



Reproductive Success of Artificially Reconditioned Kelt Steelhead in the Yakima River

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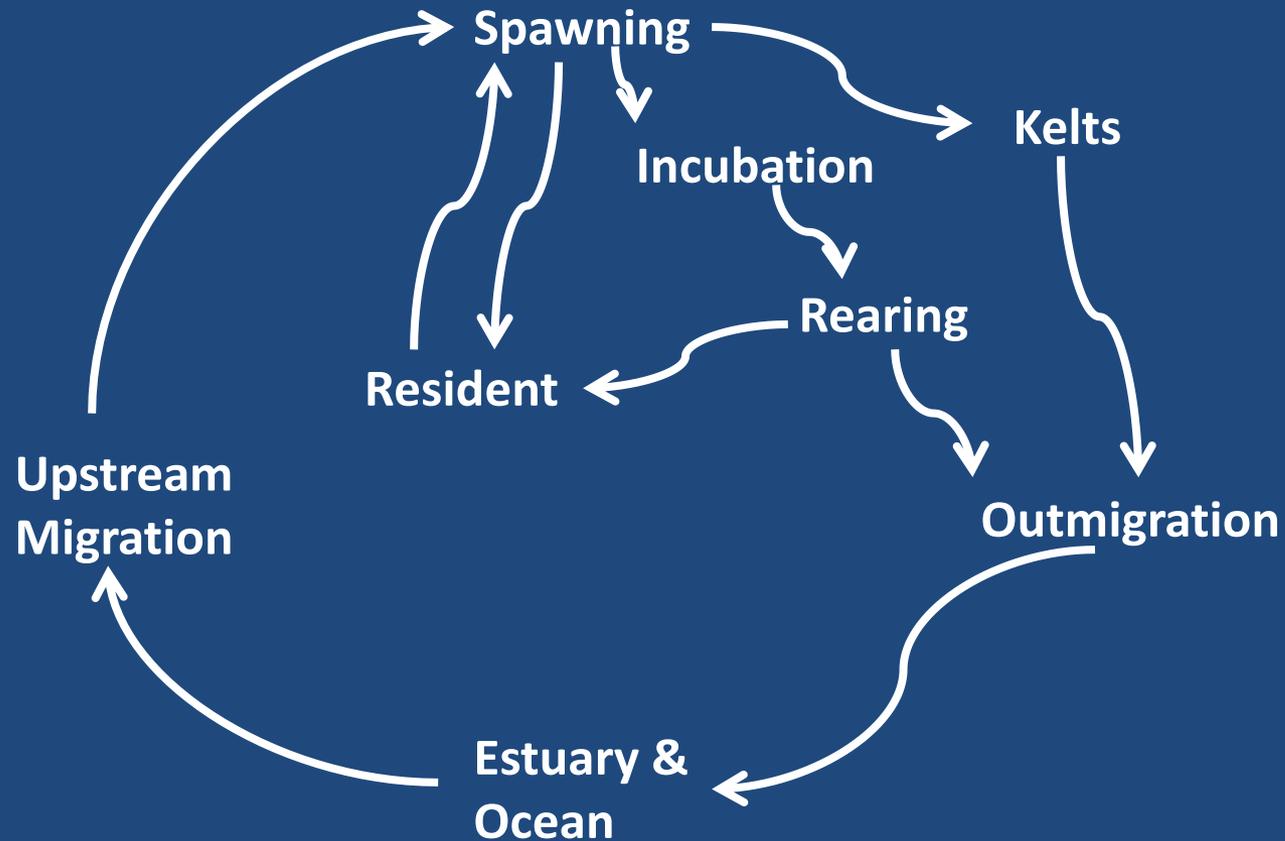
Goal

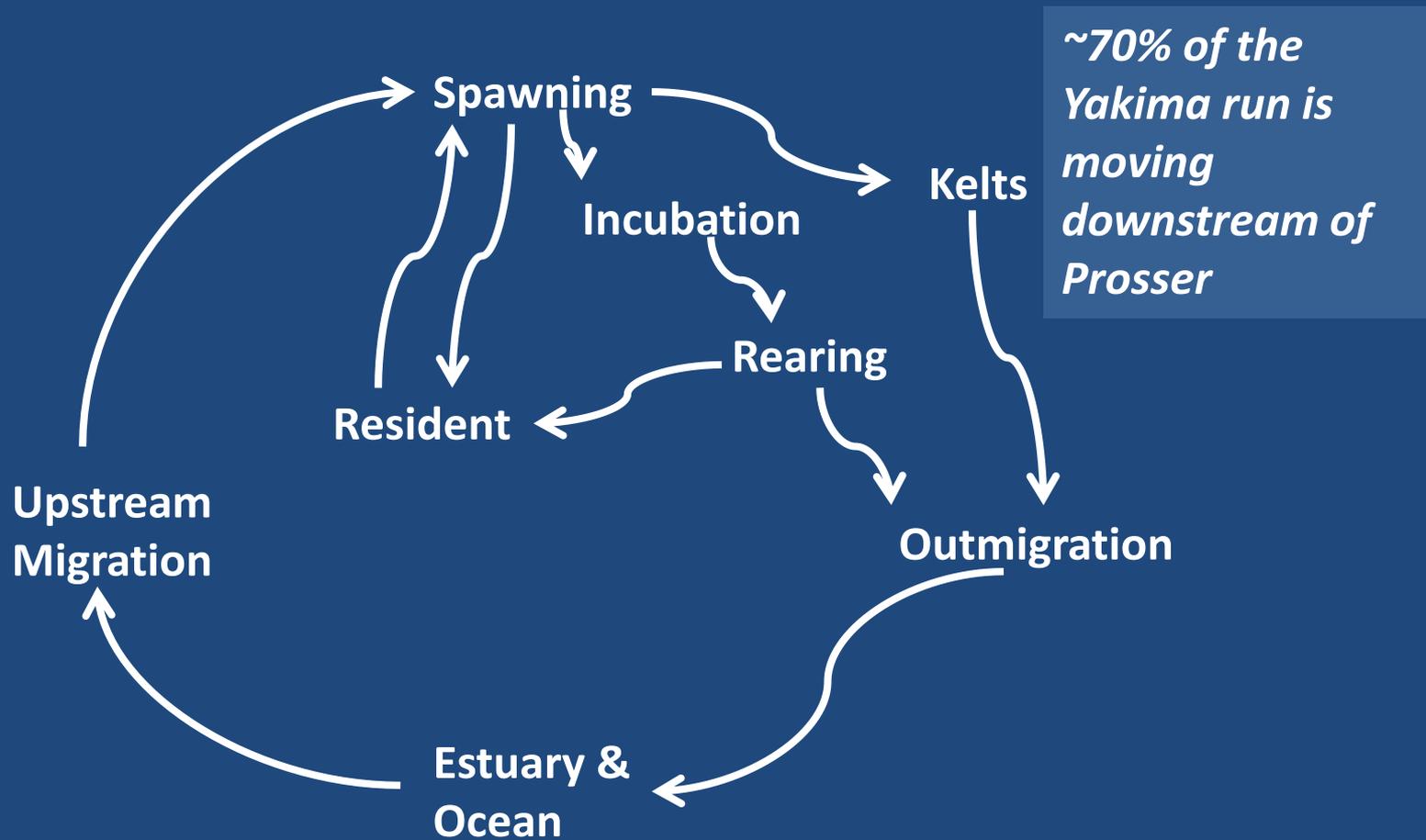
- Detect parentage of kelts in the Yakima River Basin
- Attempt to find Relative Reproductive Success of kelts compared to “maiden” steelhead
- Attempt to determine Lifetime Reproductive Success of Kelts

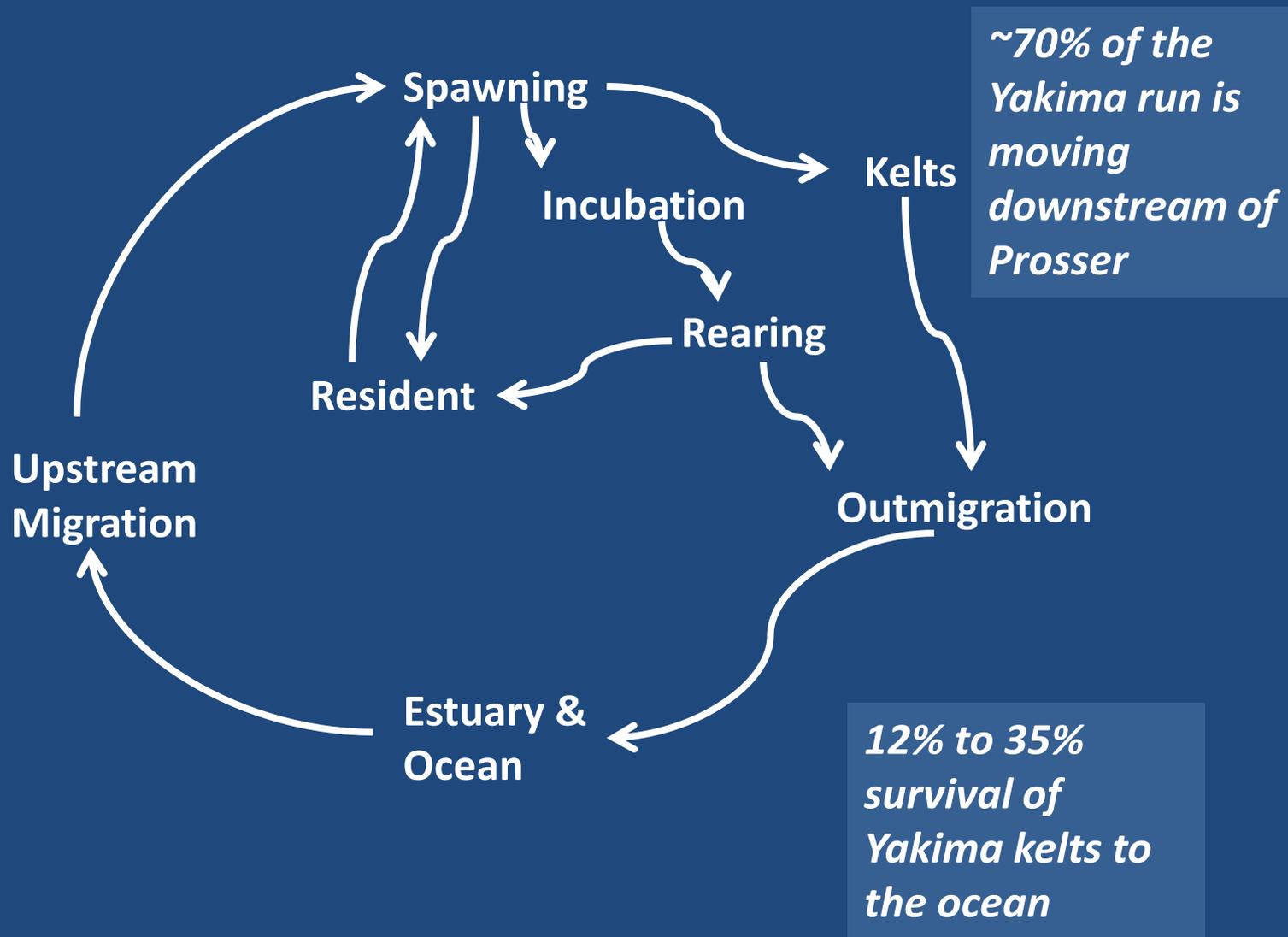
Update

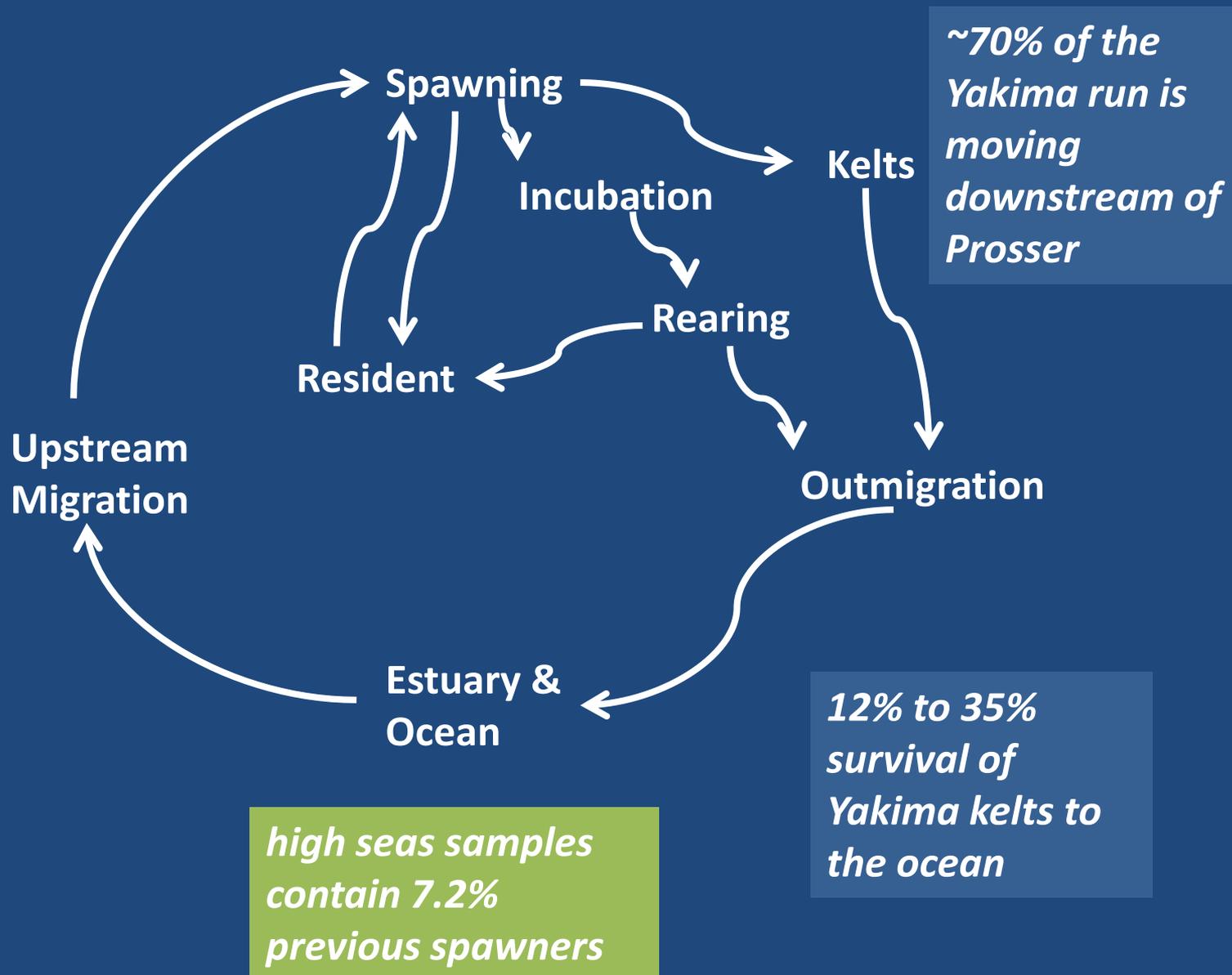
- 6 spawn years of data
- Analysis limited to fish detected moving into Satus or Toppenish Creek

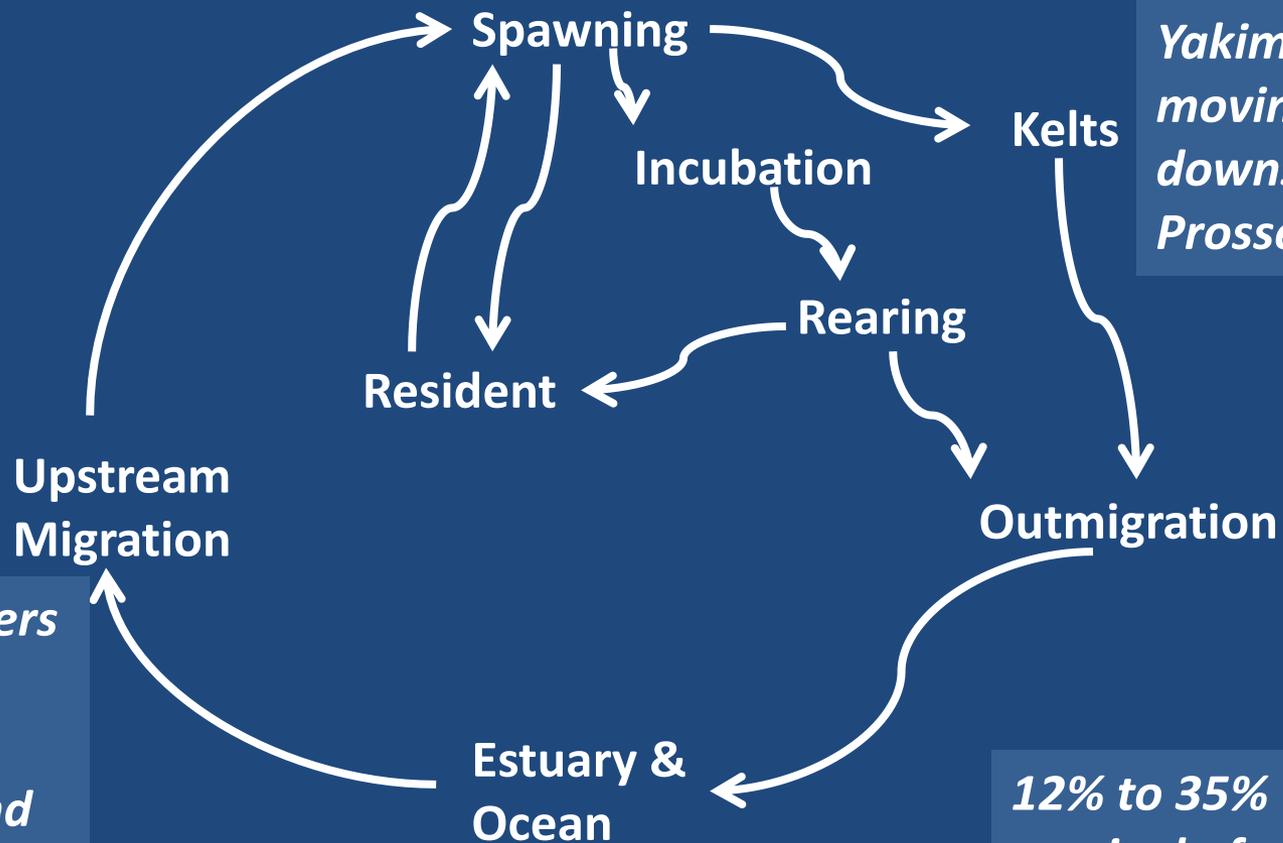
Life history of natural kelts in Yakima











~70% of the Yakima run is moving downstream of Prosser

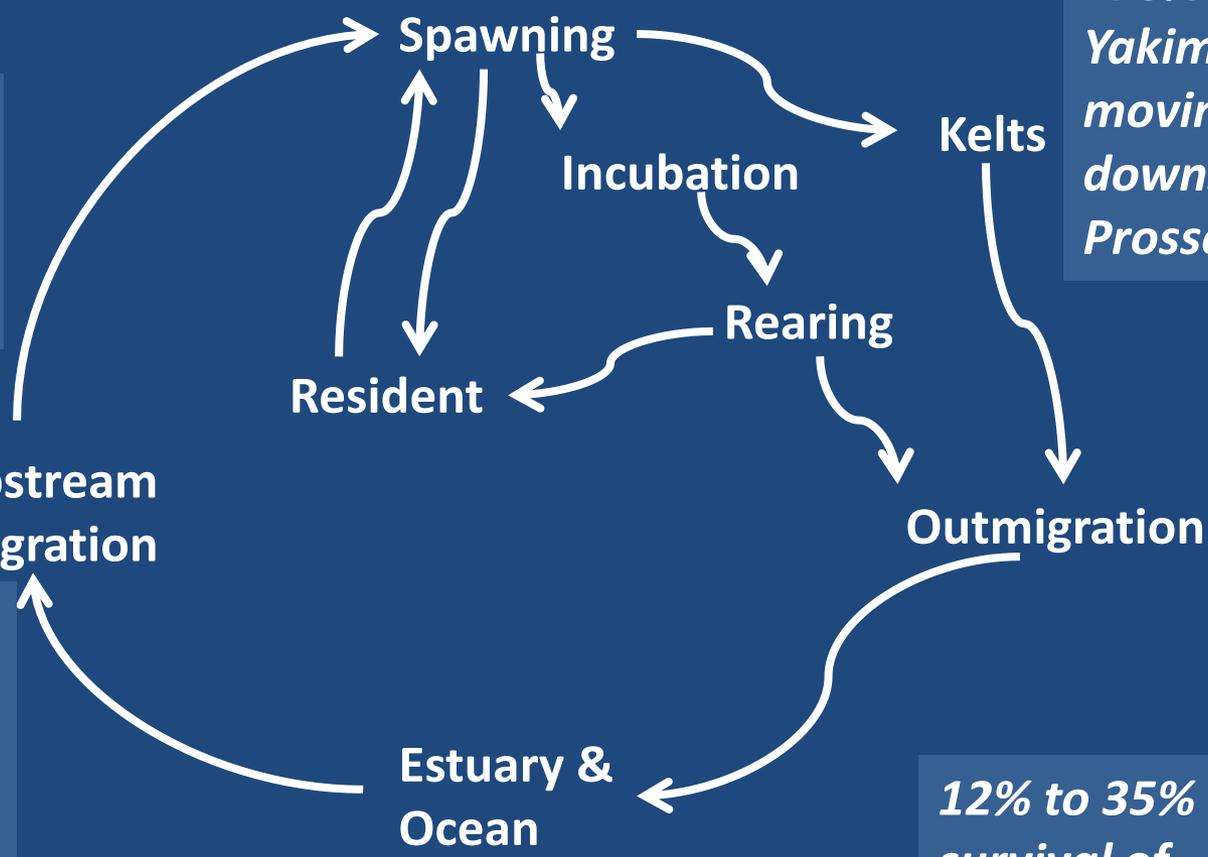
Repeat spawners typically comprise 60% consecutive and 40% skips.

high seas samples contain 7.2% previous spawners

12% to 35% survival of Yakima kelts to the ocean

2.7% of the run at Prosser are natural repeat spawners

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~70% of the Yakima run is moving downstream of Prosser

high seas samples contain 7.2% previous spawners

12% to 35% survival of Yakima kelts to the ocean

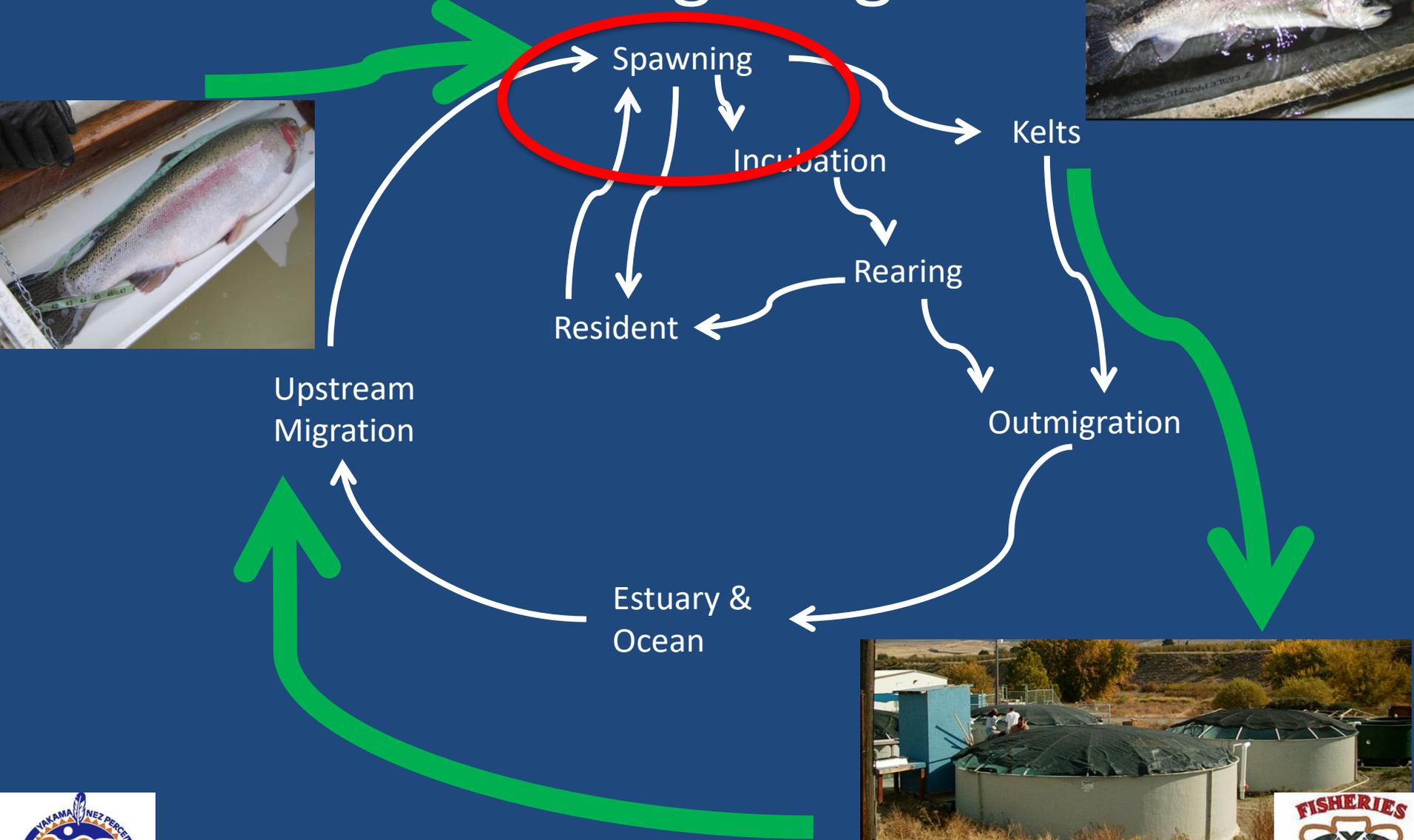
Kelt Reconditioning Program



Artificial Reconditioning In the Yakima River to date

- Capture and feed for 6 to 9 Months
- Collected 10,024 kelt steelhead
- Reconditioned and released 4,208
- Survival to release ~ 42%
- Individual survival correlated with fish condition at time of collection

Kelt Reconditioning Program



Parent Sample Collections

- Maidens. Upstream at Prosser Dam Denil Ladder
 - Detected at a tributary PIT antennae
 - Not detected in prior or subsequent years
- Kelts. Downstream at Chandler
 - Detected in a tributary after reconditioning
 - Assumed to be present for at least two spawning years



Offspring Sample collections

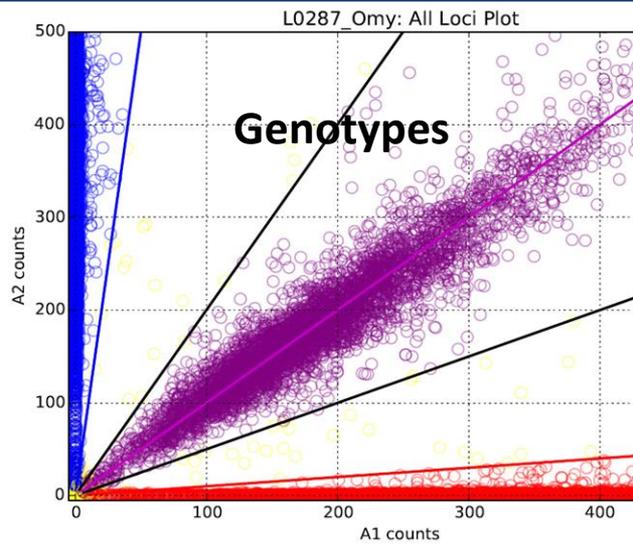
- Electrofished in August and September
- Targeted areas with known steelhead spawning
- Targeted age-0 young of the year



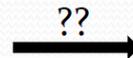


Parentage Method

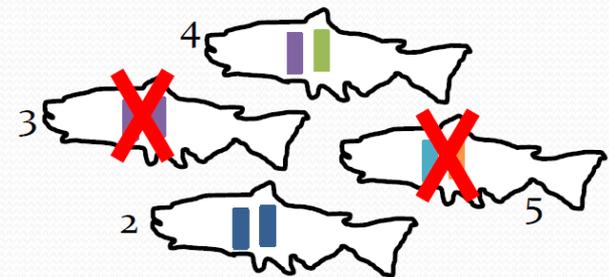
- Used the Program CERVUS
- Simulations ran to determine a 99% confidence interval for LOD scores
- Progeny assignments were used if
 - Met 99% confidence interval
 - Had one or less mismatching loci.



Offspring



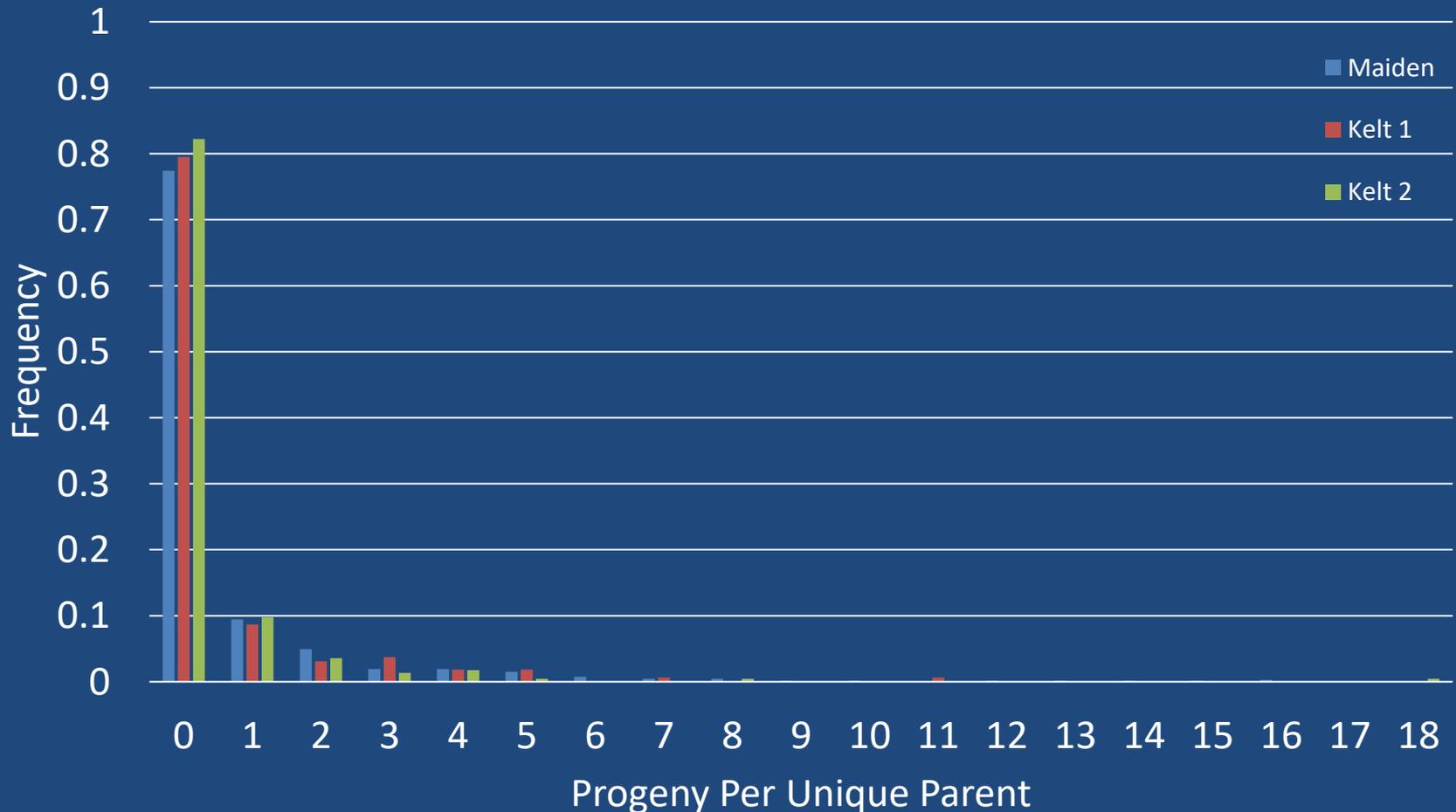
Candidate parents



Working Dataset

- Female Parents
 - 470 Maidens
 - 175 Kelts event 1
 - 230 Kelts event 2
- Male Parents
 - 246 Maiden
 - 24 Kelts event 1
 - 30 Kelts event 2
- 985 Offspring assignments

Variation in reproductive success for parent groups (Not separated by gender)

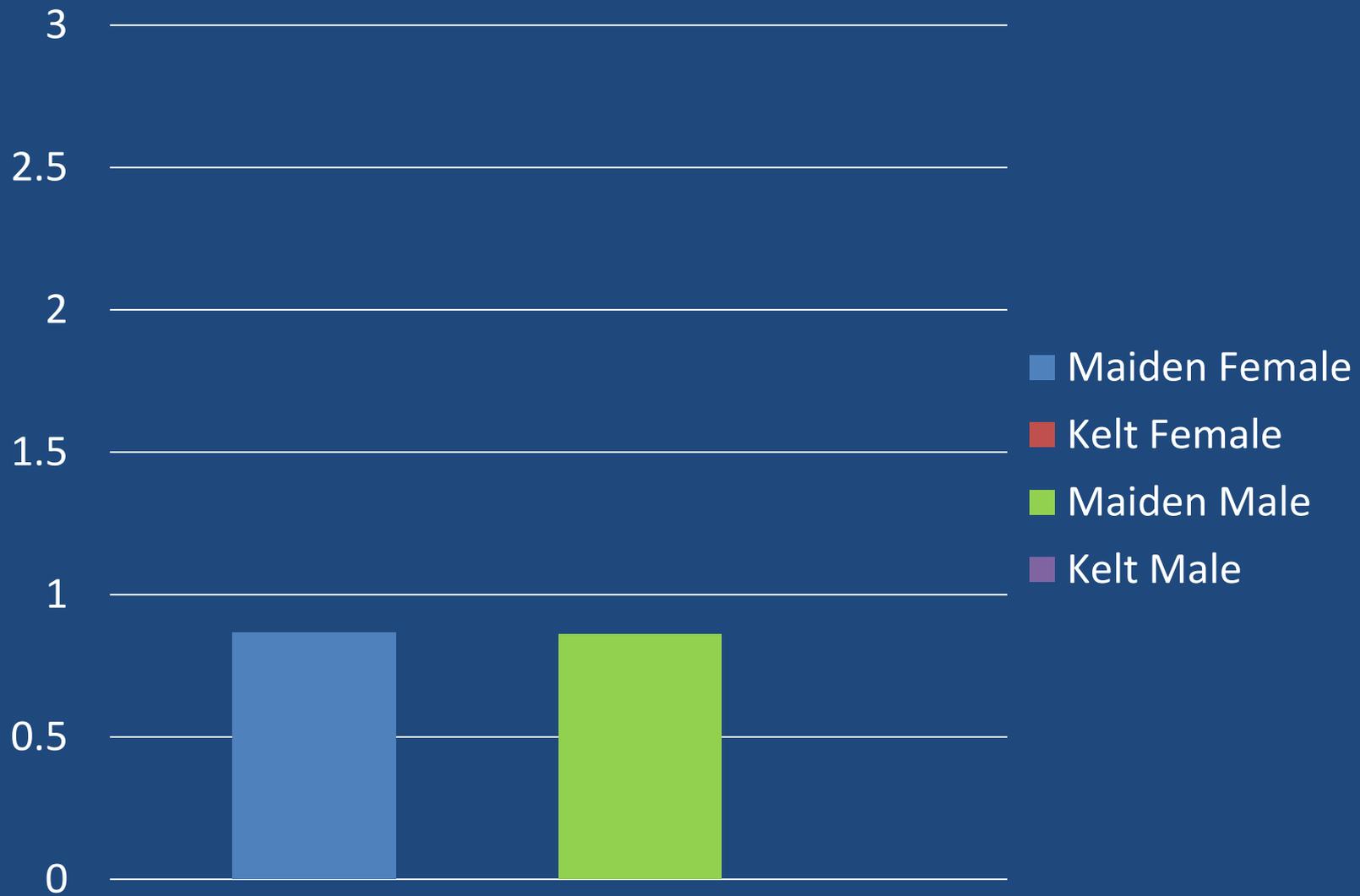


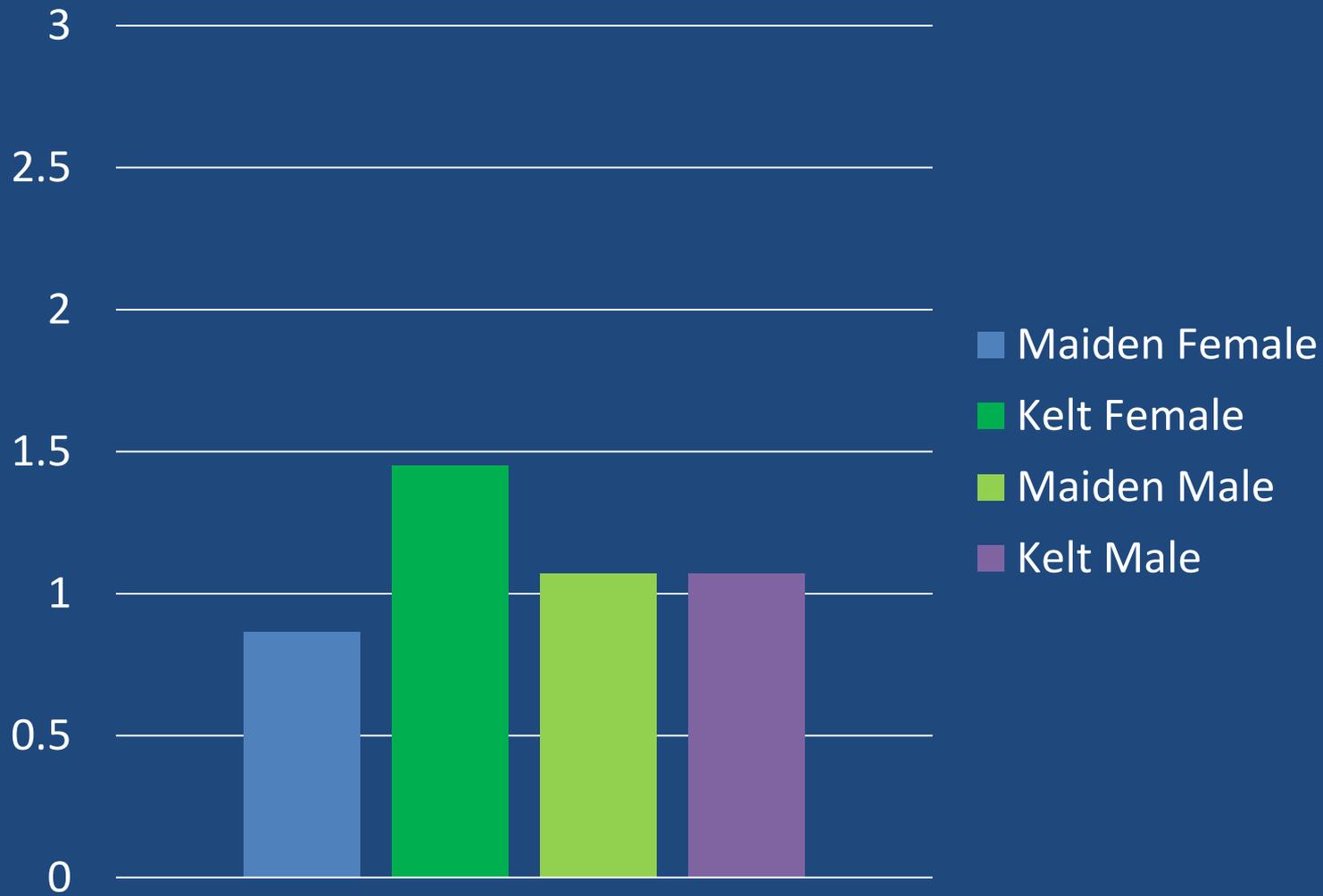
Relative Reproductive Success (RRS)

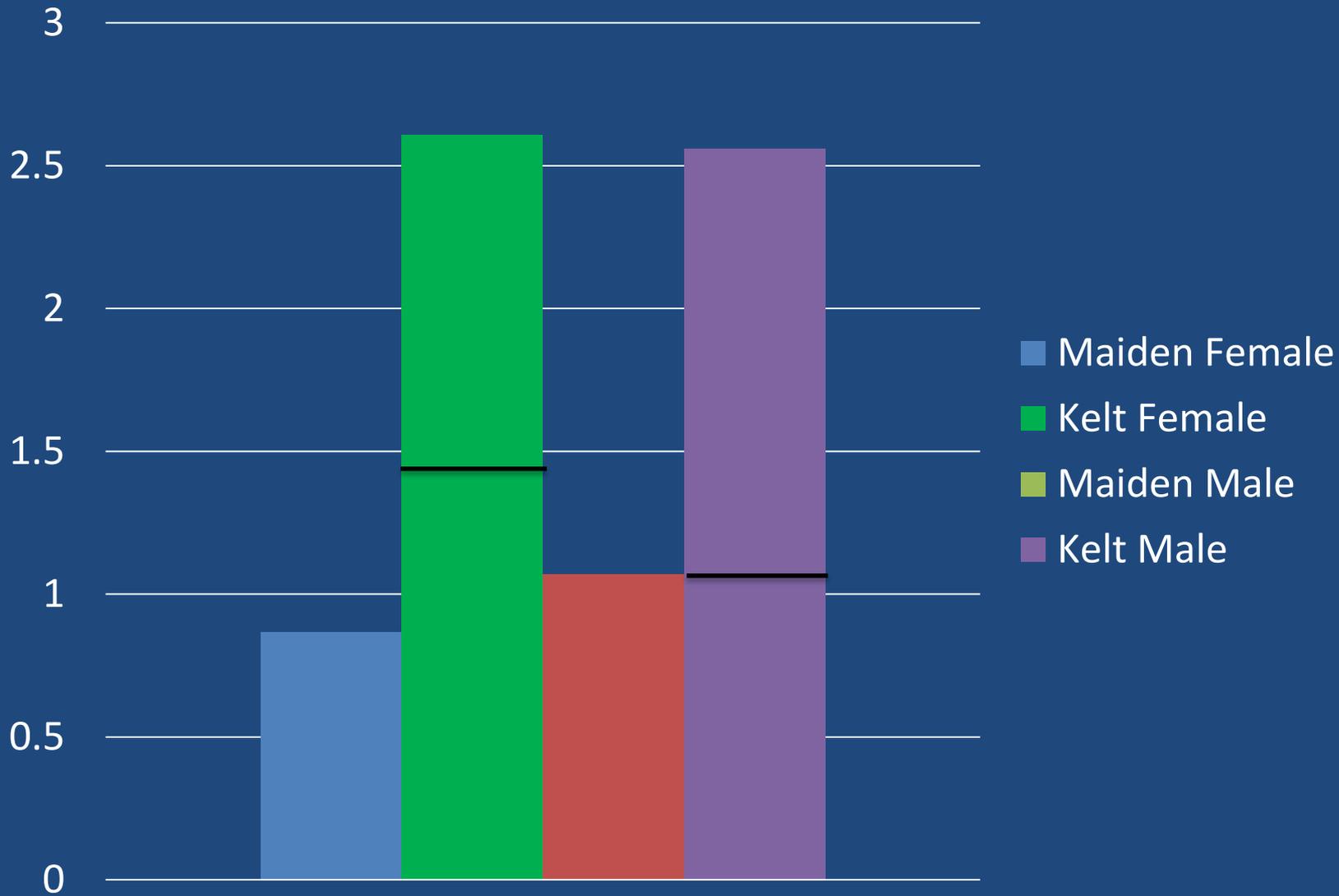
- Standardize RRS to maidens (RRS=1)
 - Make comparisons within single spawn years
 - Report as average of all 6 years
 - Separate RRS for male and female fish
 - Separate RRS for first and second spawn events in kelts
 - Report Lifetime Reproductive success as the sum of the estimates for first and second spawn events

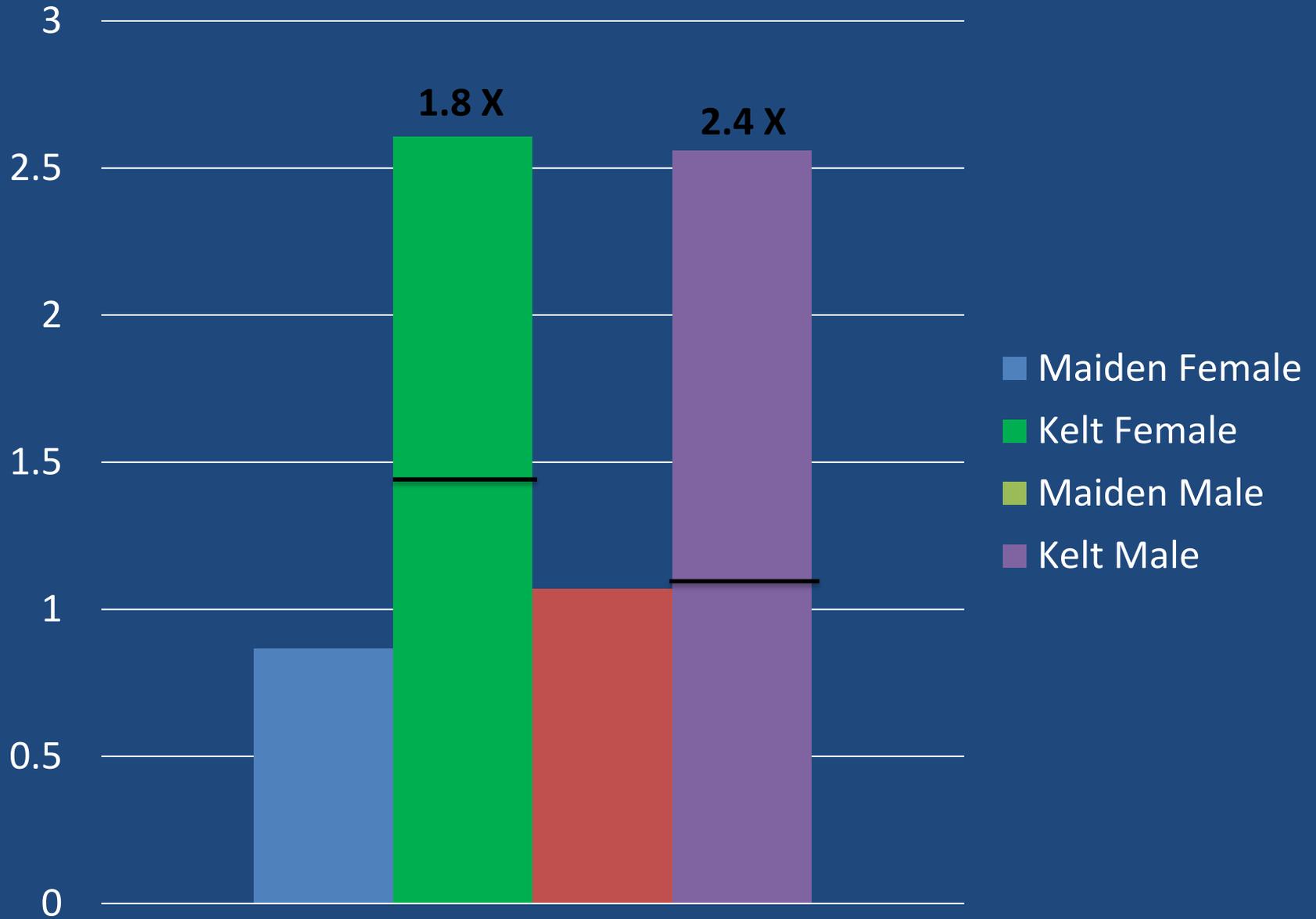
Natural Reproductive Success

- Seamons & Quinn 2010 studied 19 Brood years of a wild population of steelhead comparing Lifetime reproductive success of repeat spawners to one time spawners.
- Lifetime Reproductive success of repeat spawners
 - Nearly twice for females
 - Nearly three times for males









Preliminary Conclusions

- Kelts represent an important life history for steelhead
- Reconditioned kelts reproduce in the wild
- Reconditioned kelts had a LRS level similar to natural kelts (Seamons & Quinn 2010)
- Reconditioned kelts have the potential to increase productivity of natural populations. Possibly good use to recover populations quickly after poor ocean or in-river conditions.

Questions?

