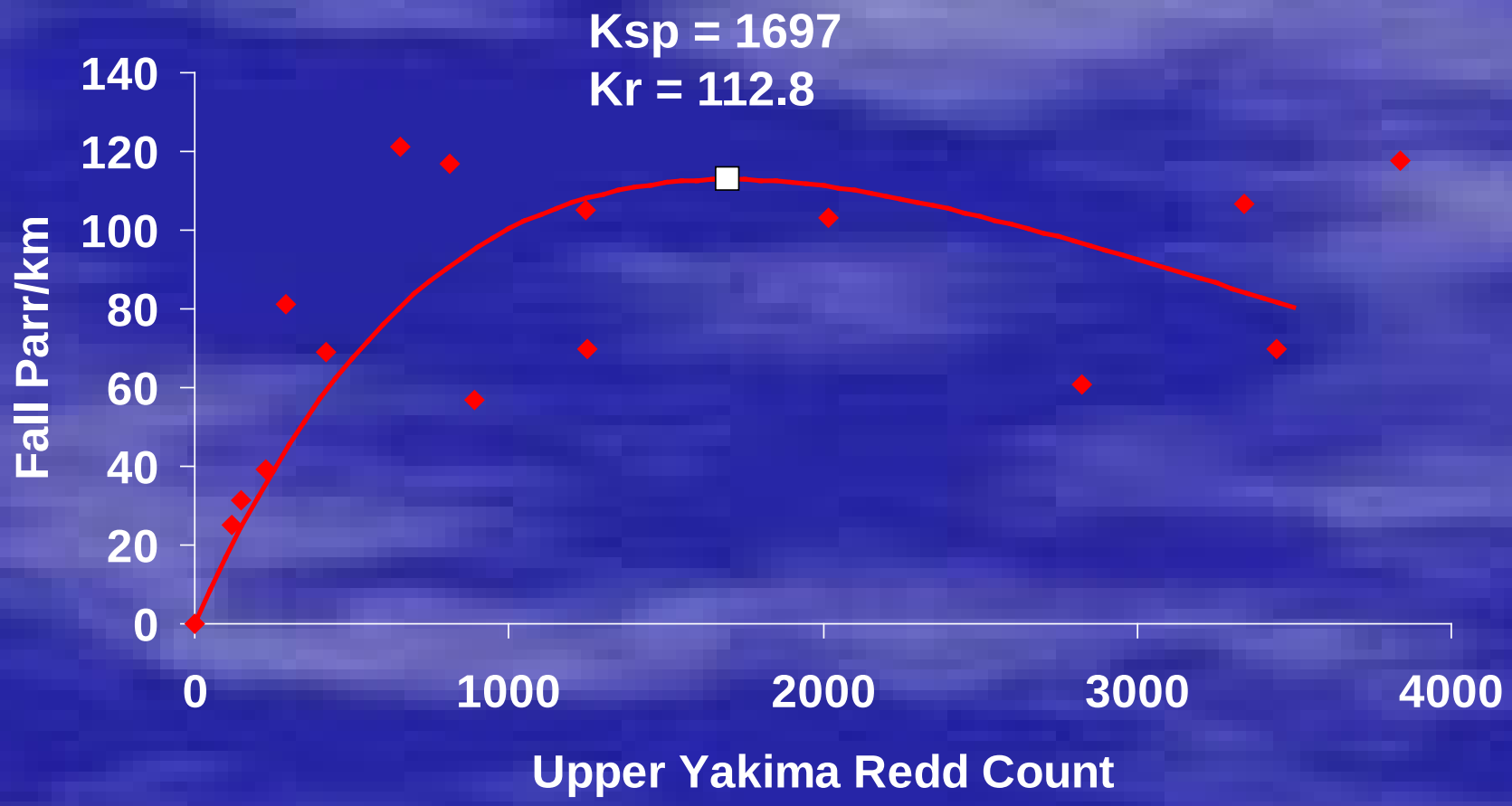
Pearsons et al. 2007

- The mean difference in upper Yakima (supplemented) and Naches (control) stock redd counts between 1981 and 2000 (before supplementation) was 538 redds.
- During supplementation (2001-2006), the upper Yakima River redd counts averaged 1,750 higher than the Naches redd counts.

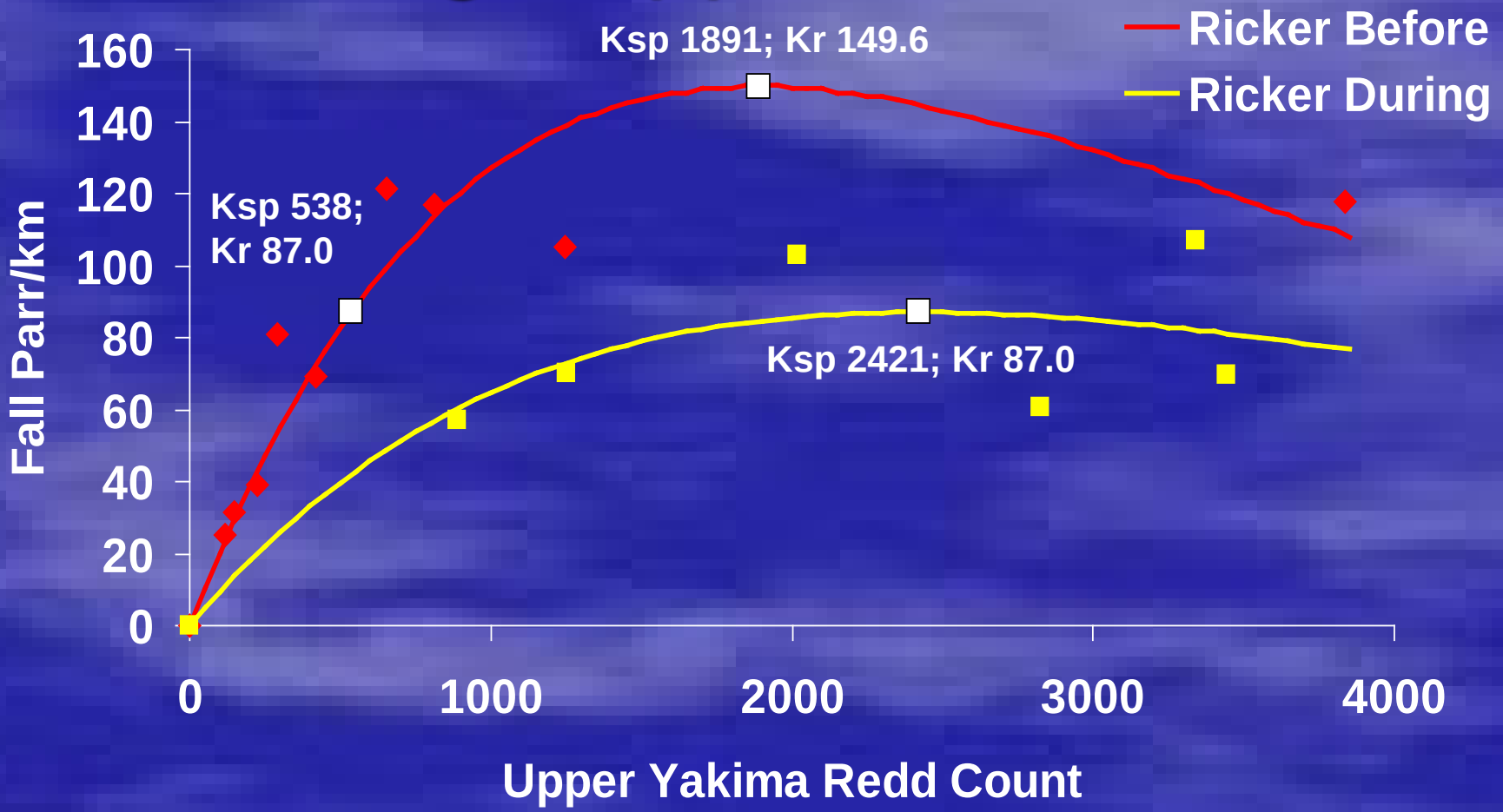
Fall Parr Abundance Before and During Supplementation



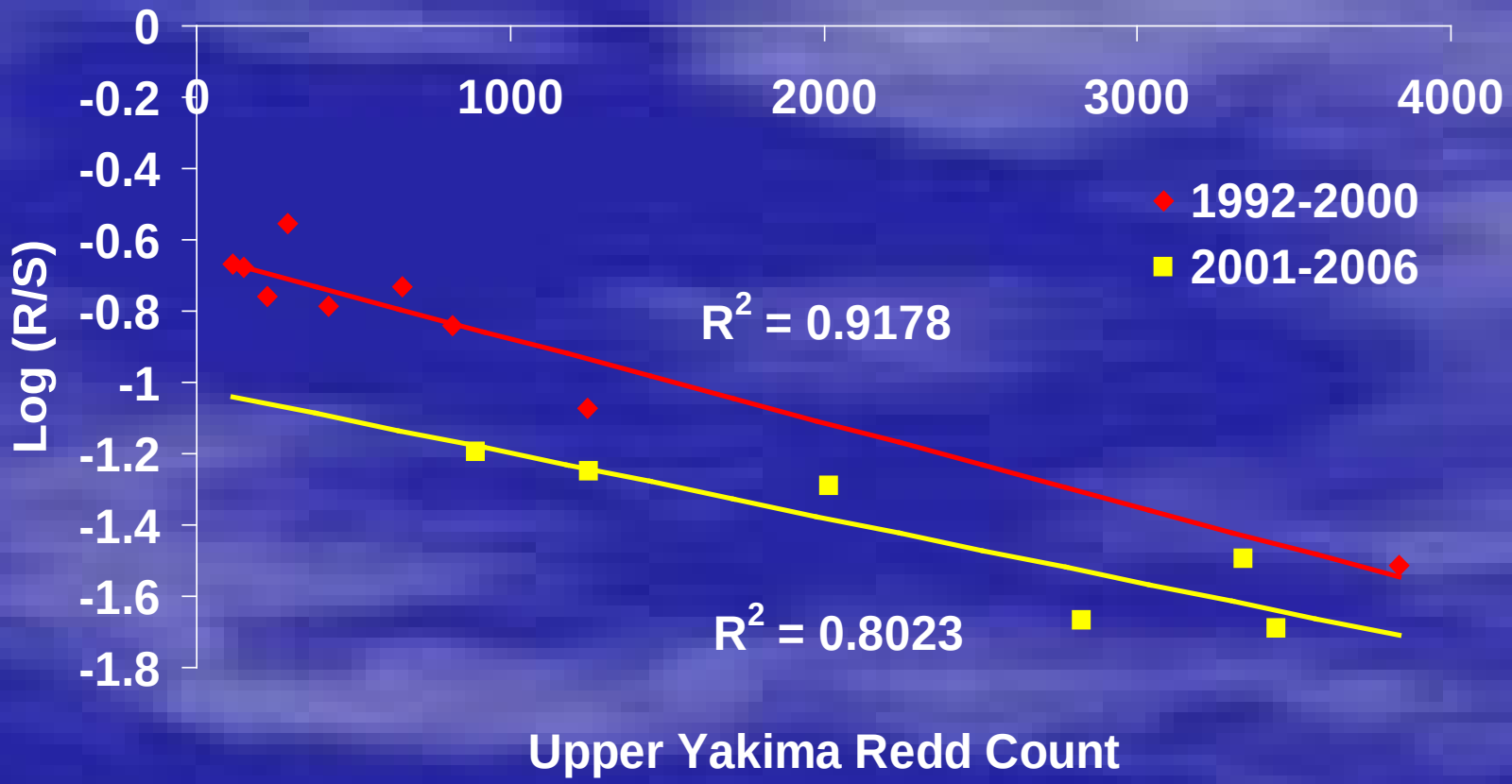
Upper Yakima Redds to Fall Parr (1 year later)



Ricker Model Before vs. During Supplementation

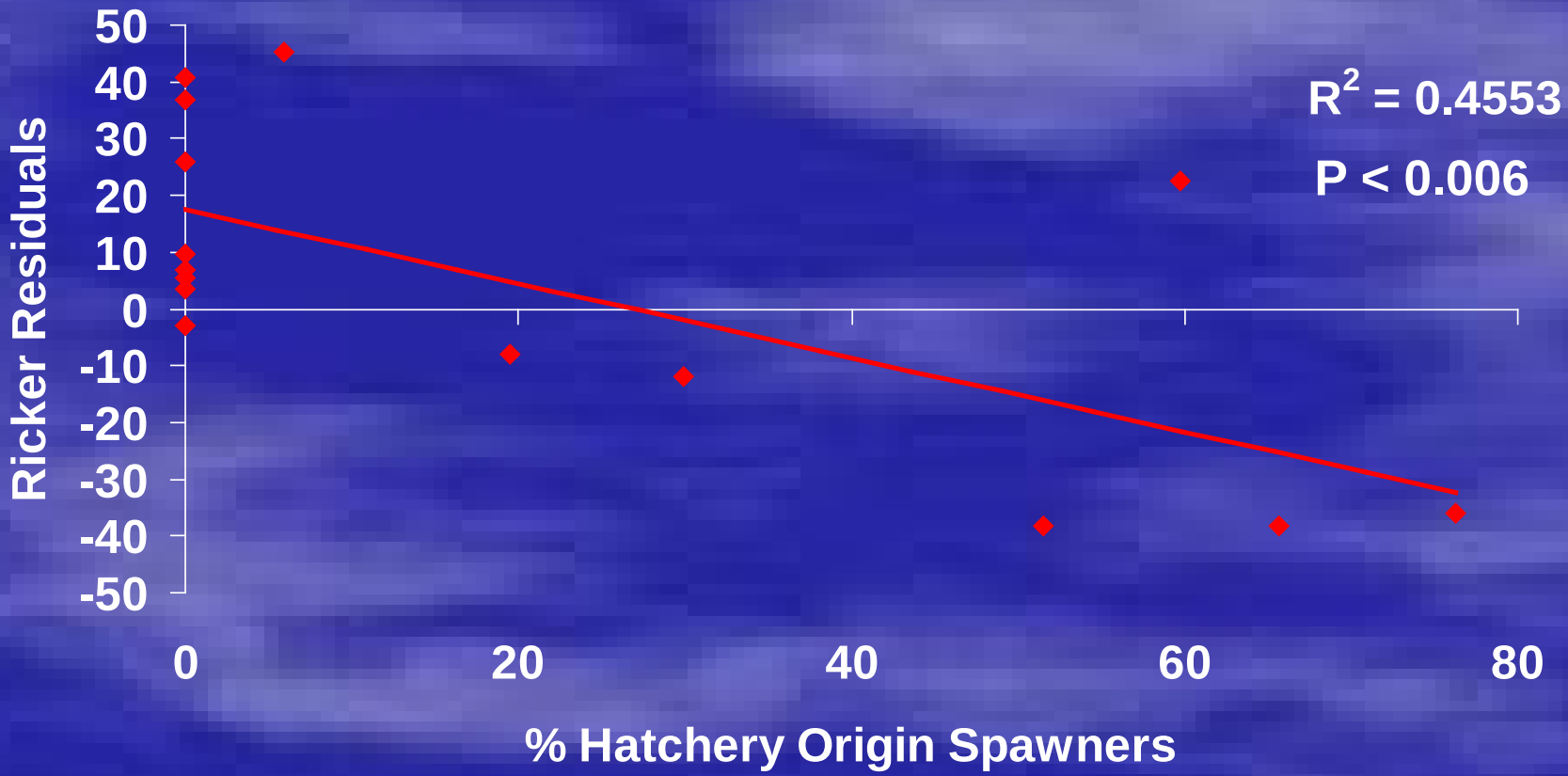


Linear Ricker Before vs. During Supplementation

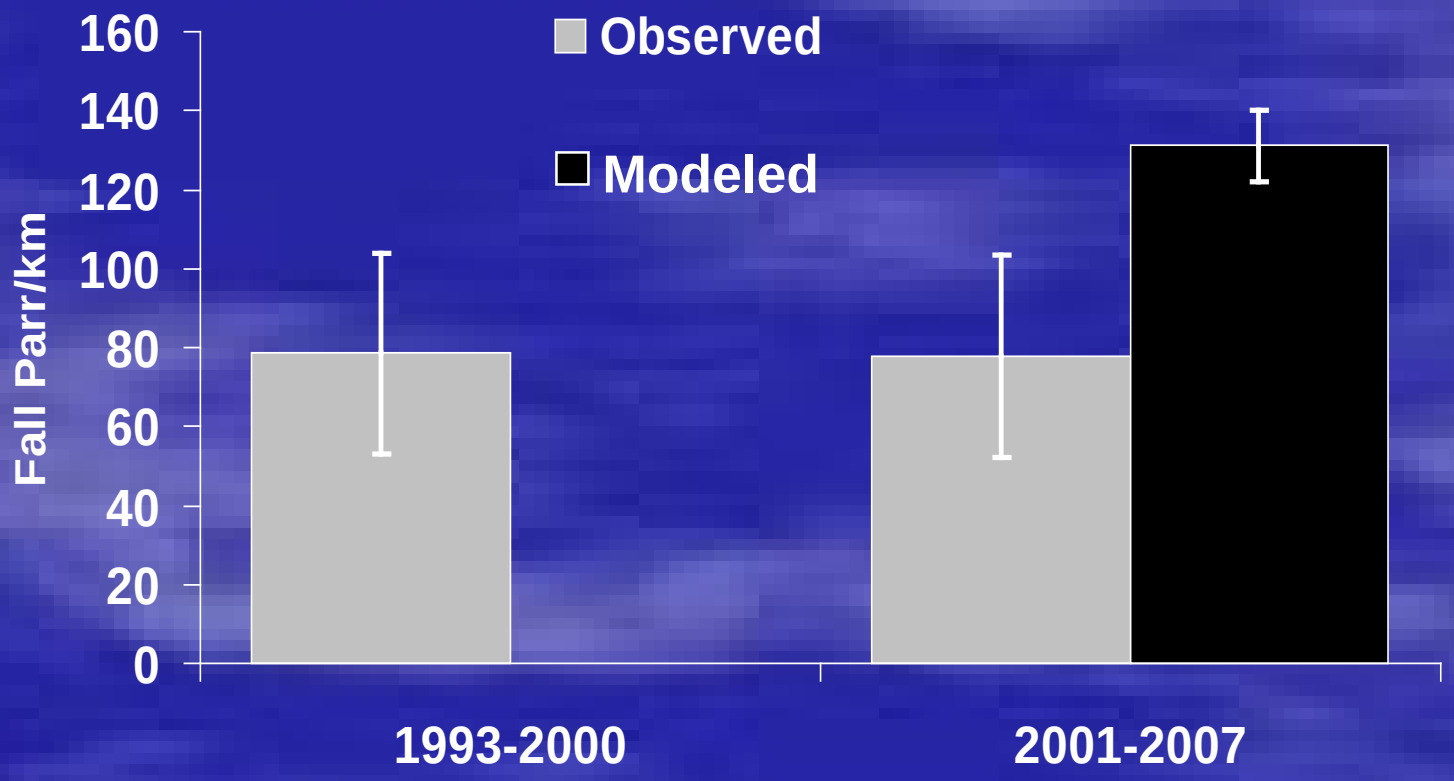


ANCOVA P<0.0007

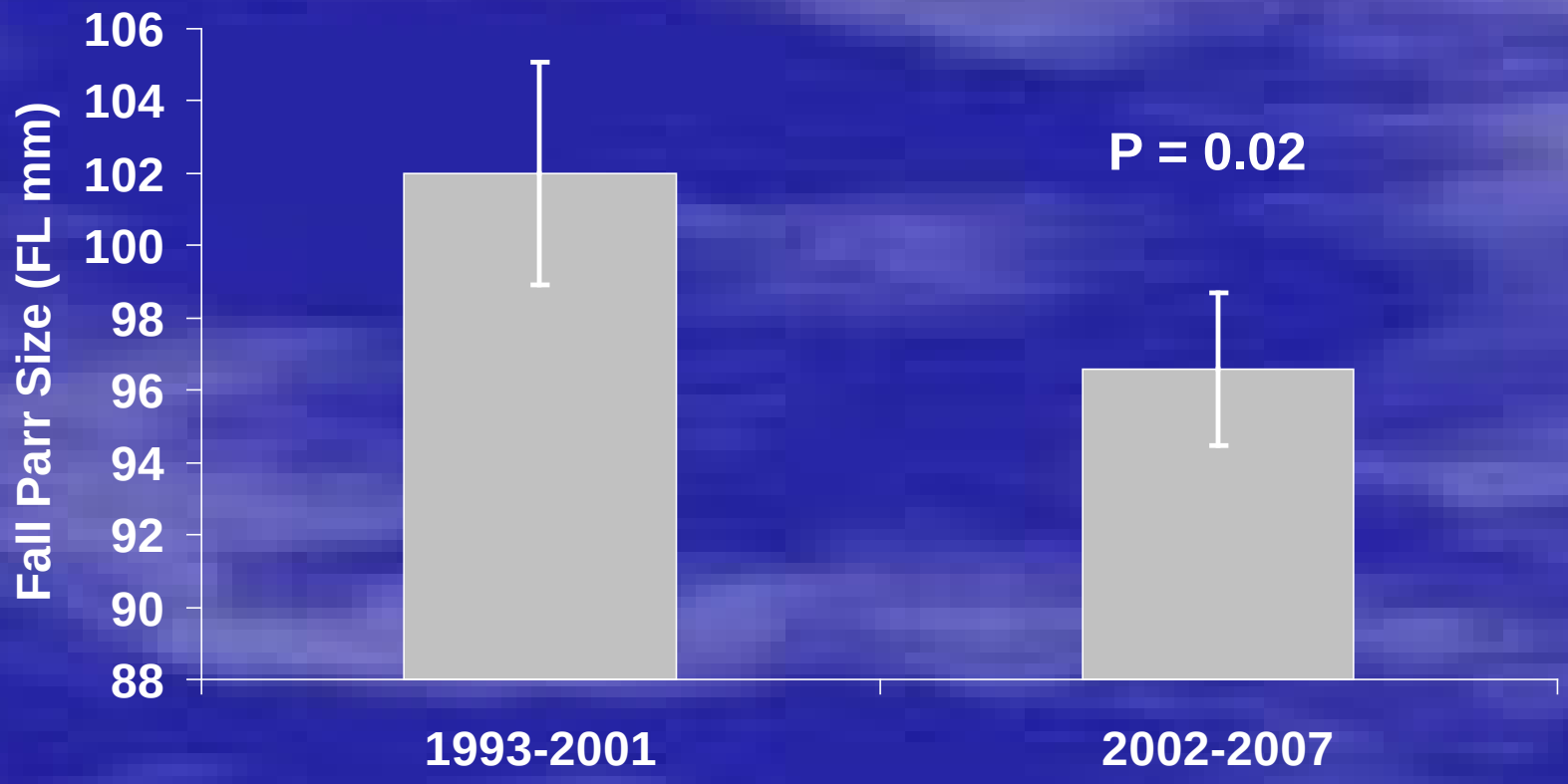
Hatchery Origin Spawners vs. Ricker Model Residuals



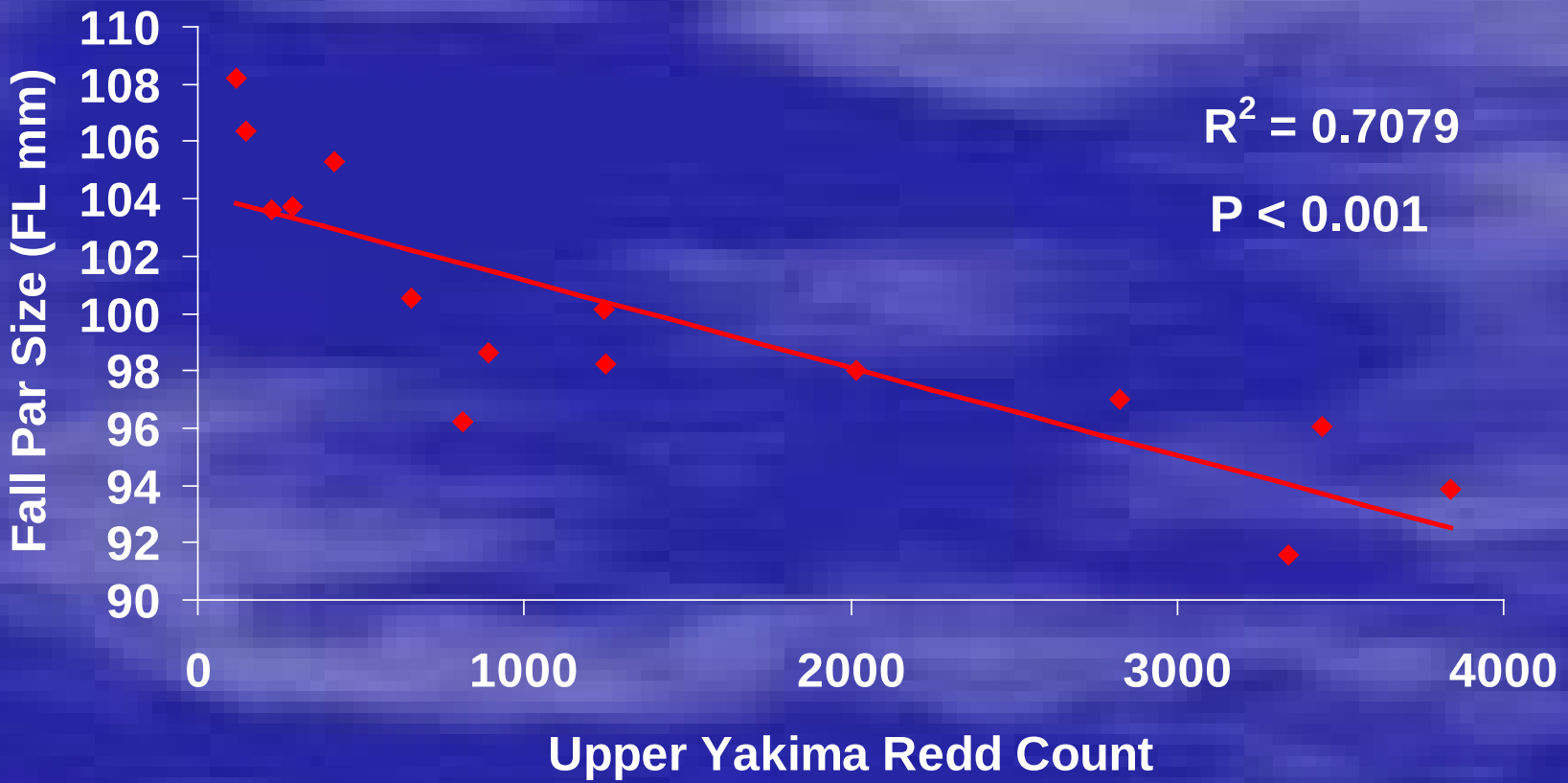
Fall Parr Abundance Before and During Supplementation



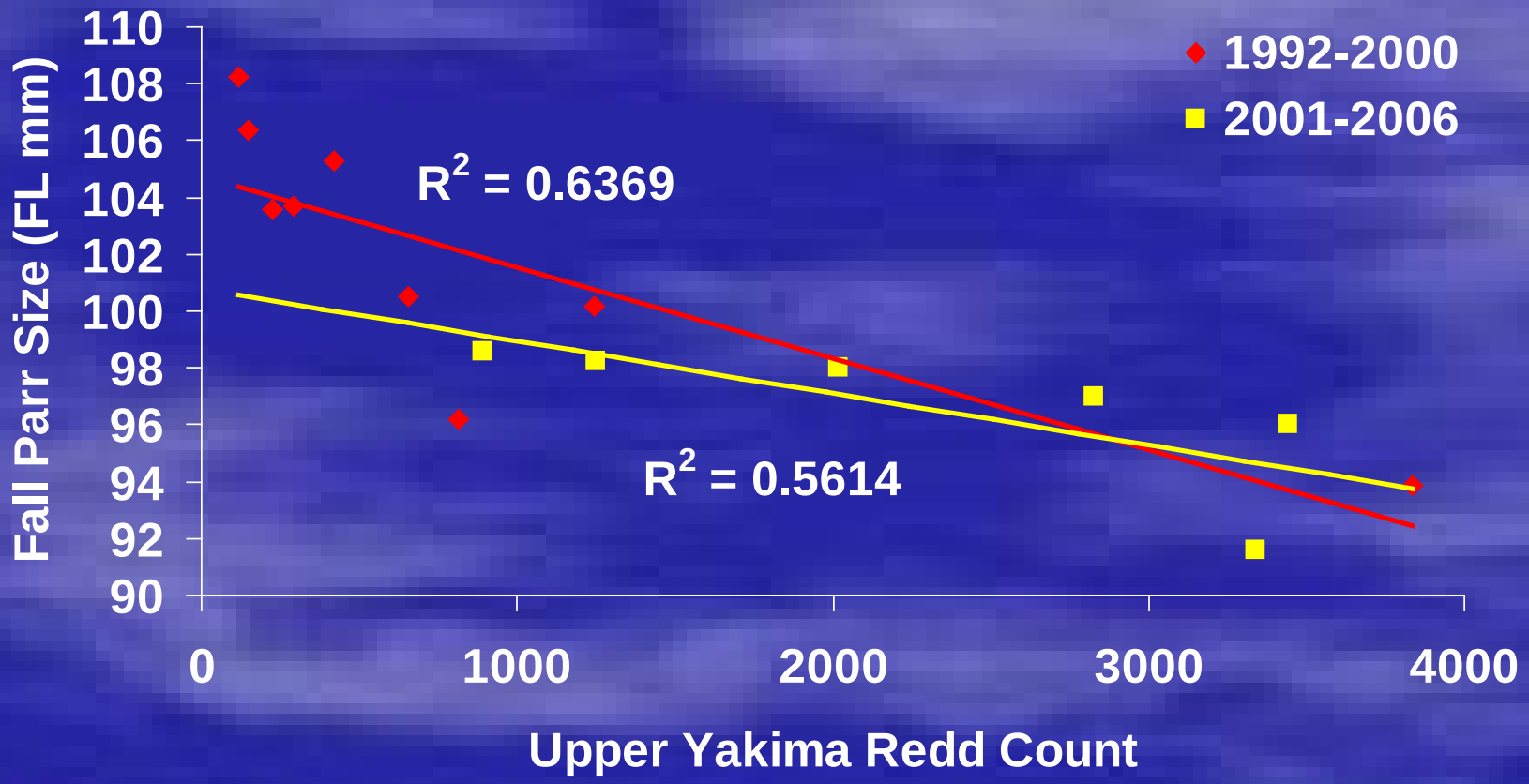
Fall Parr Size



Redd Abundance vs Fall Parr Size the Next Year



Redd Abundance vs. Fall Parr Size (Before and During Supp.)



ANCOVA P = 0.40

Possible Mechanisms

- Life-history traits
- Adult shape
- Female reproductive traits
- Reproductive success
- Spawning habitat
- Predation
- Competition

Preliminary Conclusions

- Density-dependent constraints to natural parr production and size
- Reduction in natural parr productivity associated with supplementation
- Natural production is limited by an interaction between environmental and biological capacity of hatchery fish

Some Benefits

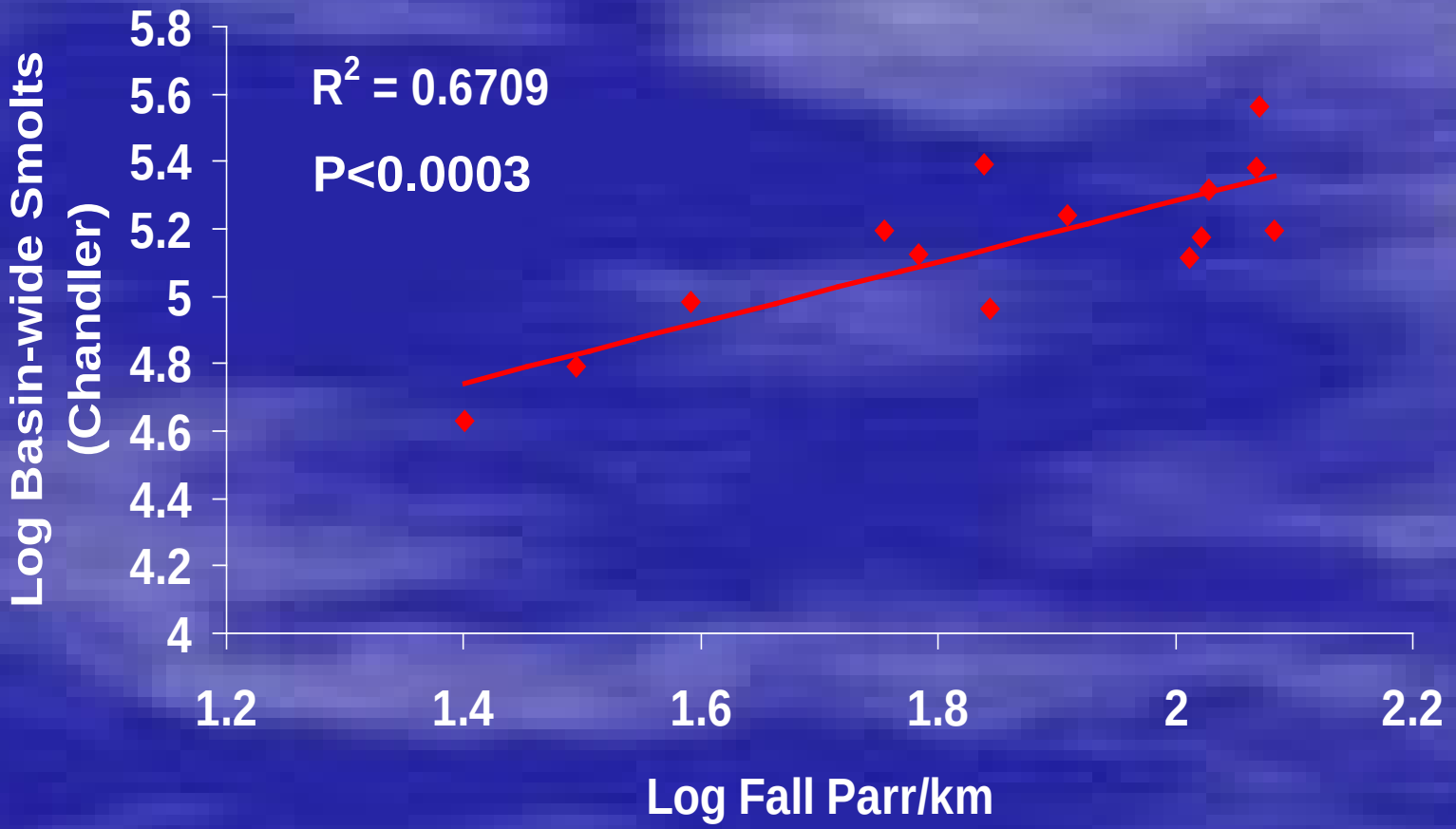
- Expanded spawning distribution
- Increased harvest
- Learning benefits
- Many variables that were not mentioned were not detectably different (e.g., male reproductive success)

Thanks

- All of the people from the Yakama Nation, Washington Department of Fish and Wildlife, and National Marine Fisheries Service who worked on this project
- BPA Funded this work
- Molly Kelly constructed schematics


The End

Upper Yakima Parr vs. Chandler Smolts (total)



Upper Yakima Parr to Smolt