Evaluating Spring Chinook Salmon Population Productivity Above Detroit Dam, North Santiam River, Using Genetic Parentage Analysis

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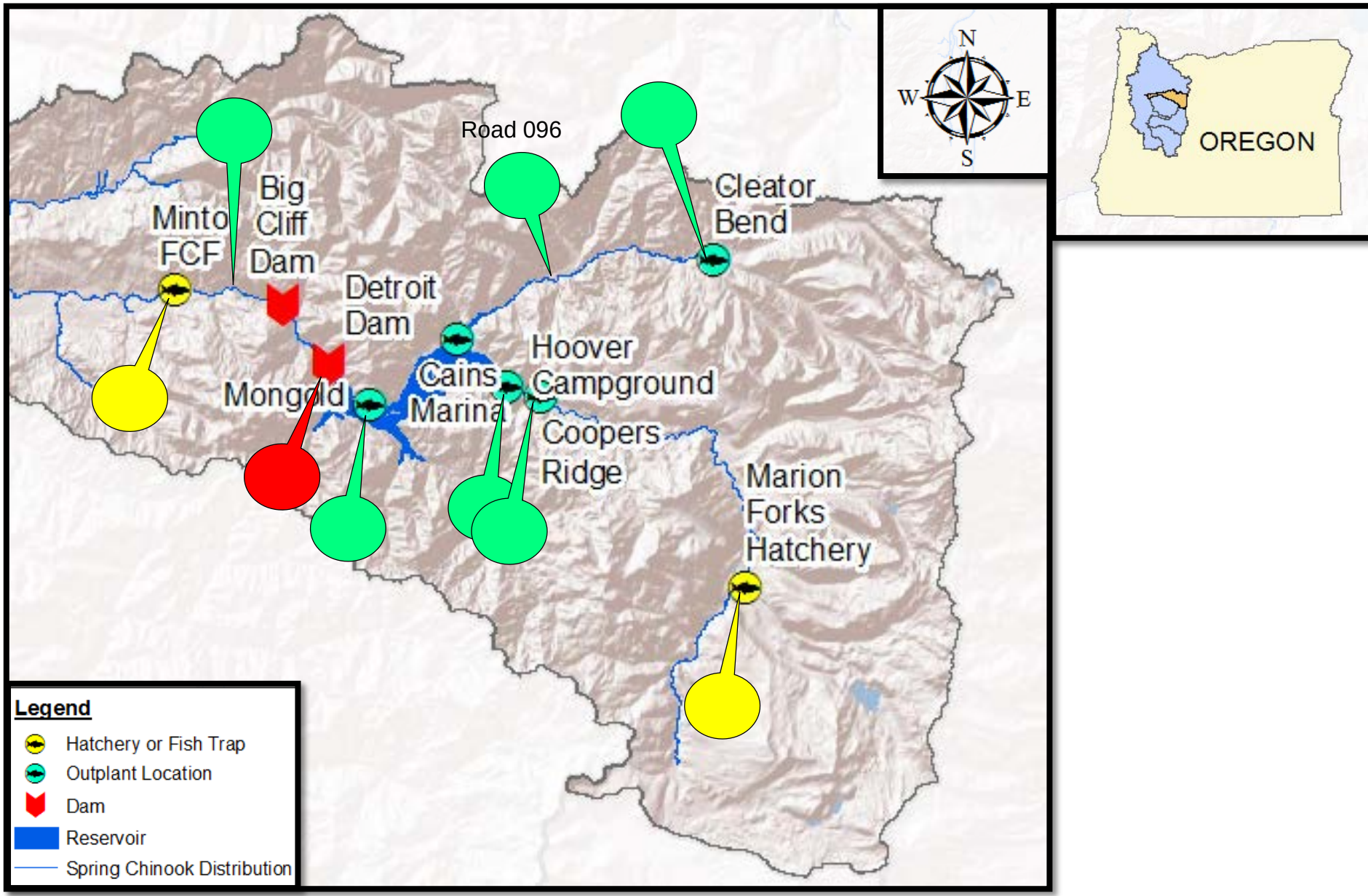
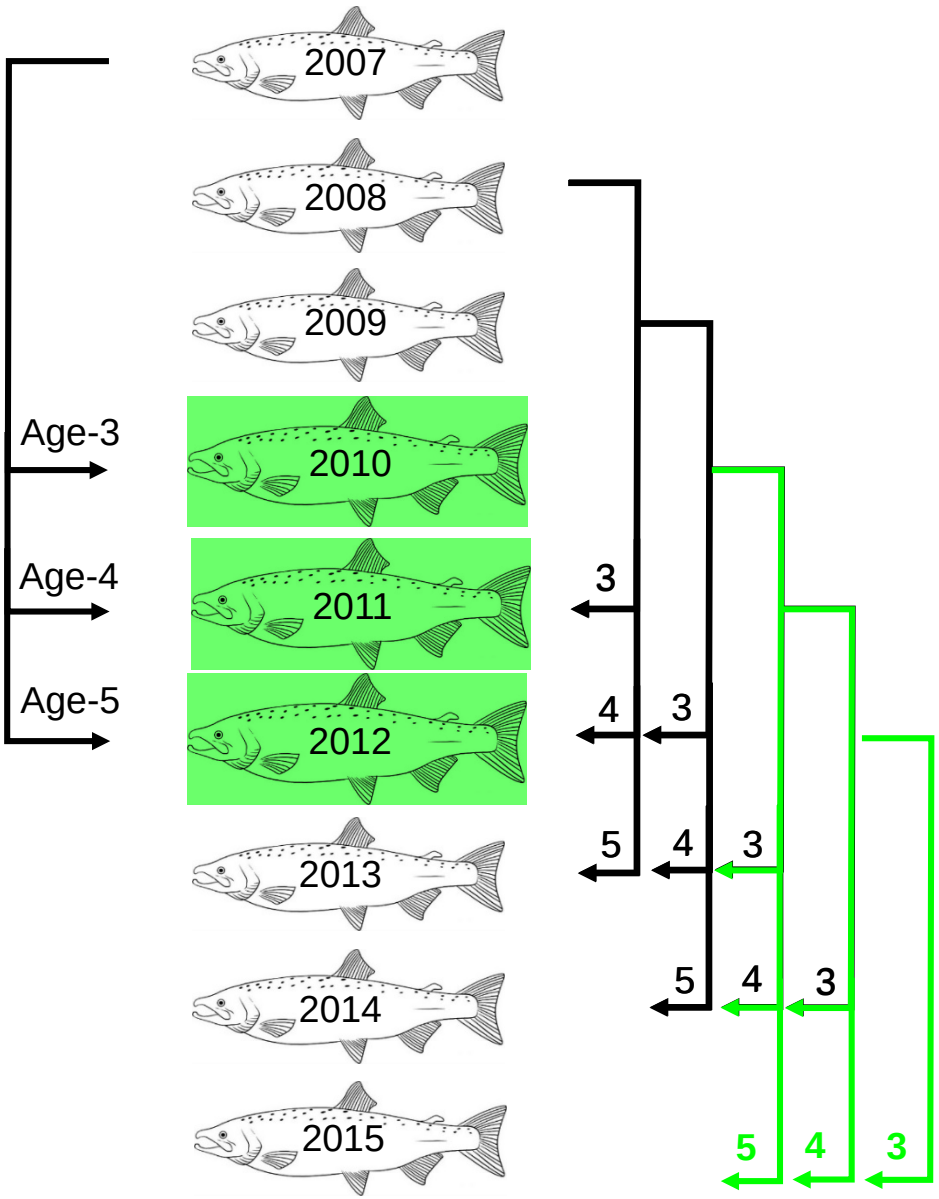
North Santiam River System



North Santiam Pedigree



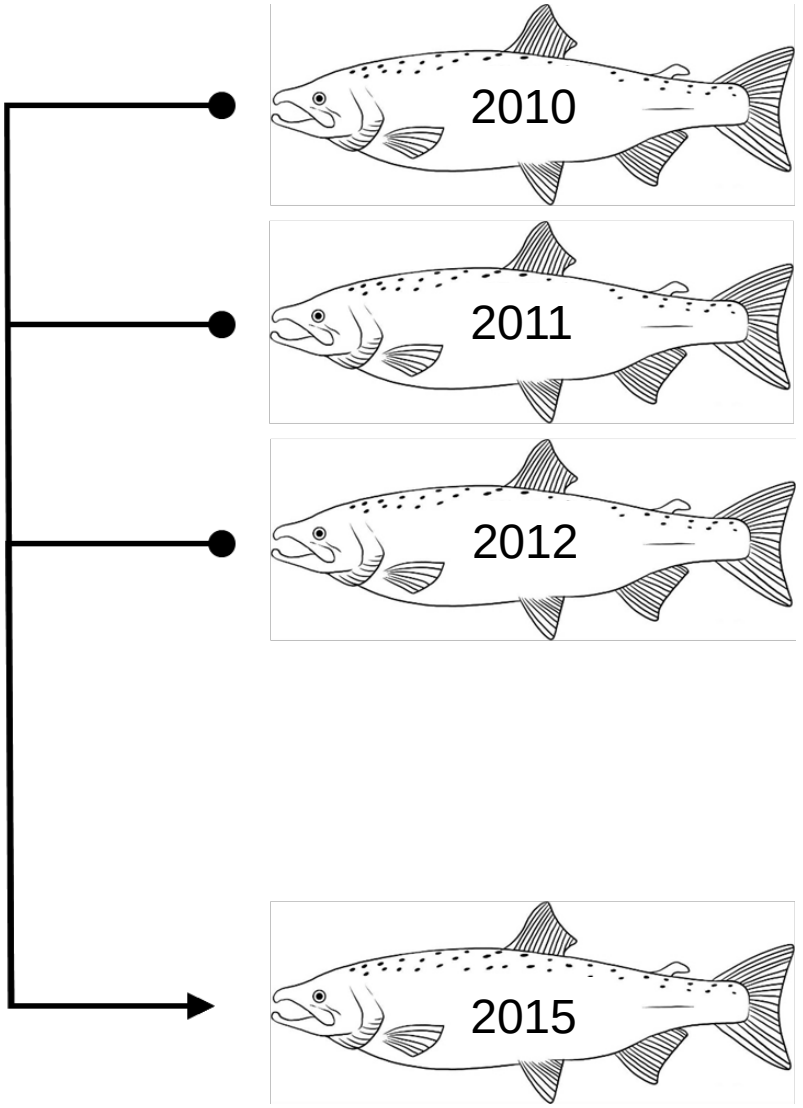
Putative 2015 Offspring: NOR Adult Returns

Location *Tissue type*	Tissue samples	DNA samples	# Genotyped < 7 markers	# Duplicates removed	♀	♂	∑
Above Detroit							
Live	498	437	1	5	144	287	**431**
Carcass	41	35	0	20	6	9	**15**
Below Big Cliff							
Live	170	156	1	7	70	78	**148**
Carcass	47	29	0	10	7	12	**19**

Putative 2010-2012 Parents:

Objective 1

Extend genetic pedigree (2007 - 2014) by assigning 2015 adult NOR returns to putative parents (2010 - 2012)

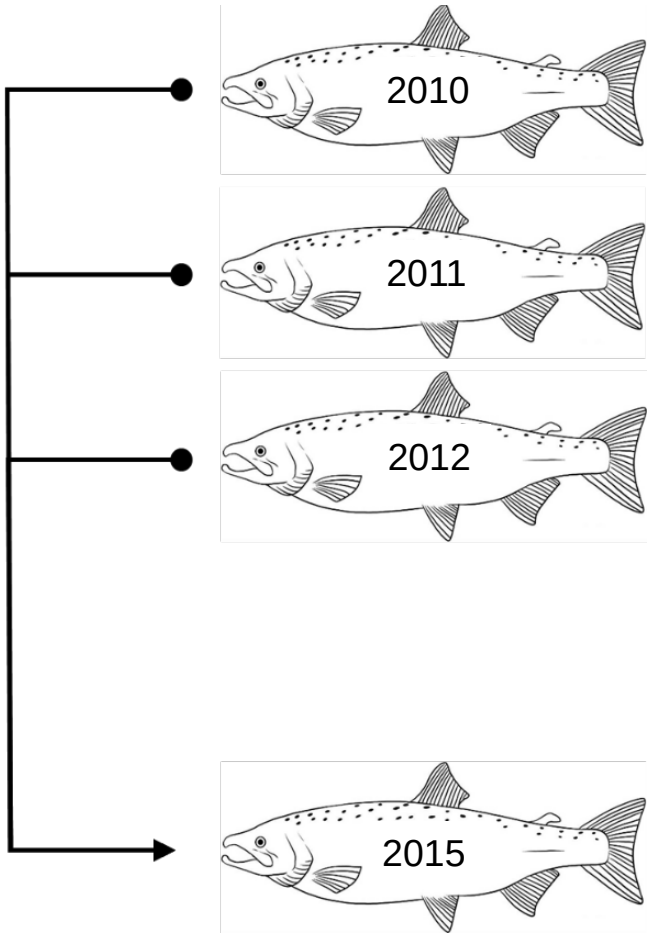


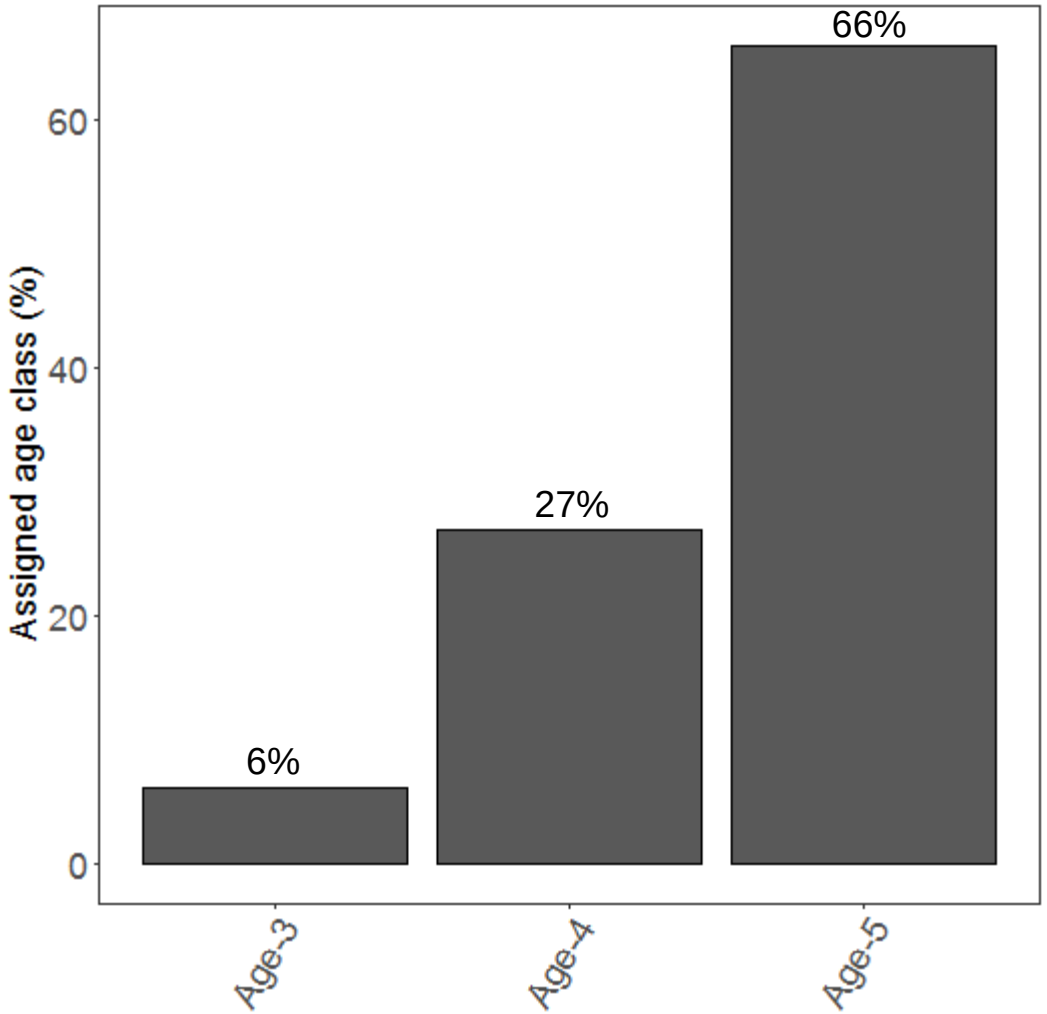
(Age-3, Age-4, Age-5)

Objective 1 Results: 2015 Parentage Assignment Rates

NOR Cohort	Assignment Rate
2015	**250 / 613 (40%)**

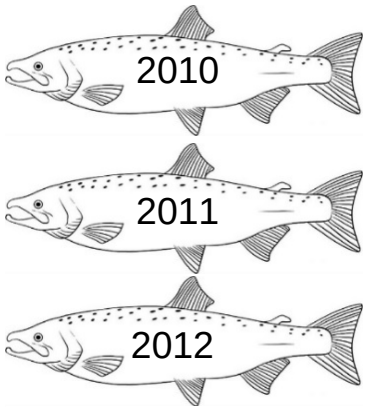
Objective 1 Results: 2015 Age Structure





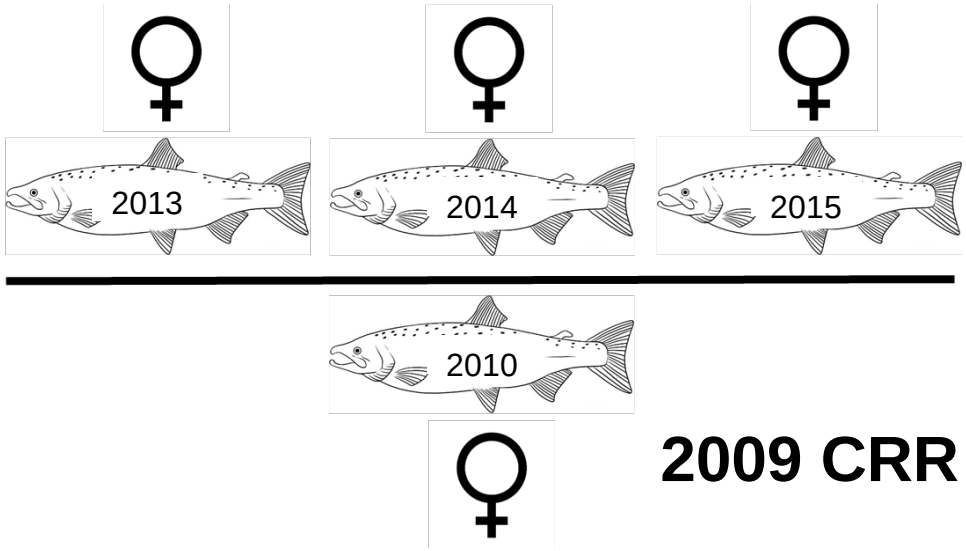
Objective 2

Estimate population productivity of salmon sampled during 2010 - 2012



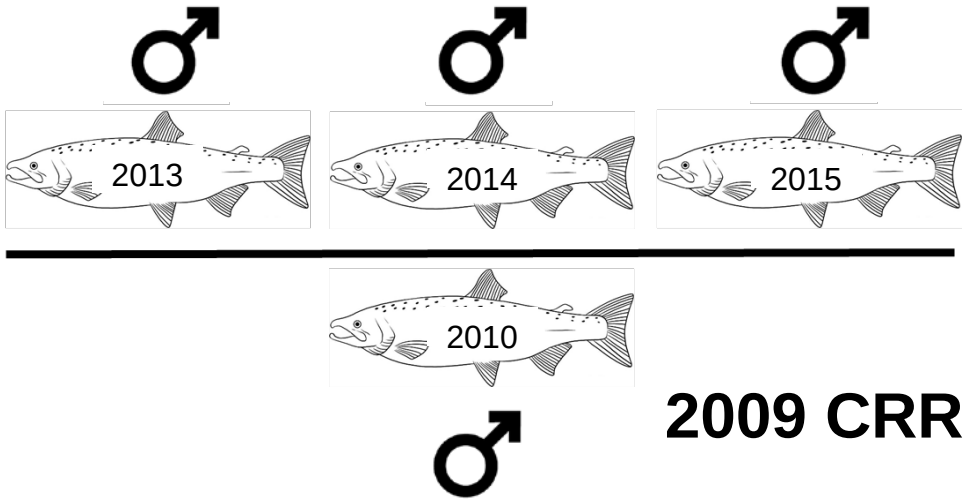
- 2010
  - **CRR:** Cohort Replacement Rate
  - **TLF:** Total Lifetime Fitness
- 2011
  - Fitness Estimates
- 2012
  - Fitness Estimates

2010 Results: Cohort Replacement Rate



$$\frac{12+105+69}{963} = 0.19$$

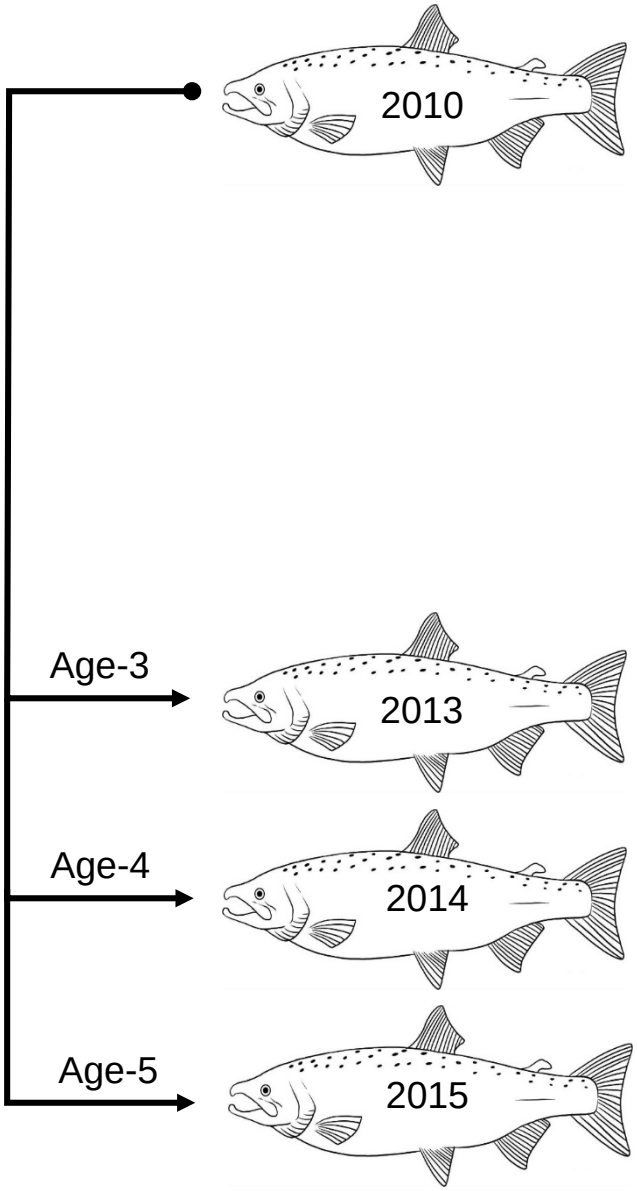
2009 CRR $= \frac{0+67+74}{131} = 1.07$

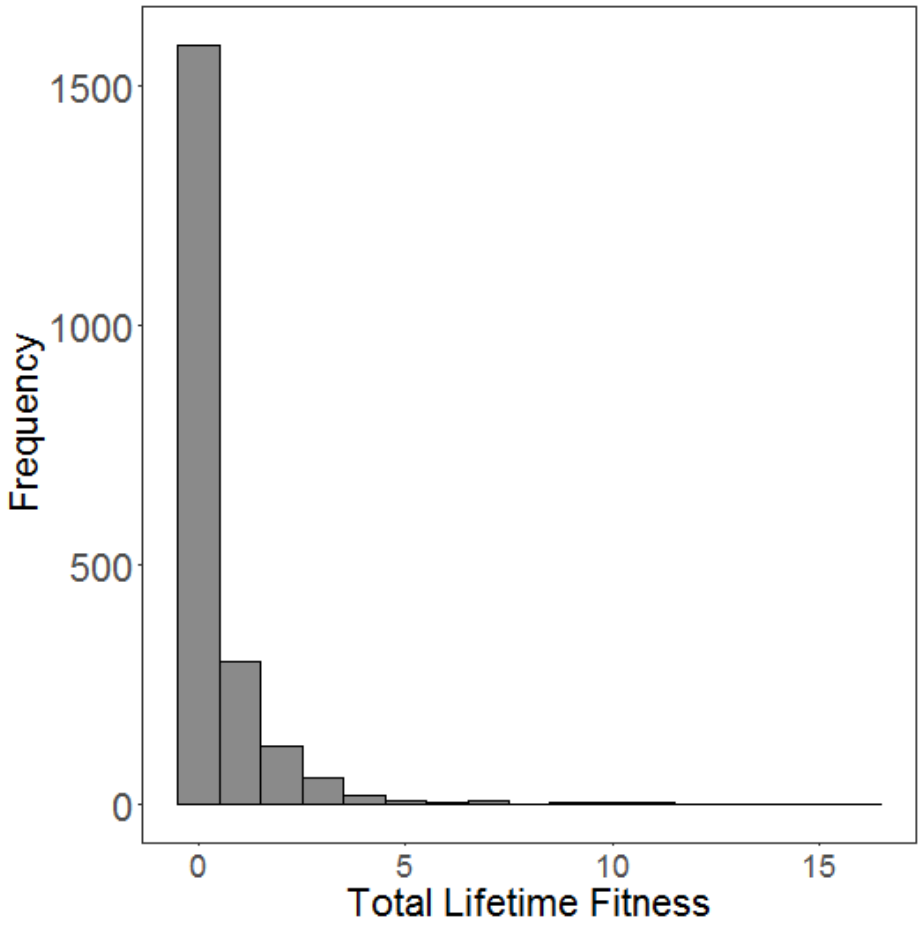


$$\frac{42+213+56}{1146} = 0.27$$

2009 CRR $= \frac{1+140+45}{628} = 0.29$

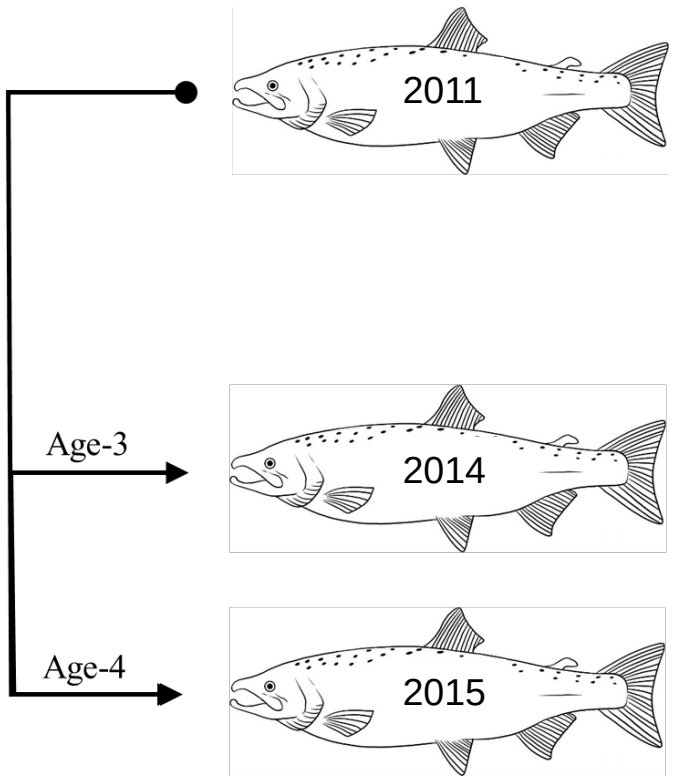
2010 Results: Total Lifetime Fitness

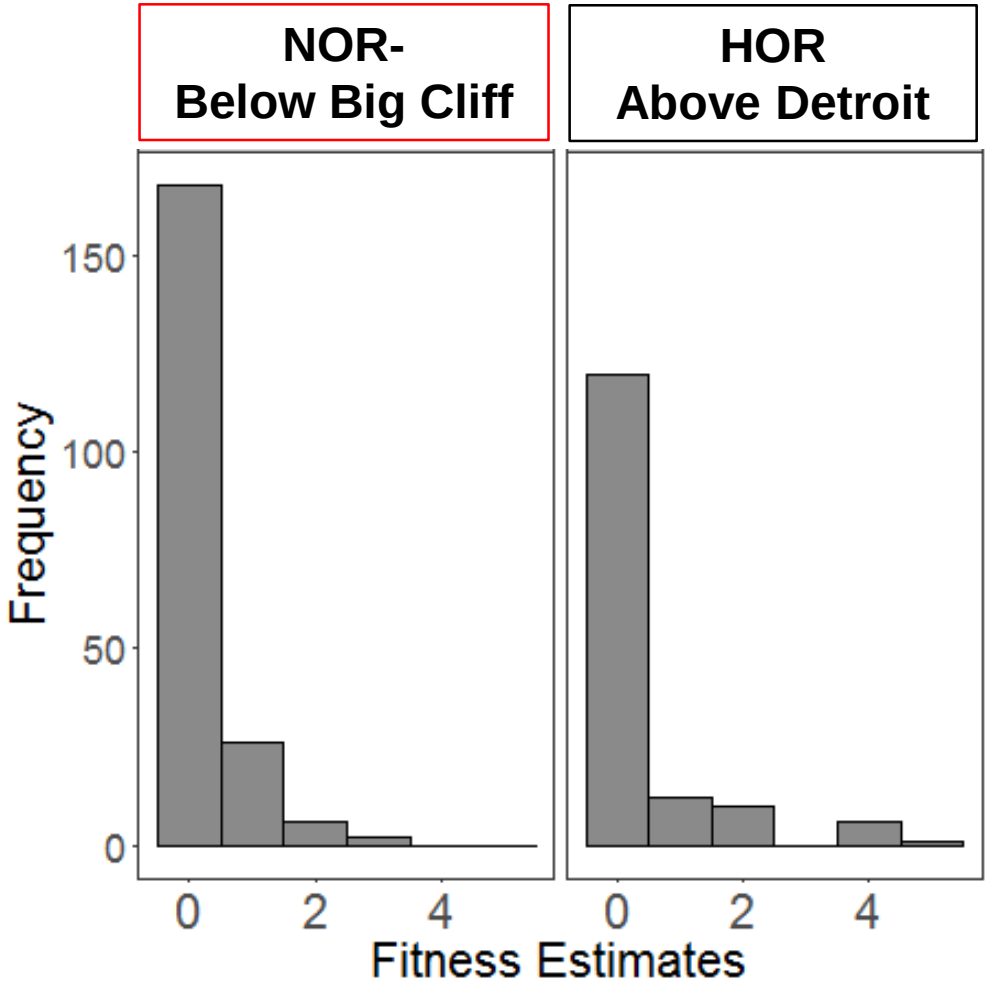




- 23% (494 / 2109) of salmon produced offspring
- TLF = 0.47 ±1.17 SD

2011 Results: Preliminary Fitness

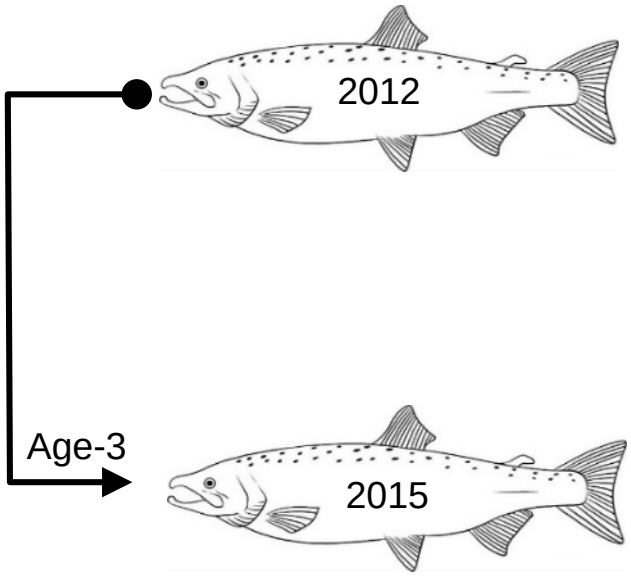


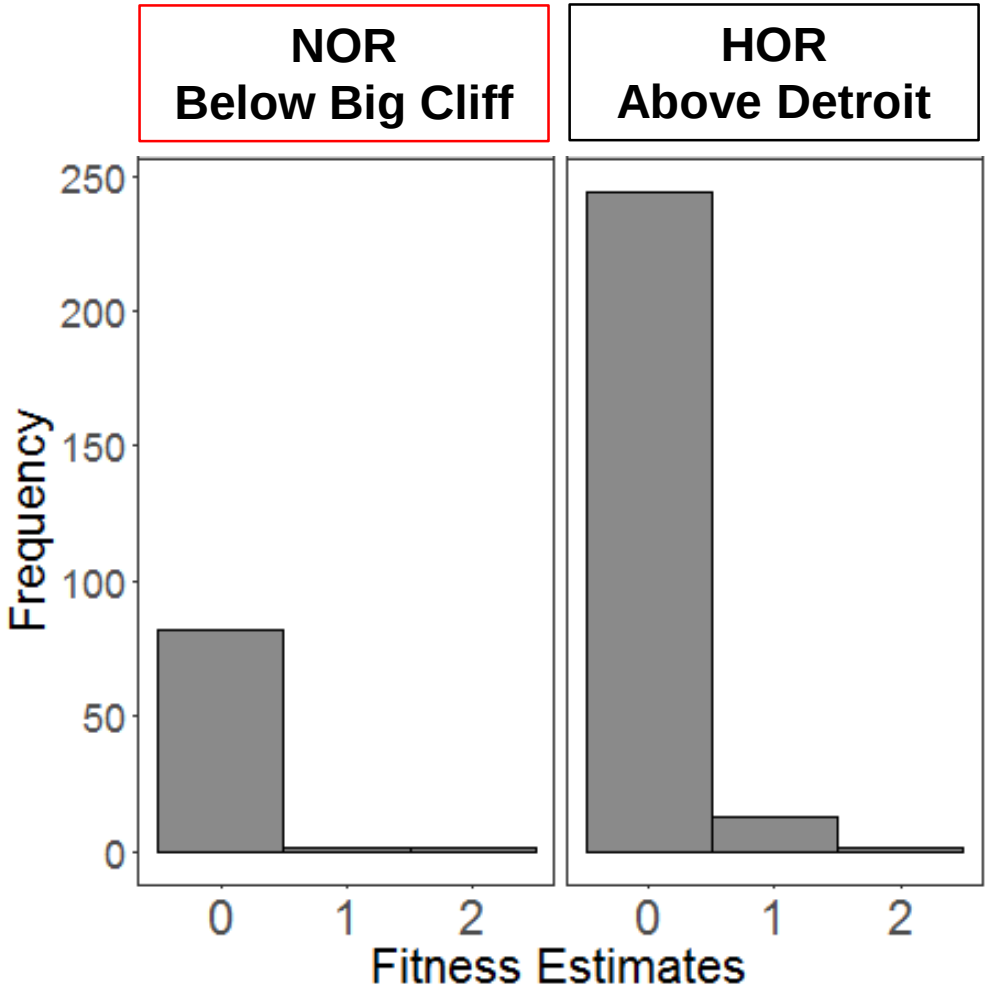


- 16% (34 / 202) of salmon produced offspring
- Fitness est. = 0.21 ± 0.53 SD

- 19% (29 / 149) of salmon produced offspring
- Fitness est. = 0.29 ± 0.77 SD

2012 Results: Preliminary Fitness

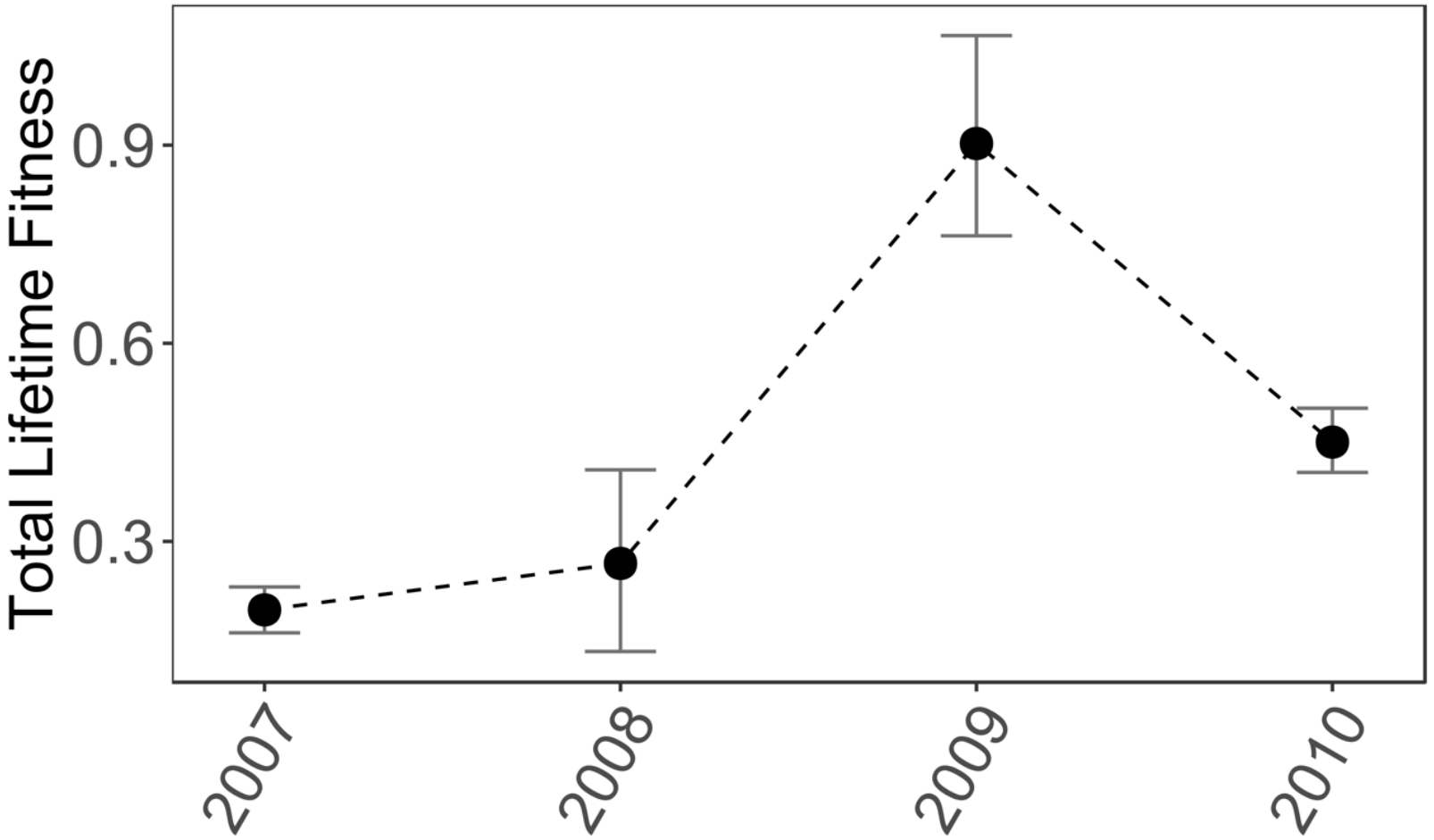




- 2% (2 / 84) of salmon produced offspring
- Fitness est. = 0.03 ± 0.24 SD

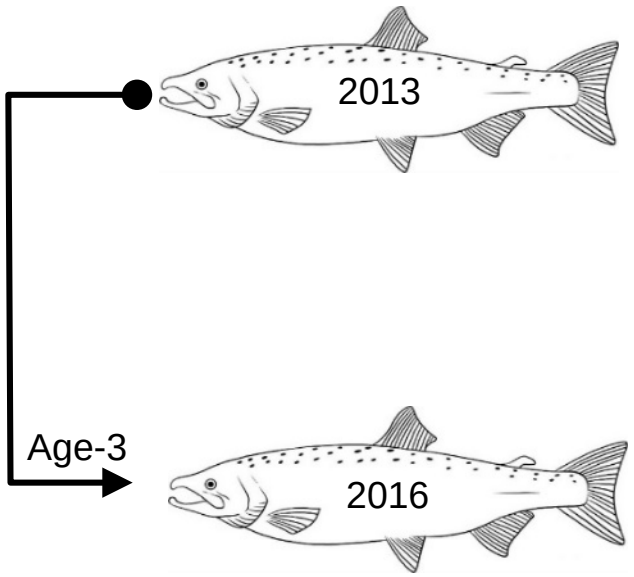
- 5% (14 / 258) of salmon produced offspring
- Fitness est. = 0.05 ± 0.25 SD

Population Productivity 2007-2010



Future Directions

- Parentage assignment for 2016 adult returns
  - Insight into population productivity of salmon outplanted in 2011
    - Three consecutive years of CRR = test for a trend
    - Five consecutive years of TLF estimates
  - First fitness estimates of fish collected and released from the new Minto fish collection facility
- Genetic and/or environmental factors associated with fitness variation in spring Chinook salmon



Acknowledgements

US Army Corps of Engineers®

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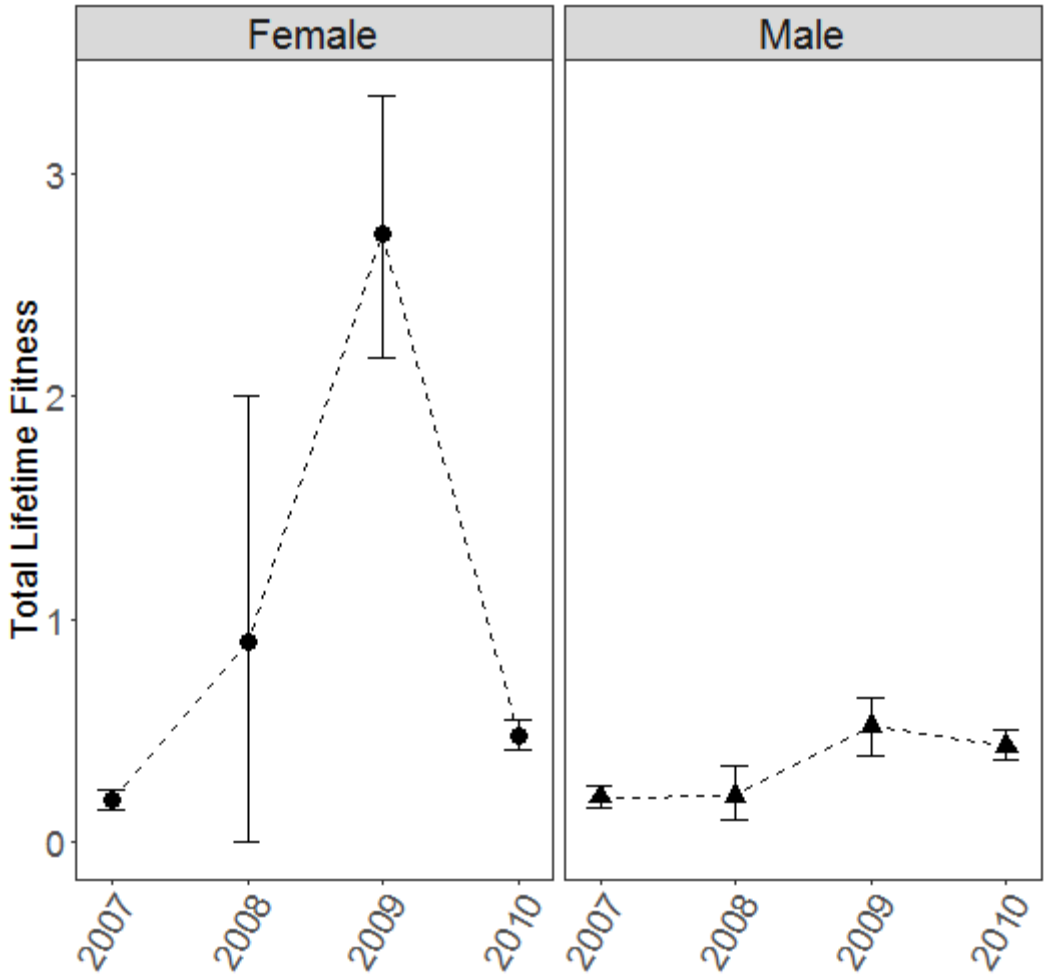
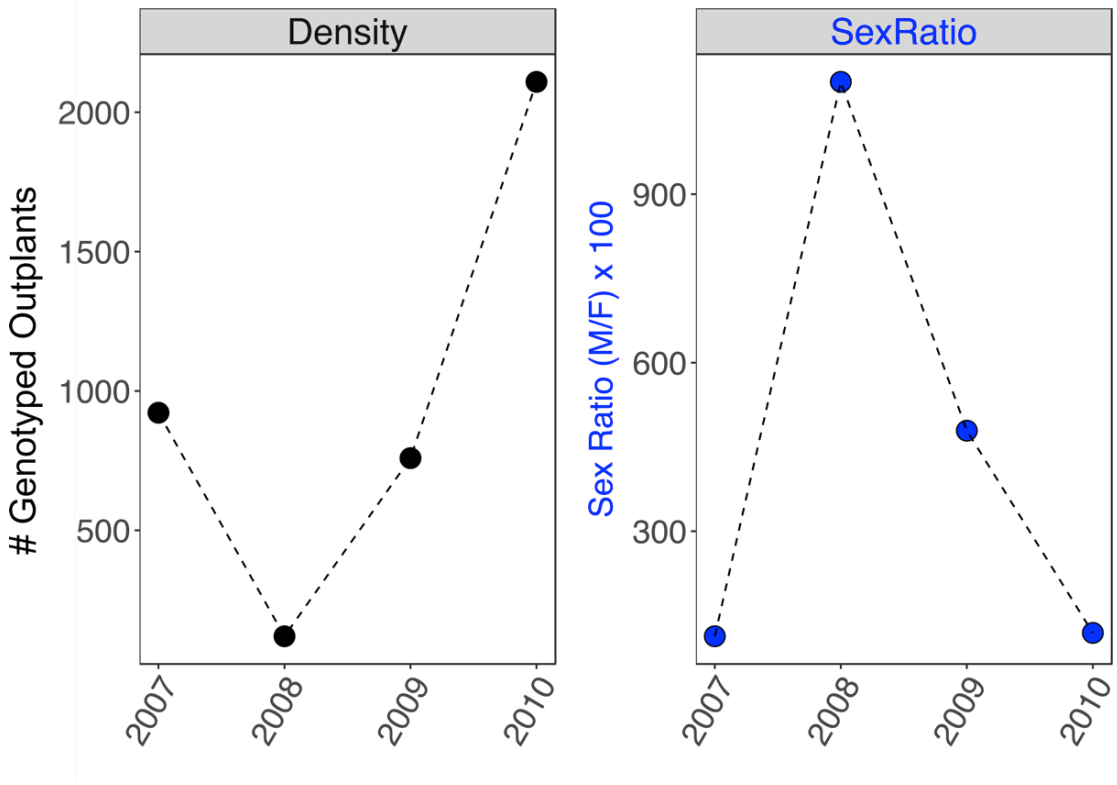
- Rich Piaskowski, USACE
- Cameron Sharpe, ODFW
- ODFW field staff

Secondary Slides

2007-2010: TLF~Sex



20007-2010: Density & Sex Ratio



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