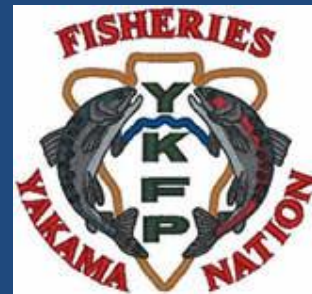


# Reproductive Success of Artificially Reconditioned Kelt Steelhead in the Yakima River

Jeff Stephenson, Dave Fast, Bill Bosch, Joe Blodgett,  
Ryan Branstetter, Andy Pierce, Shawn Narum, Doug  
Hatch

# Acknowledgements

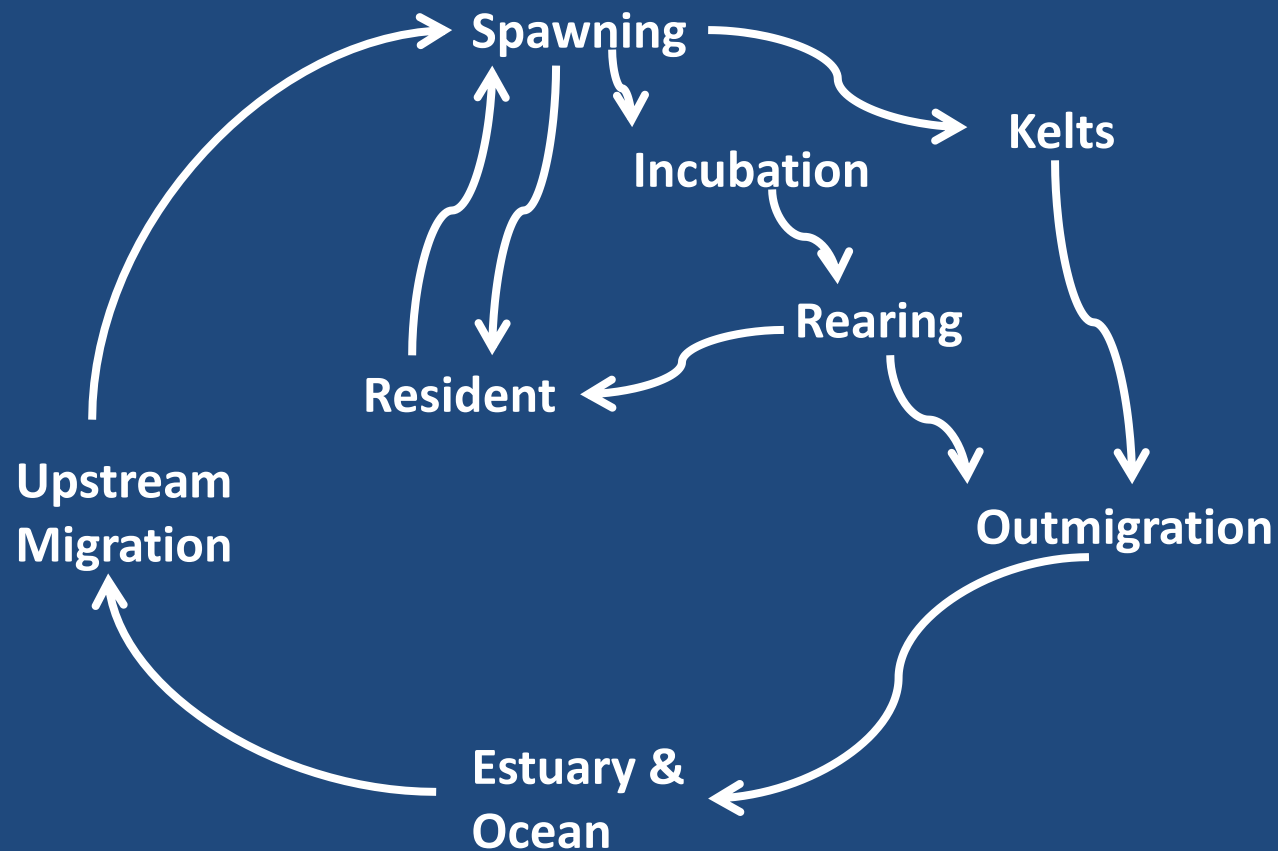
- Tracy Hauser (BPA)
- Chris Frederiksen (YN)
- Jeff Trammell (YN)
- Tim Resseguie (YN)
- Todd Newsome (YN)
- Ryan Deknikker (YN)
- Bill Fiander (YN)
- Jeremiah Newell (CRITFC)
- Bobby Begay (CRITFC)
- Zack Mays (YN)
- CRITFC Genetics Crew
- Prosser Hatchery Crew

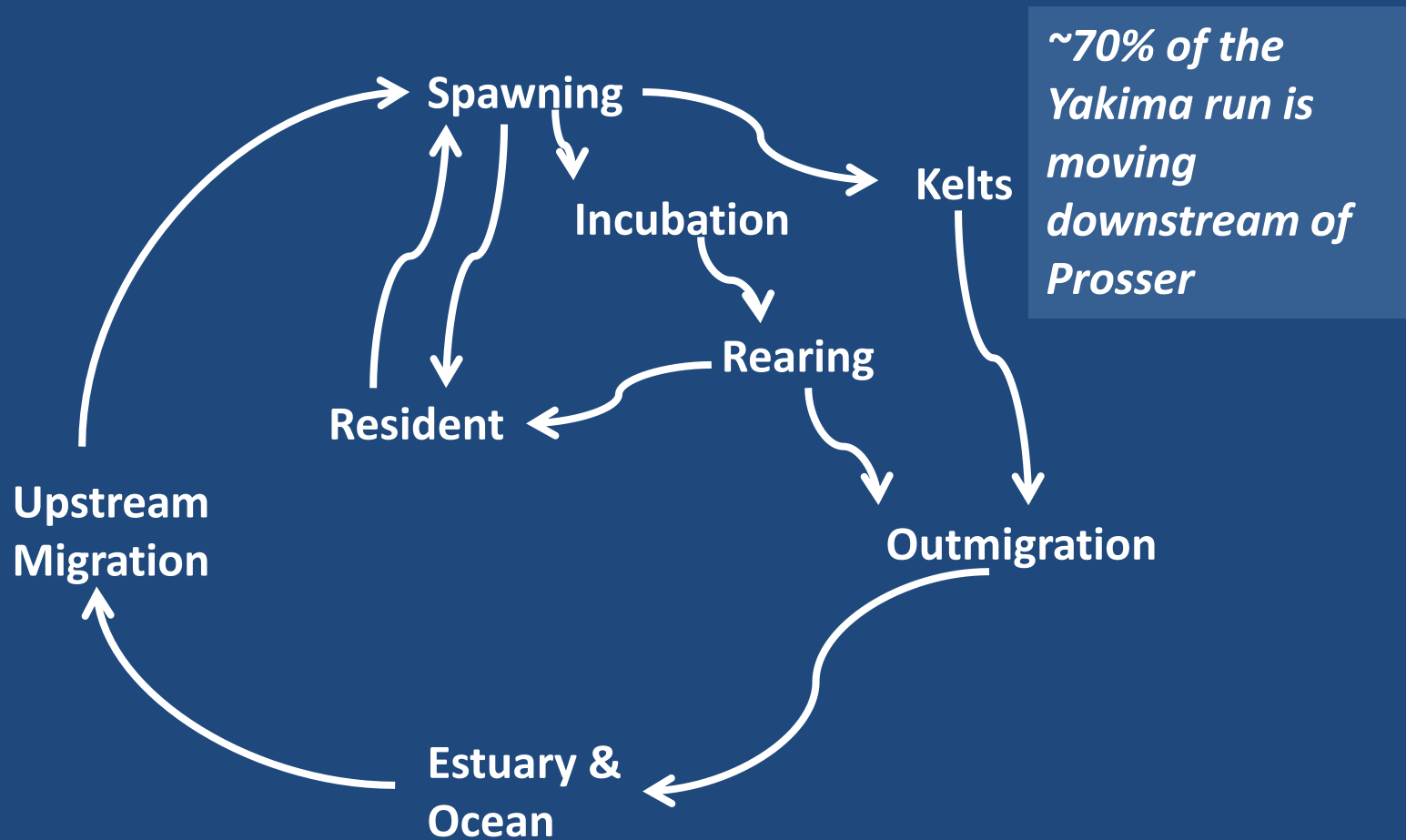


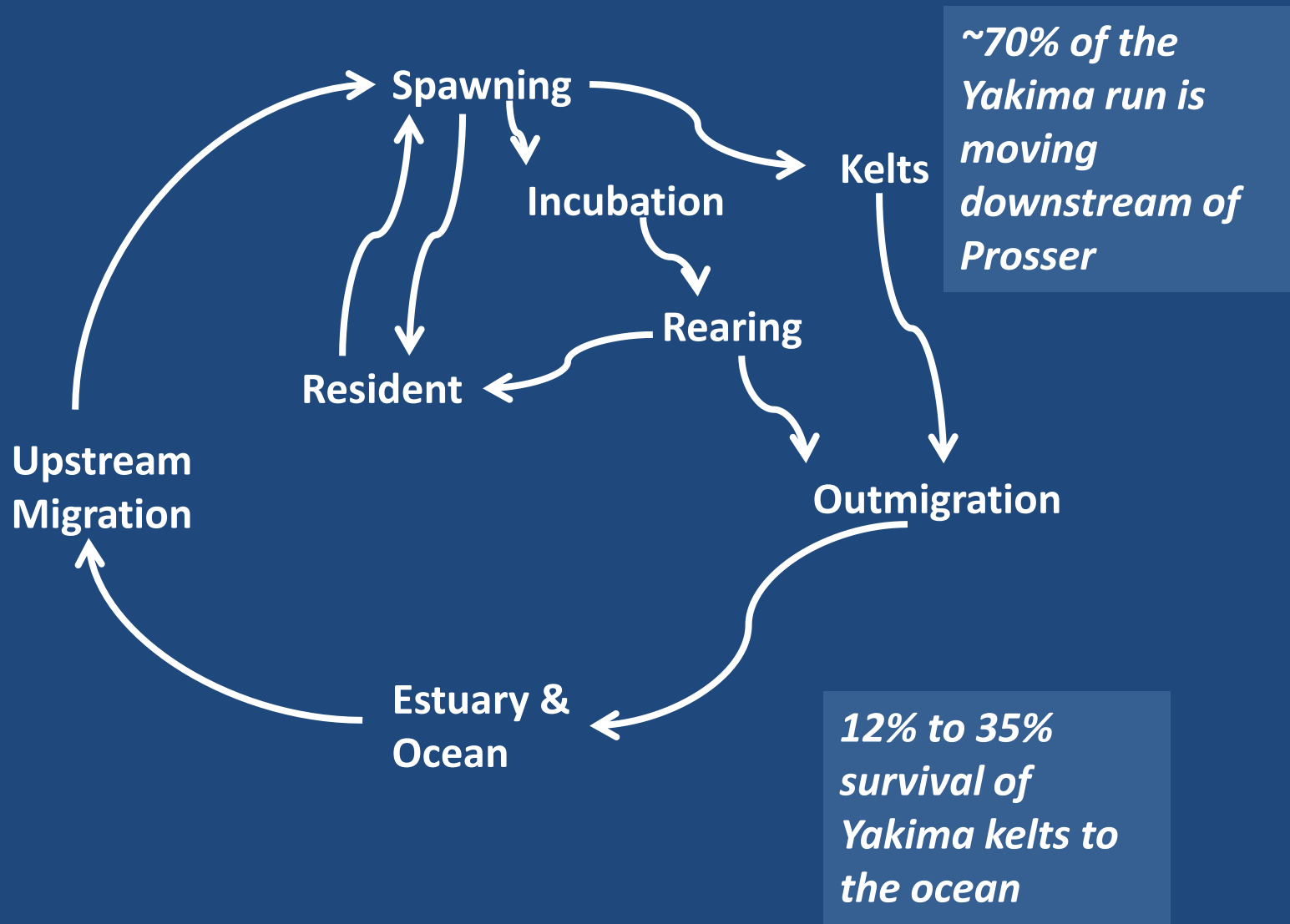
# Changes from previous years

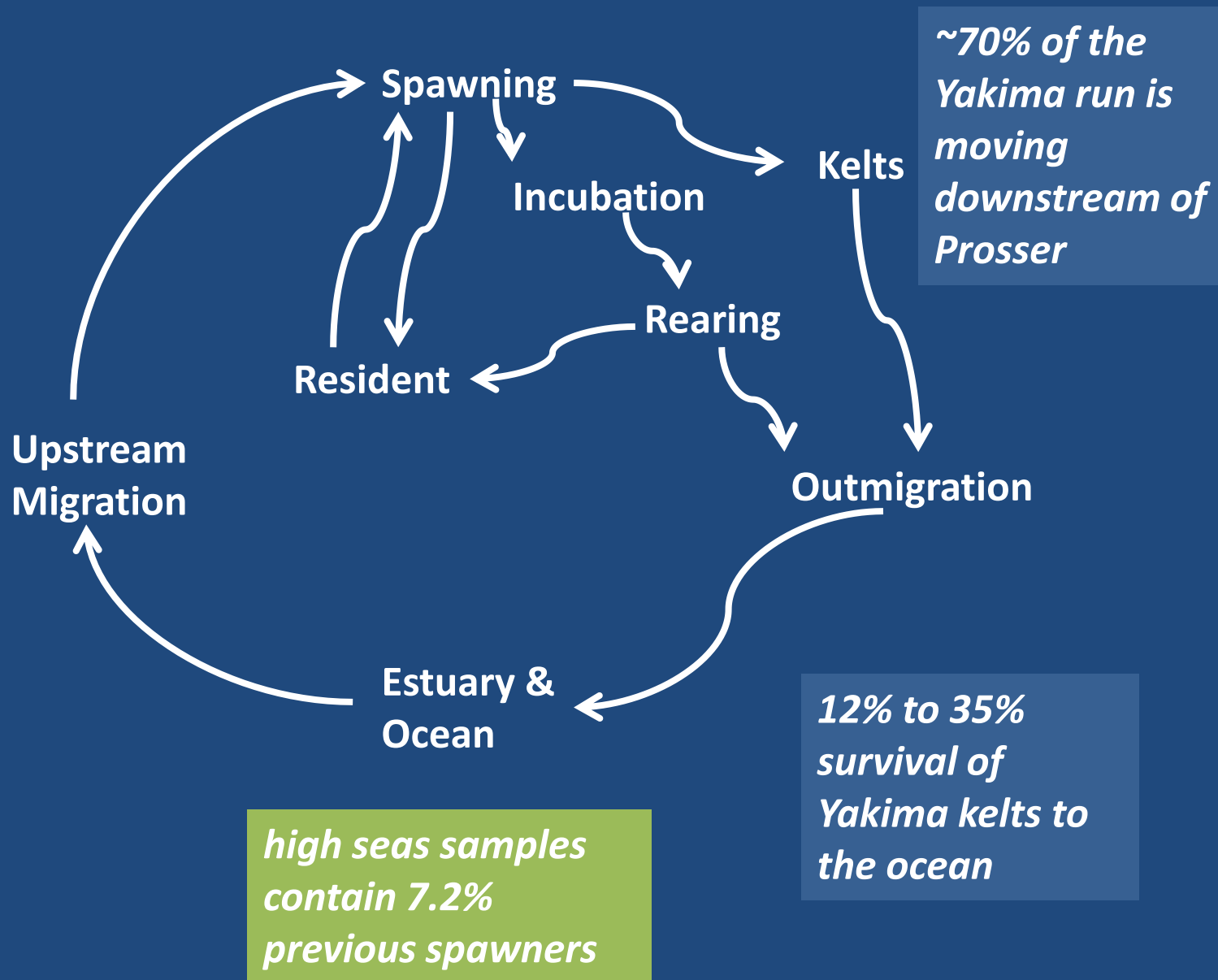
- 4 spawn years of data
- Analysis limited to fish detected moving into Satus or Toppenish Creek
- Enough data to start looking at male reproductive success

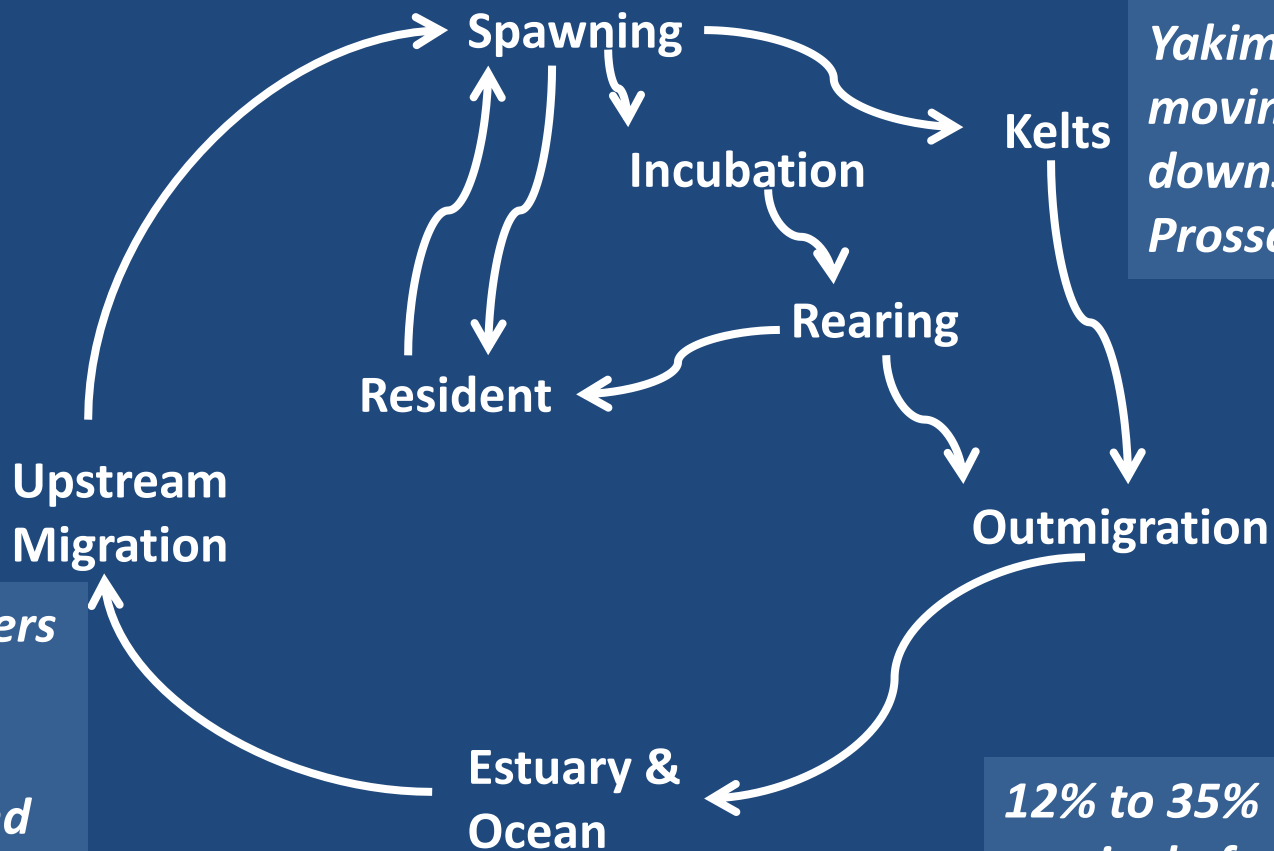
# Life history of natural kelts in Yakima











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

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

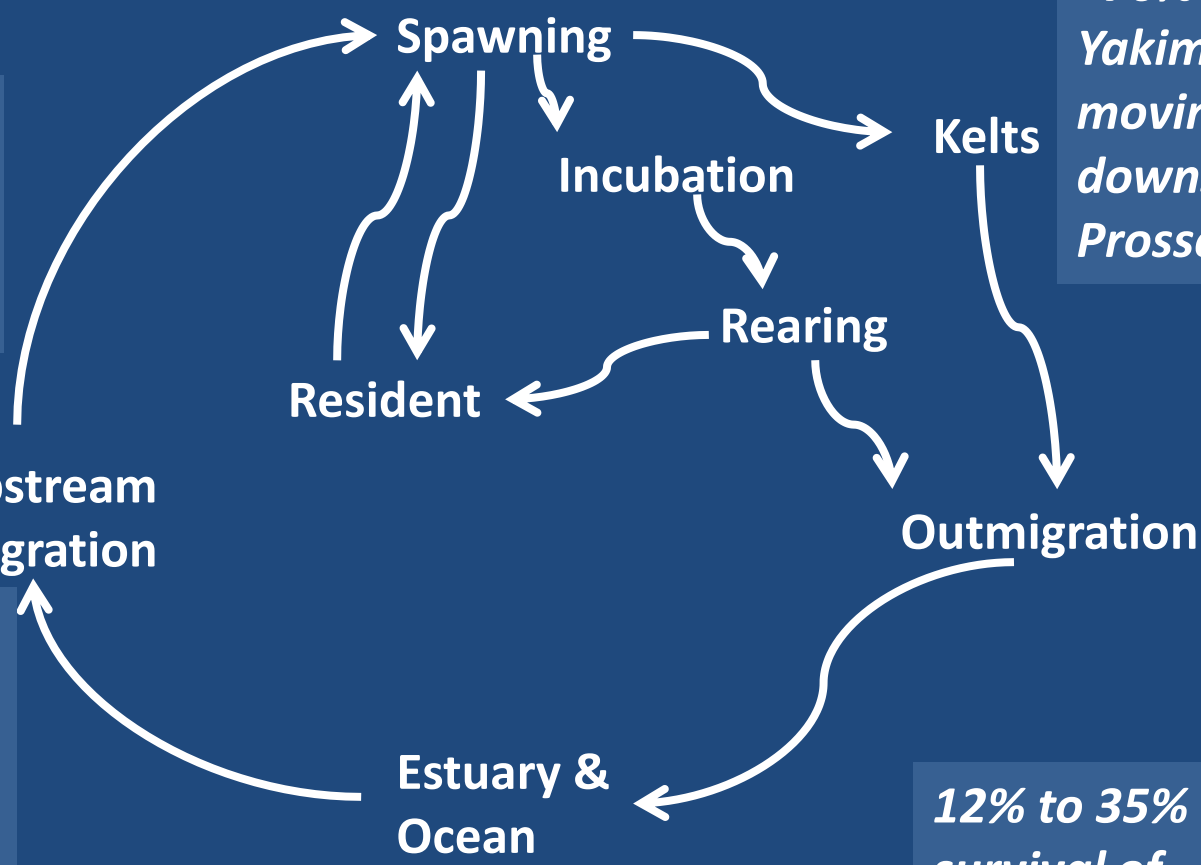
*high seas samples contain 7.2% previous spawners*

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



*2.7% of the run at Prosser are natural repeat spawners*

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

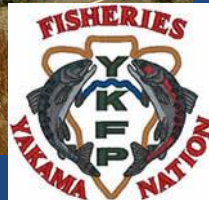


*~70% of the Yakima run is moving downstream of Prosser*

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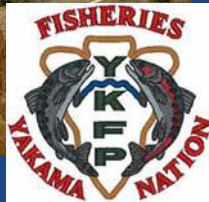
# Kelt Reconditioning Program



# Artificial Reconditioning In the Yakima River to date

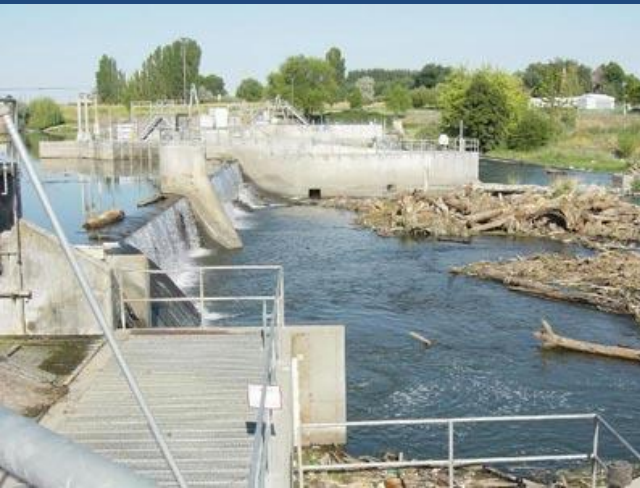
- Capture and feed for 6 to 9 Months
- Collected 9,679 kelt steelhead
- Reconditioned and released 4,042
- Survival to release ~ 42%
- Individual survival correlated with fish condition

# Kelt Reconditioning Program



# Parent Sample Collections

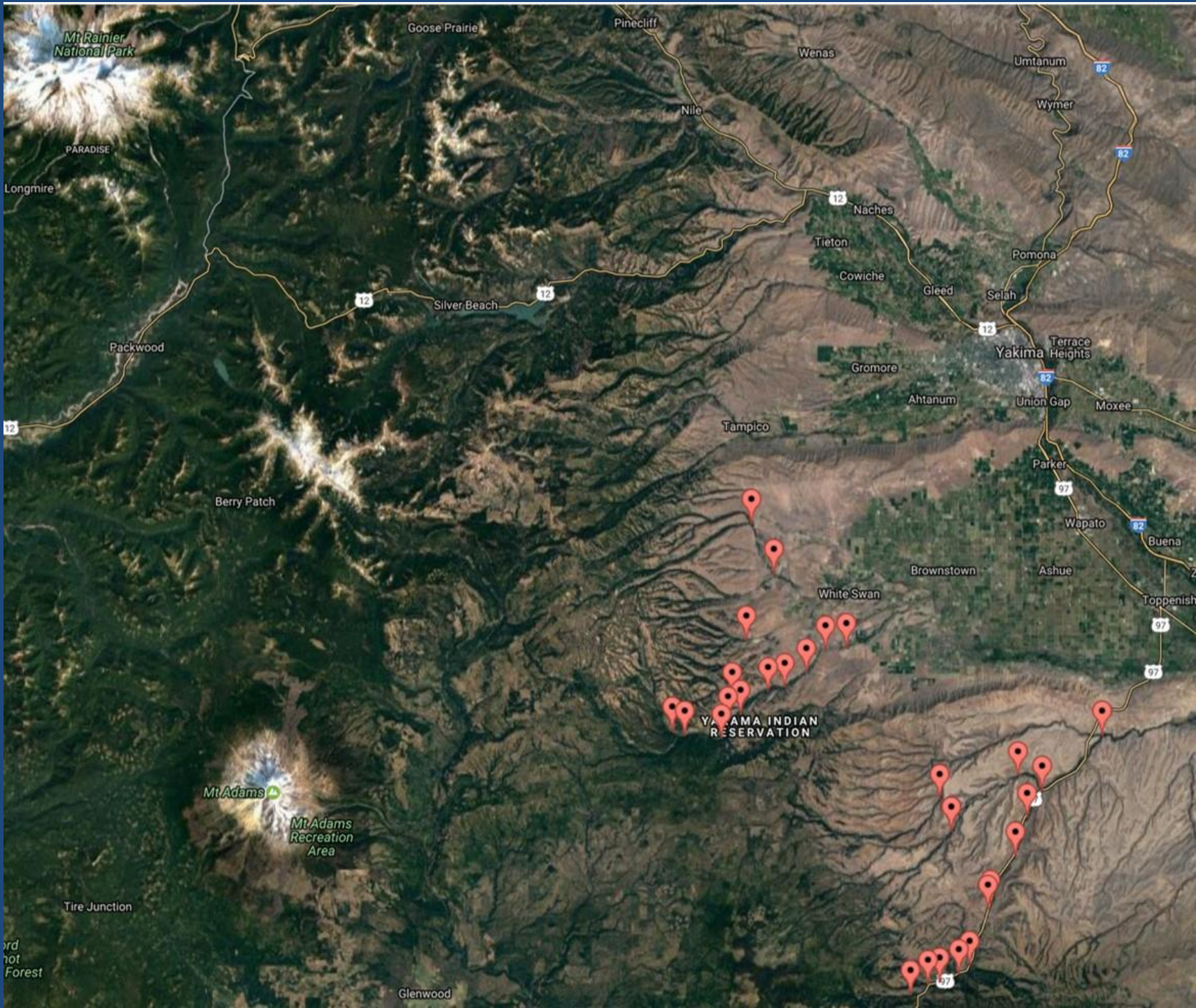
- Maidens. Upstream at Prosser
  - Detected at a tributary PIT antennae
  - Not detected in subsequent years
- Kelts. Downstream at Chandler
  - Detected in a tributary after reconditioning
  - Assumed to be present for two spawning years



# Offspring Sample collections

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





Mt Rainier National Park

Goose Prairie

Pinecliff

Wenas

Umtanum

Wymer

Nile

Naches

Tieton

Cowiche

Gleed

Selah

Pomona

Terrace Heights

Gromore

Ahtanum

Union Gap

Moxee

Tampico

Parker

Wapato

Buena

Brownstown

Ashue

White Swan

Toppenish

YAKIMA INDIAN RESERVATION

Mt Adams

Mt Adams Recreation Area

Tire Junction

Glenwood

ord  
not  
Forest



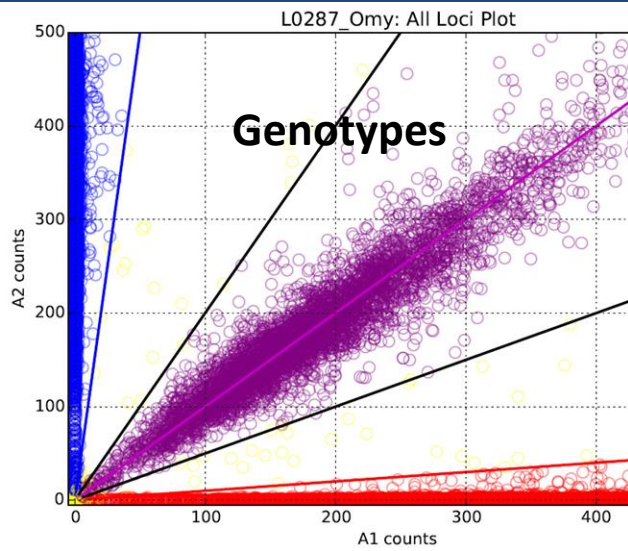




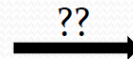


# Parentage Method

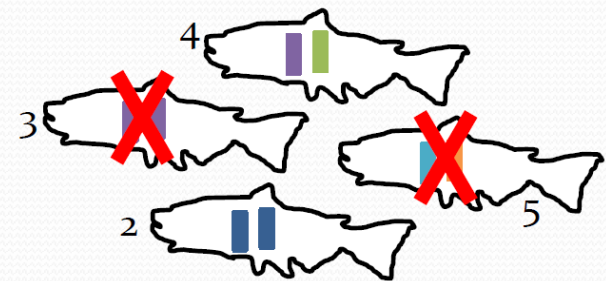
- Used the Program CERVUS
- Simulations ran to determine a 99% confidence interval for LOD scores
- Progeny assignments were used if
  - Met 99% confidence interval
  - Had one or less mismatching loci.



Offspring



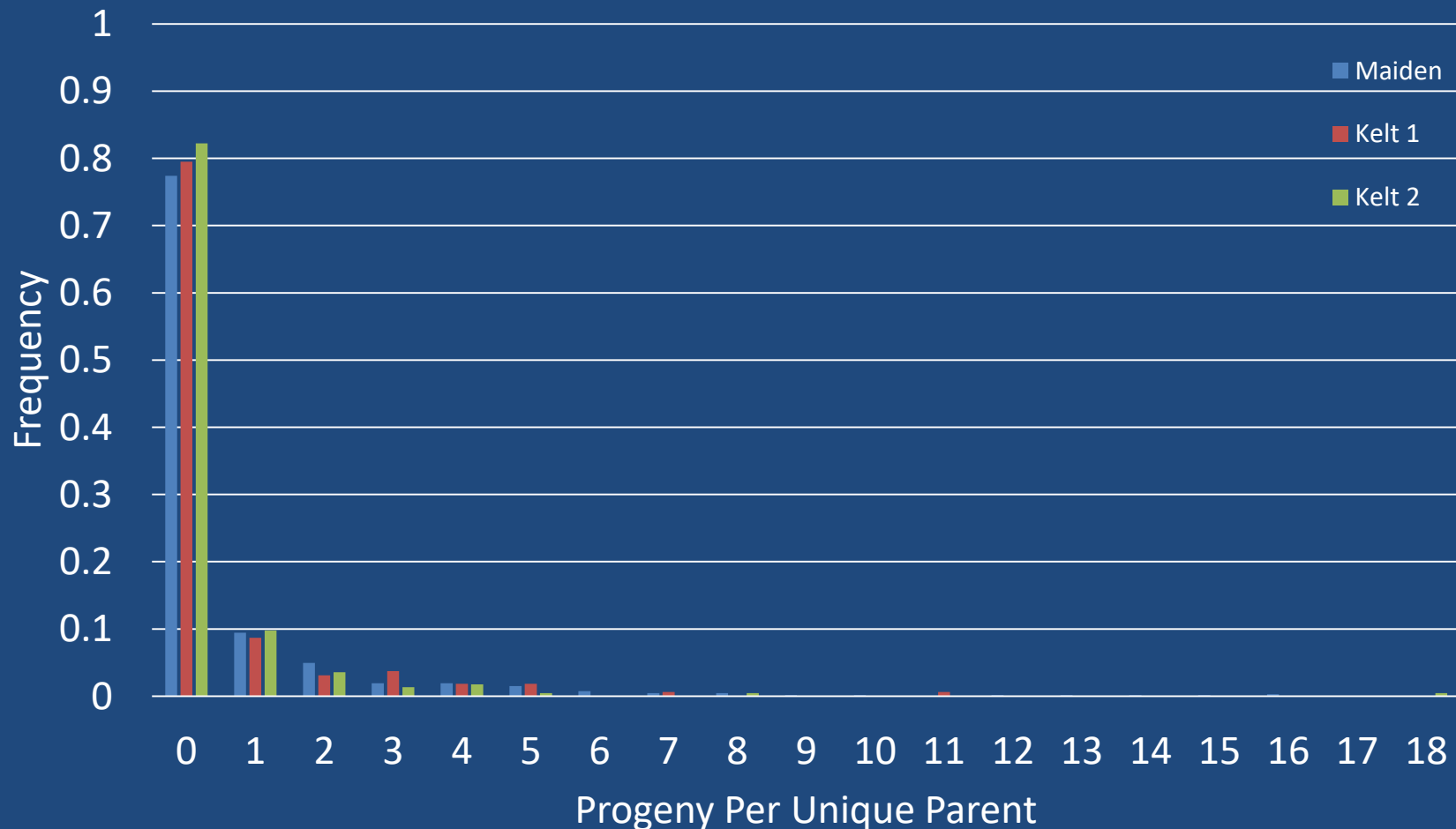
Candidate parents

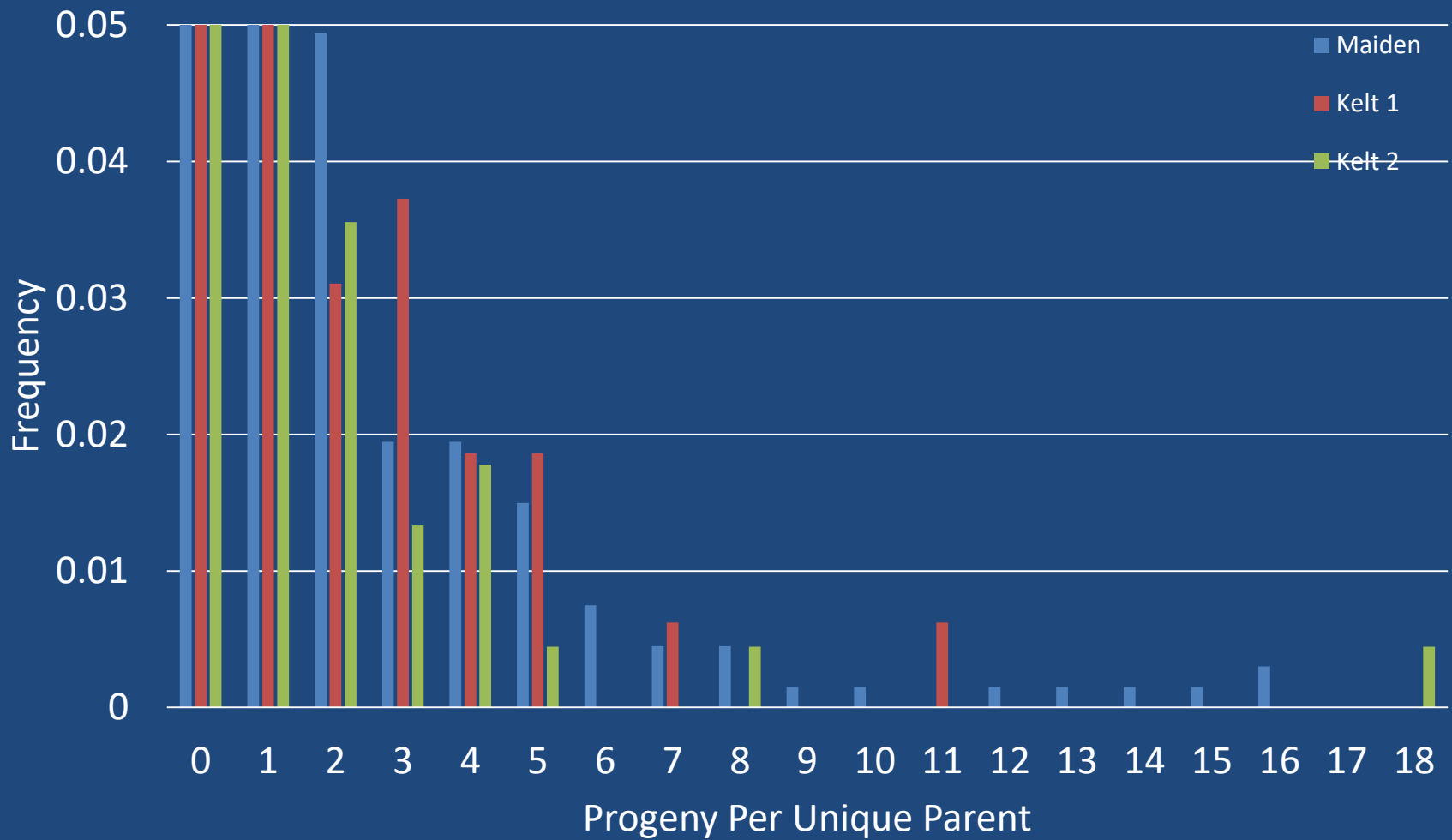


# Working Dataset

- Female Parents
  - 440 Maidens
  - 136 Kelts event 1
  - 196 Kelts event 2
- Male Parents
  - 228 Maiden
  - 25 Kelts event 1
  - 29 Kelts event 2
- 644 Offspring assignments

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





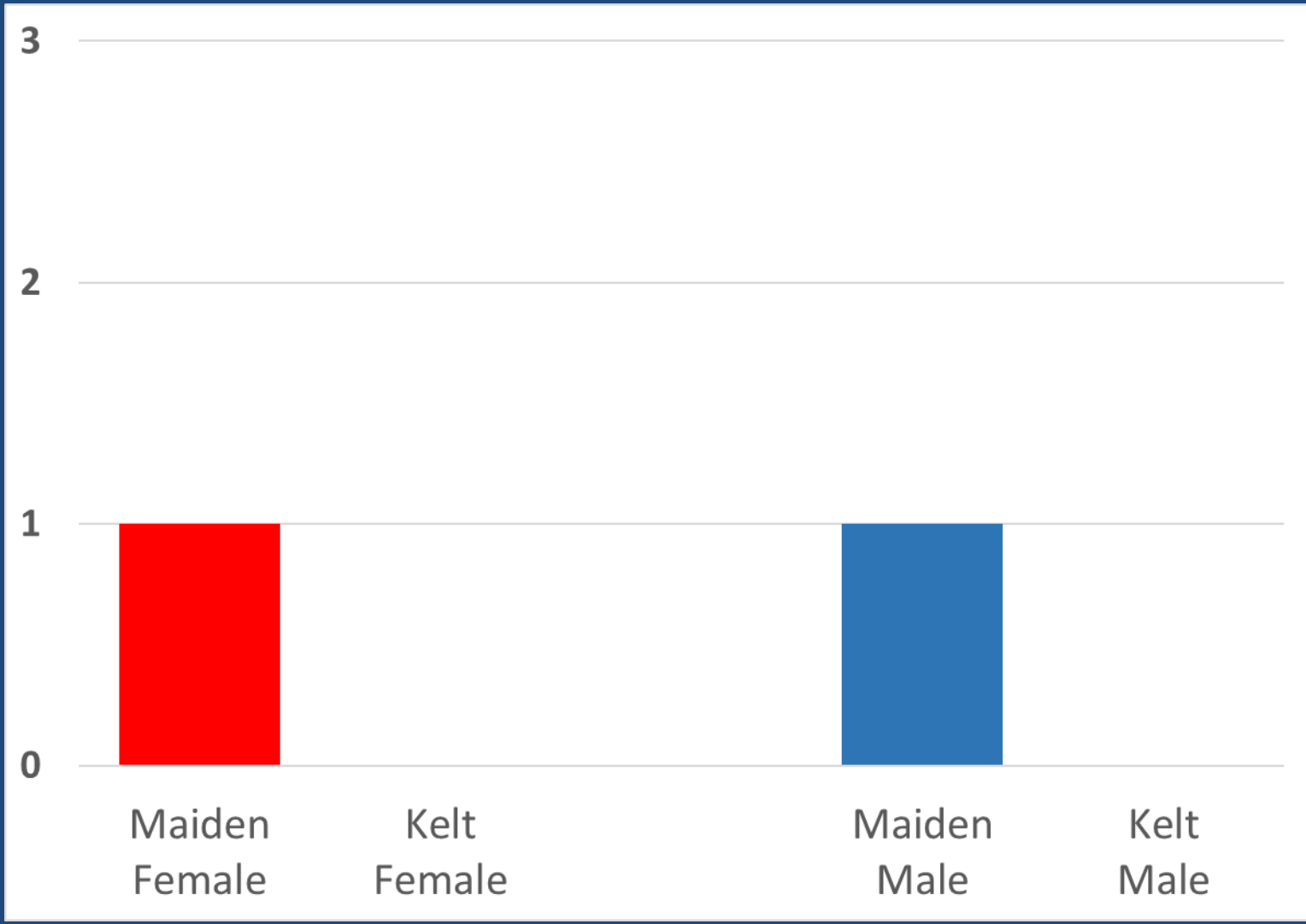
# Relative Reproductive Success (RRS)

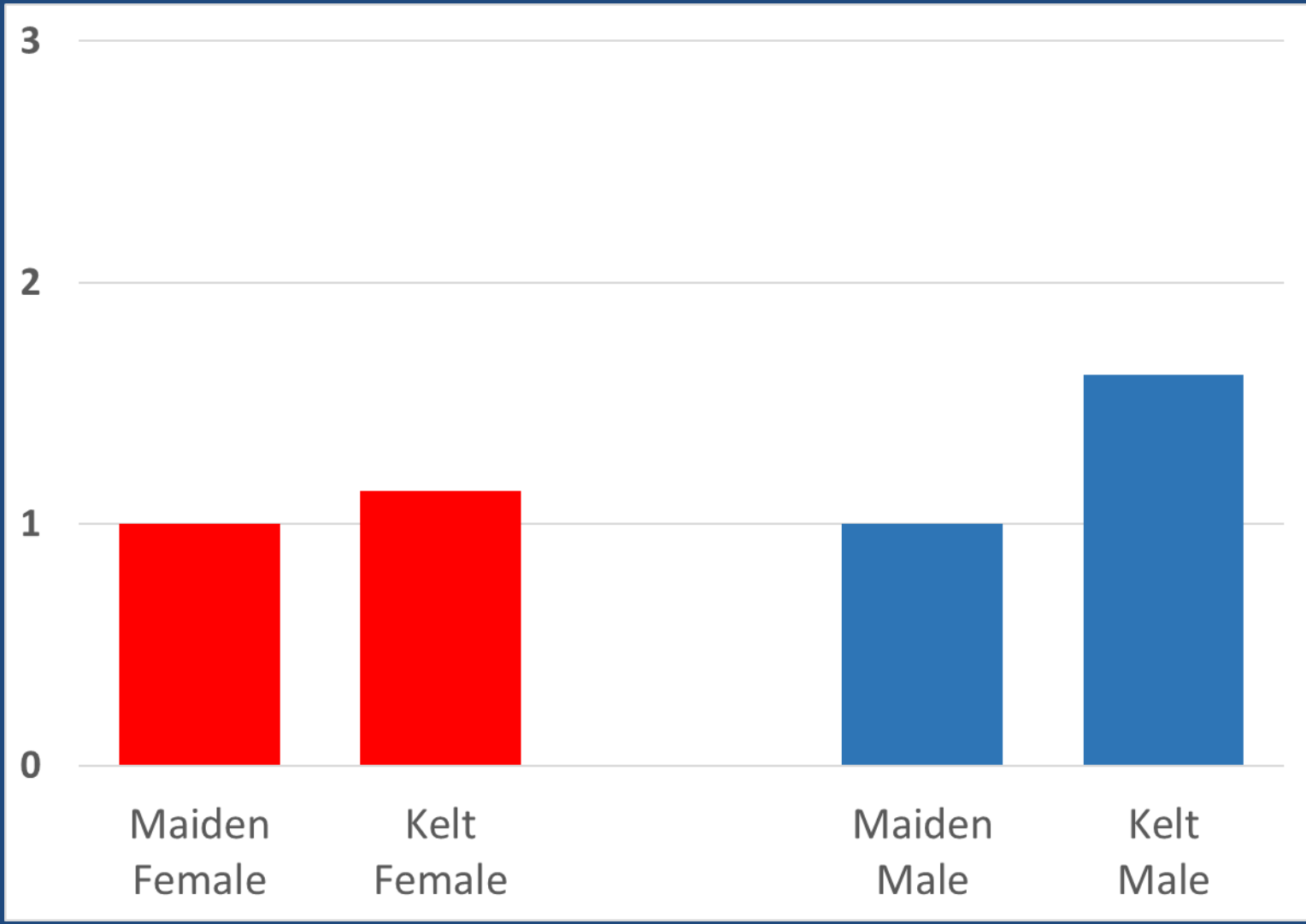
- Standardize RRS to maidens (RRS=1)
  - Make comparisons within single spawn years
  - Report as average of all 4 years
  - Separate RRS for male and female fish
  - Separate RRS for first and second spawn events in kelts
  - Report Lifetime Reproductive success as the sum of the estimates for first and second spawn events

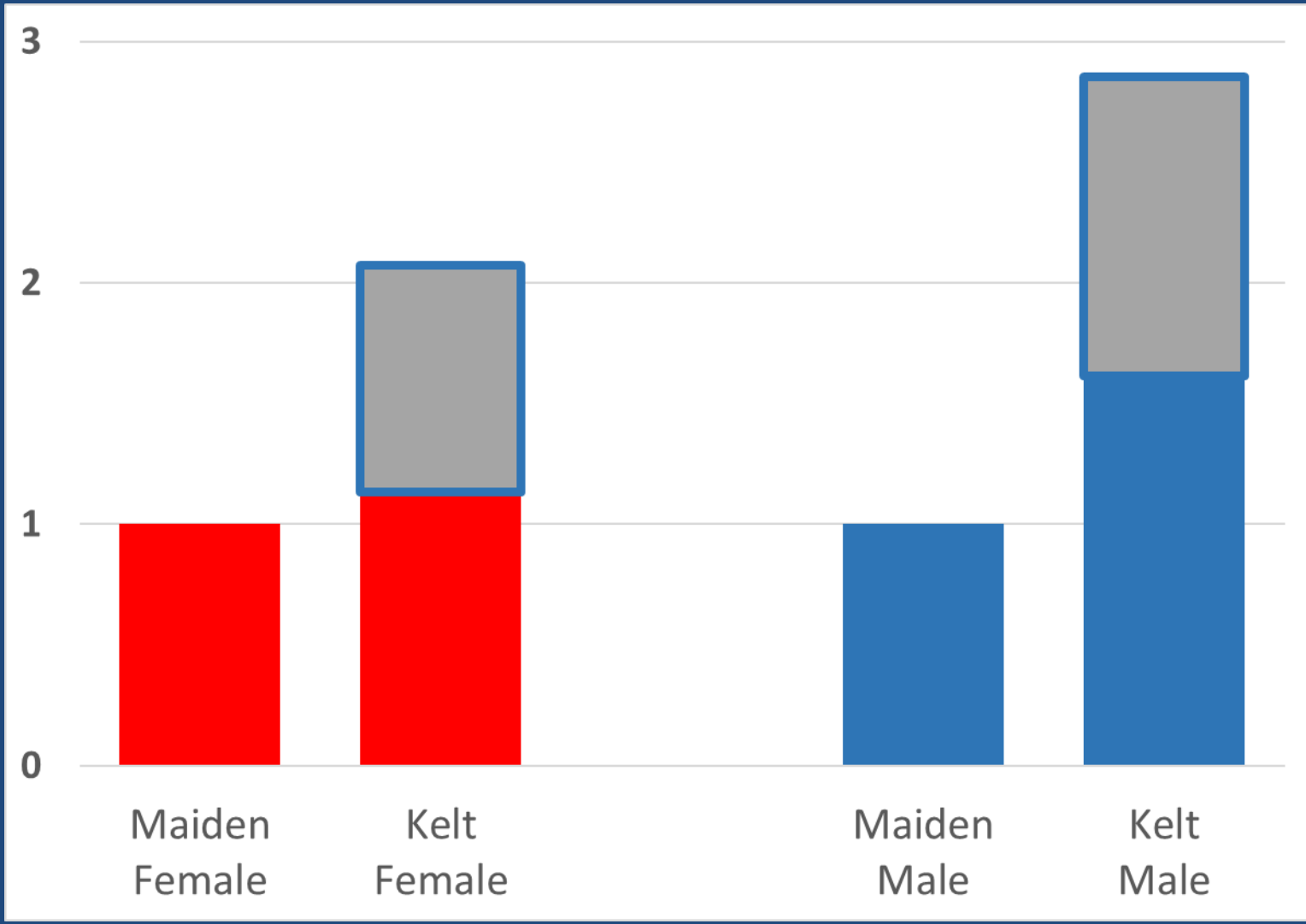
# Natural Reproductive Success

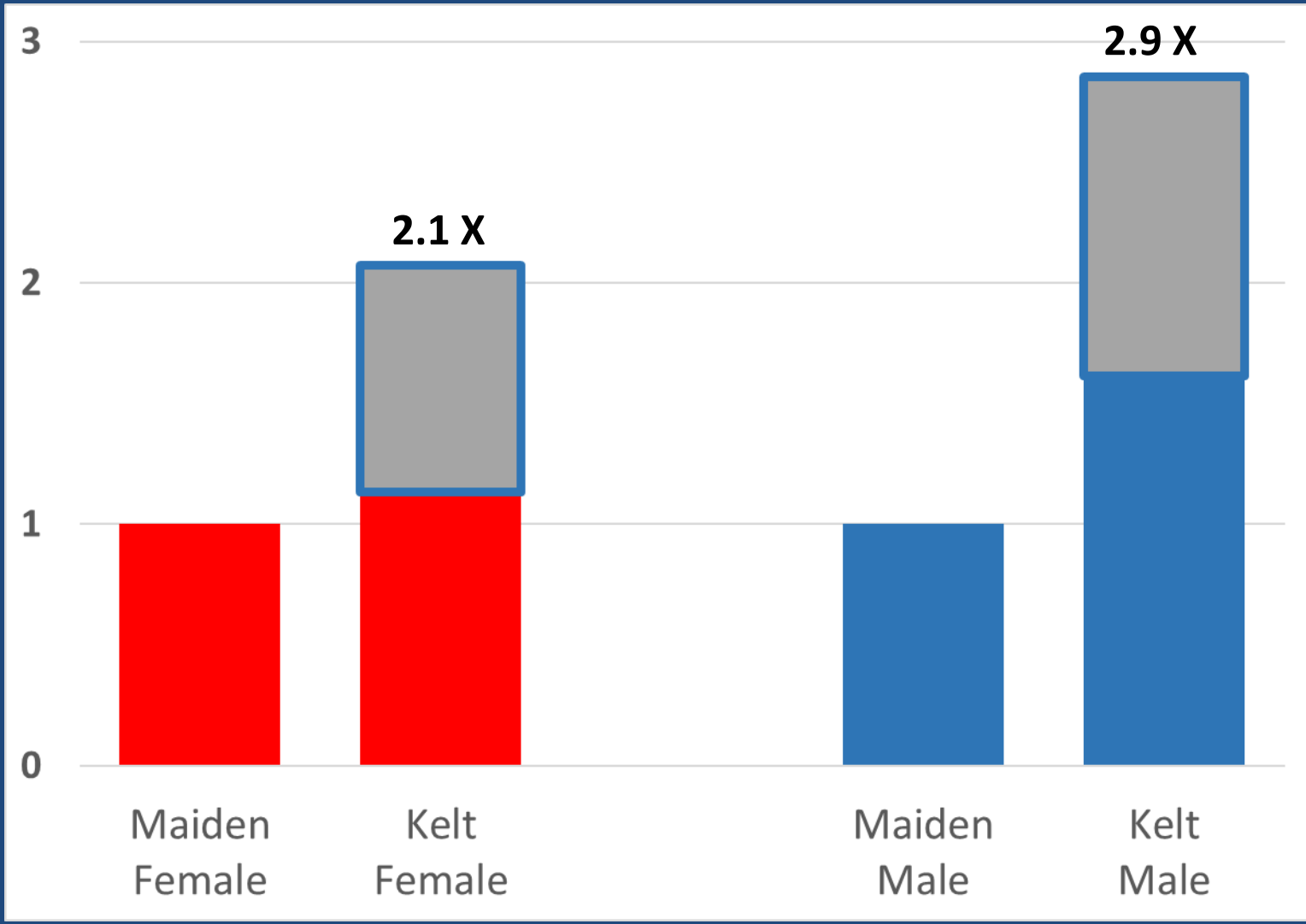
- Seamons & Quinn 2010 studied 19 Brood years of a wild population of steelhead comparing Lifetime reproductive success of repeat spawners to one time spawners.
- Lifetime Reproductive success of repeat spawners
  - Nearly twice for females
  - Nearly three times for males











# 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

