Elucidating population productivity of reintroduced spring Chinook salmon on the South Santiam River through genetic parentage assignment

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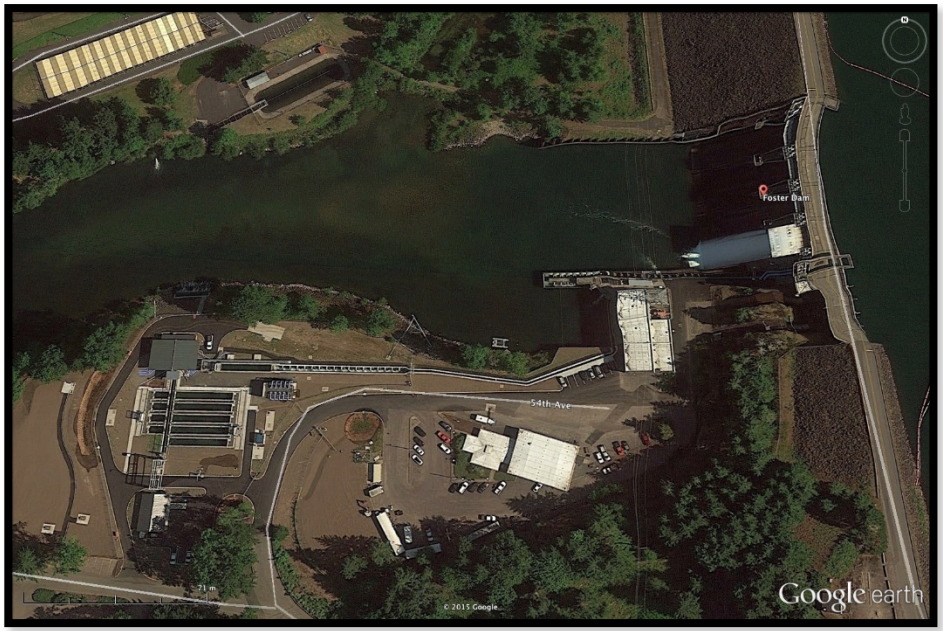
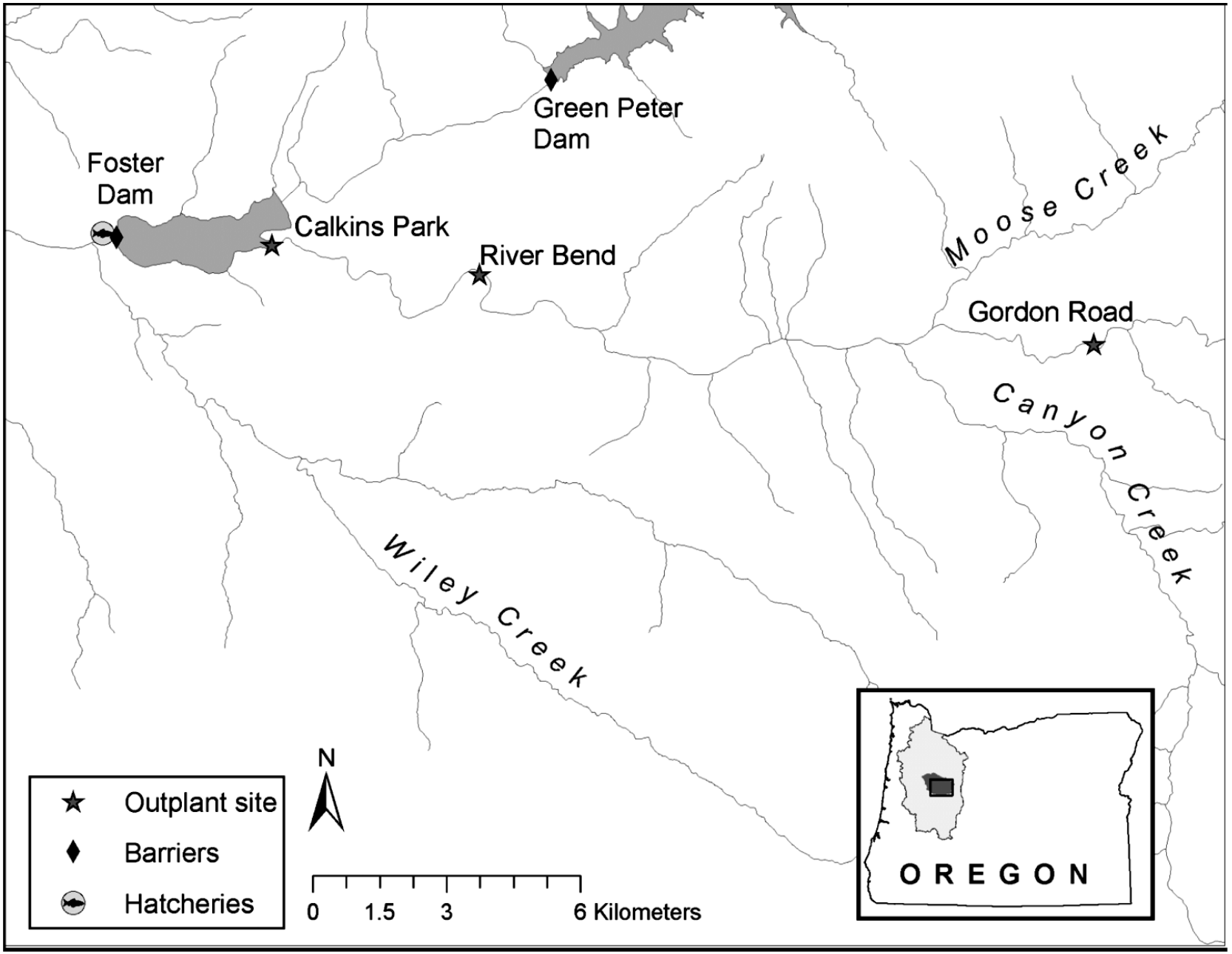


South Santiam River System



South Santiam Recovery Efforts

Above Foster Dam

Year	HOR	NOR
*2007	385	18
2008	527	163

Below Foster Dam

Year	N†
2011	66
2012	47
2013	80
2014	87

† After removing duplicates and low genotyping samples

* 64% genetically sampled

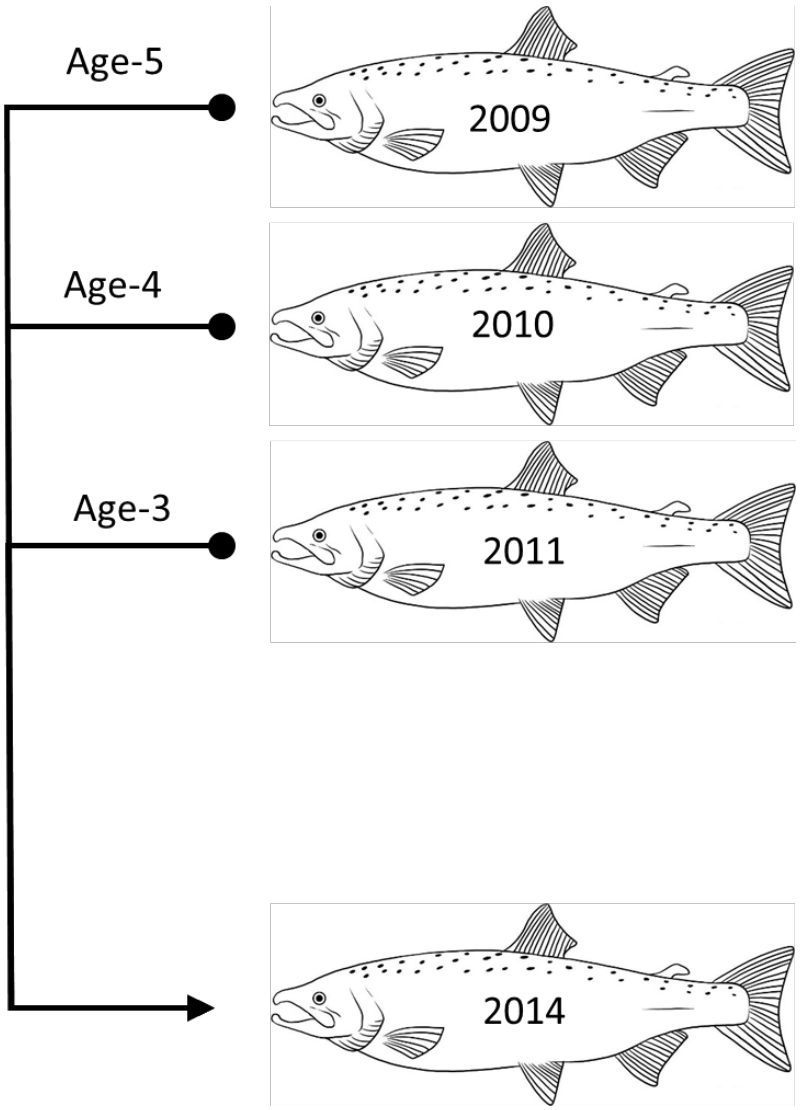
Objectives

Use genetic parentage assignment to evaluate demographic viability of reintroduced salmon

1. Extend an existing genetic pedigree (2007-2013) by assigning below and above dam 2014 adult recruits to putative parents (2009-2011)
2. Estimate population productivity of reintroduced salmon during 2009 and 2010

Objective 1

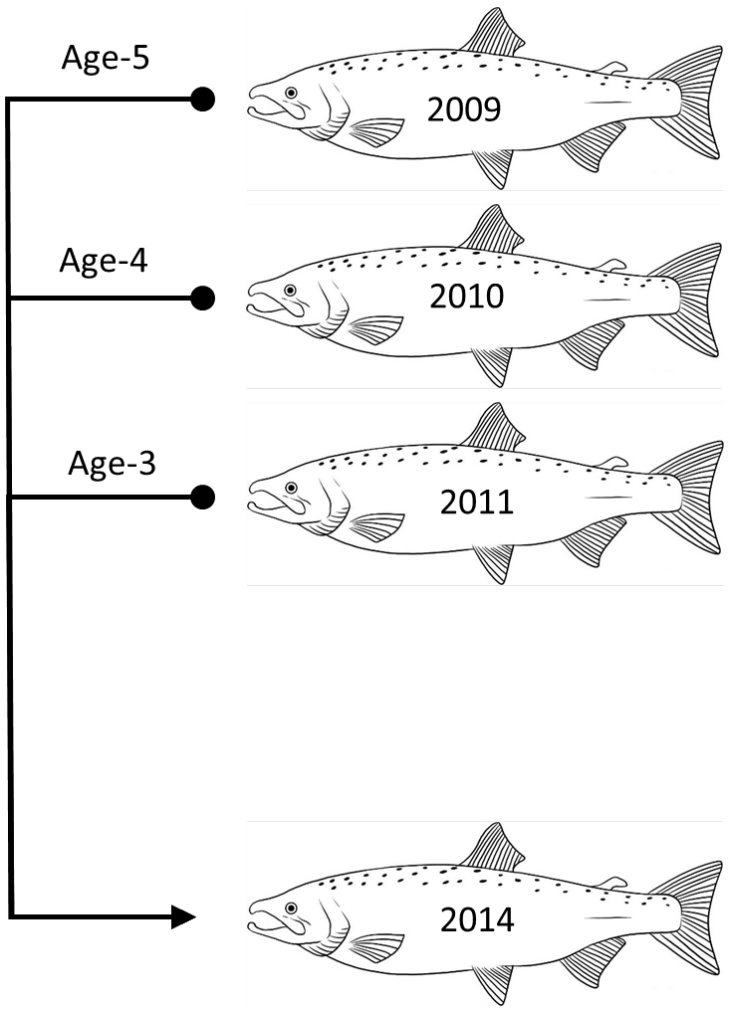
1. Extend an existing genetic pedigree (2007-2013) by assigning below and above dam 2014 adult recruits to putative parents (2009-2011)

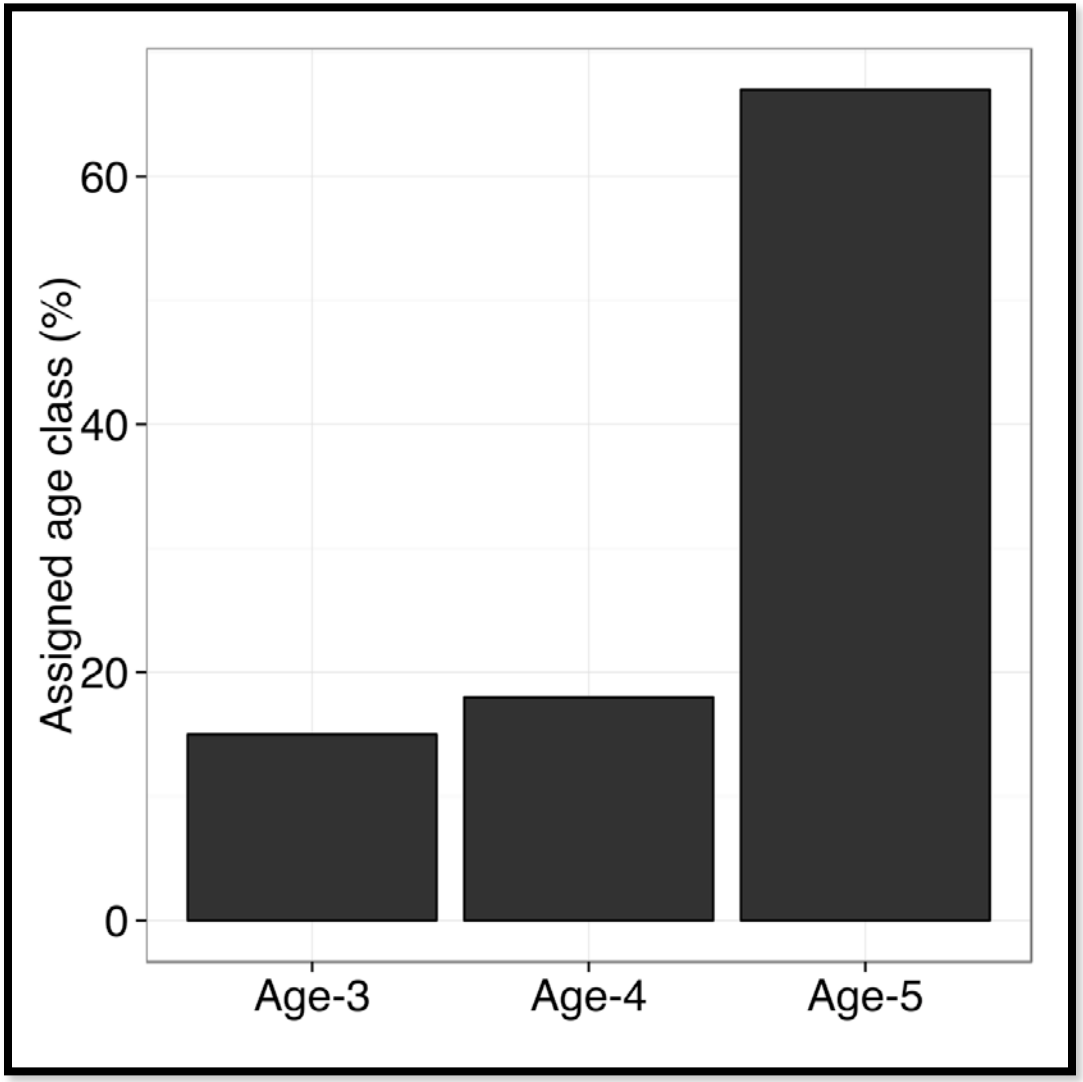


Objective 1 Results: 2014 Parentage Assignment Rates

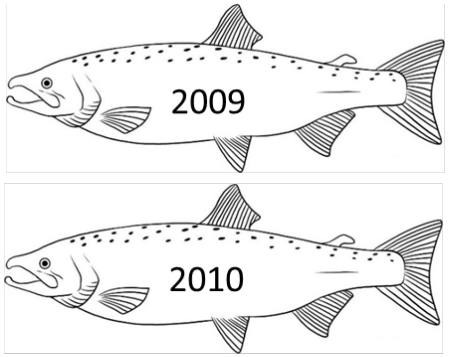
YEAR	ABOVE FOSTER DAM	BELOW FOSTER DAM
2014	**44%** (171/390)	**7%** (6/87)

Objective 1 Results: 2014 Age Structure





Objective 2

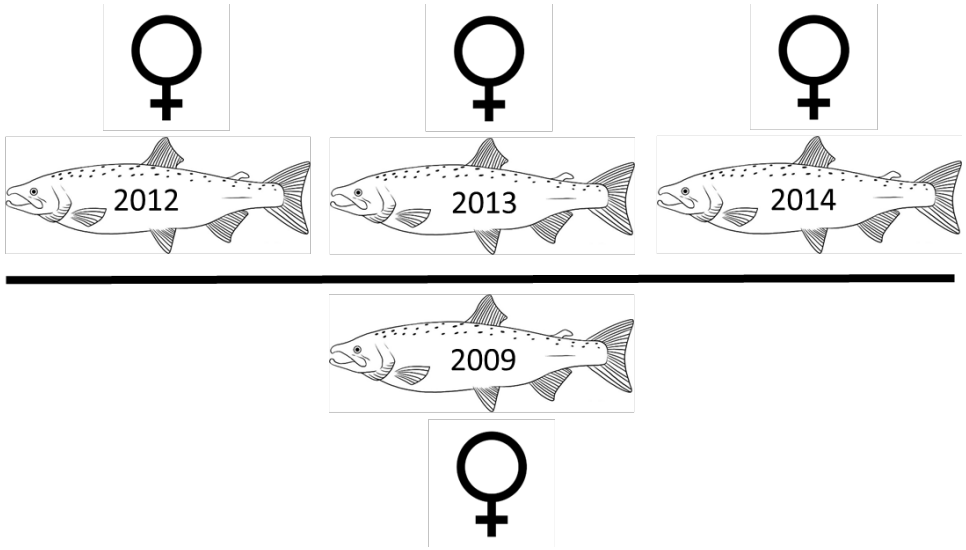


2. Estimate population productivity of reintroduced salmon during 2009 and 2010

- **CRR:** Cohort Replacement Rate ♀
- **TLF:** Total Lifetime Fitness

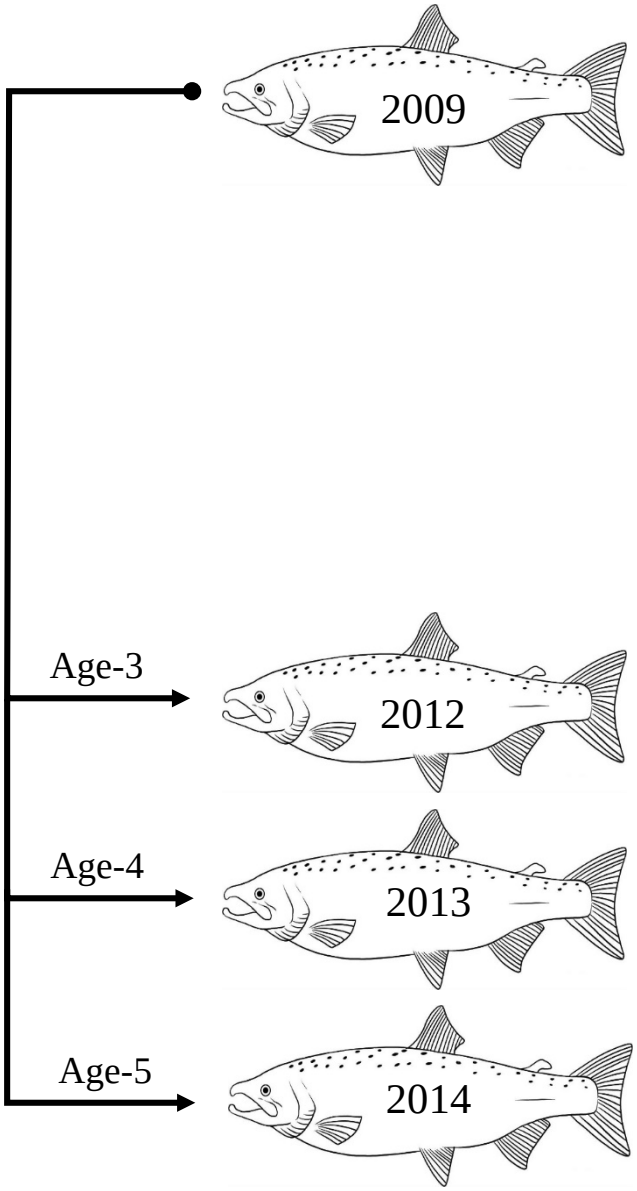
    - 2010: Fitness Estimates

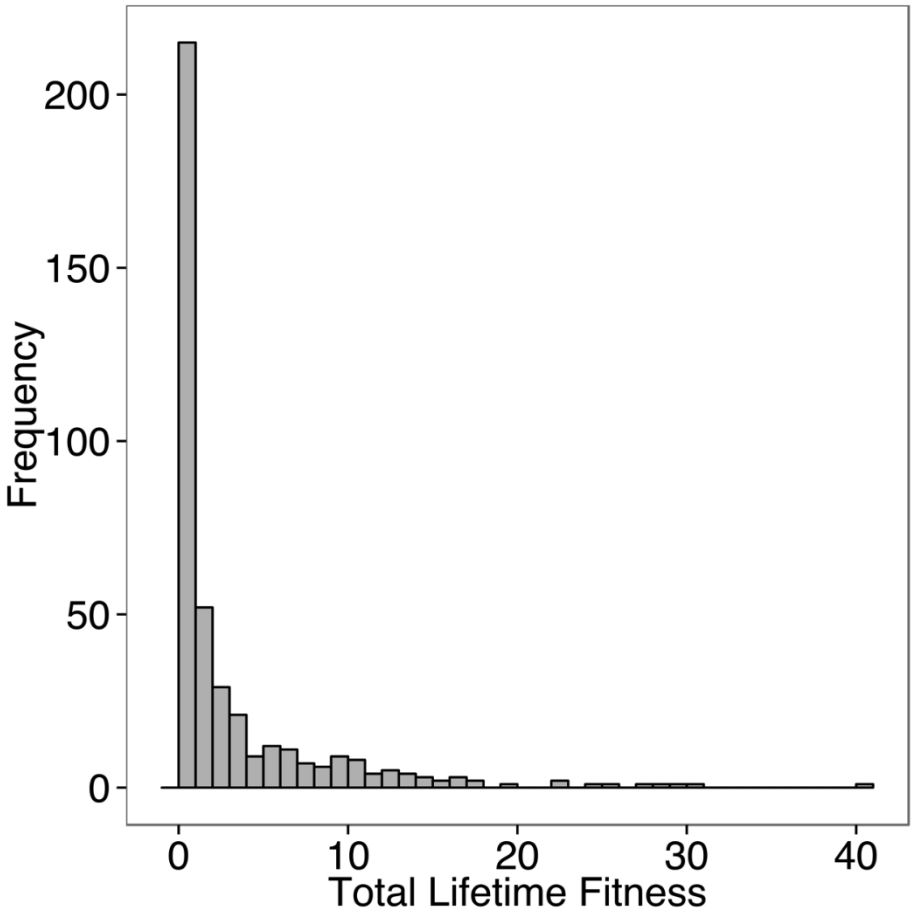
2009 Results:
Cohort Replacement Rate



$$\frac{\text{♀}_{2012} + \text{♀}_{2013} + \text{♀}_{2014}}{\text{♀}_{2009}} = \frac{4+166+77}{158} = \textit{1.56}$$

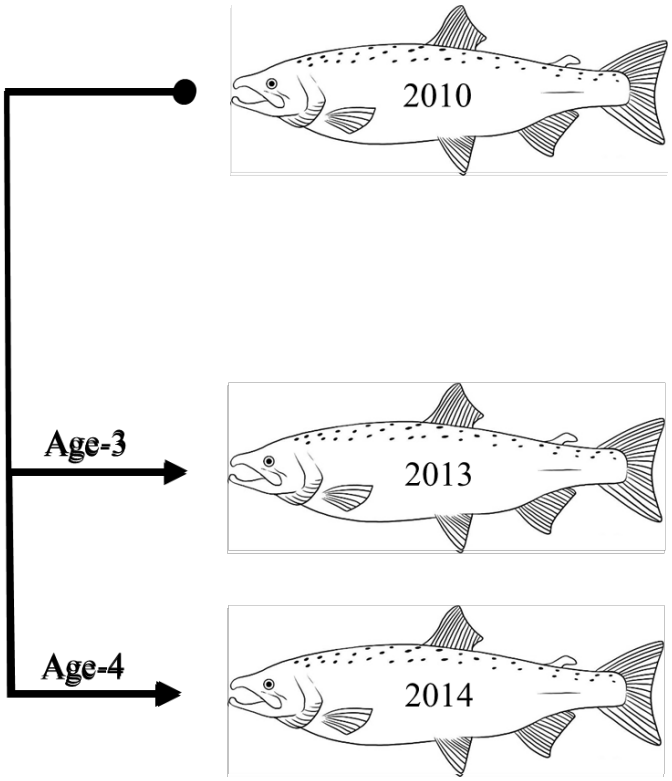
2009 Results: TLF of Reintroduced Salmon

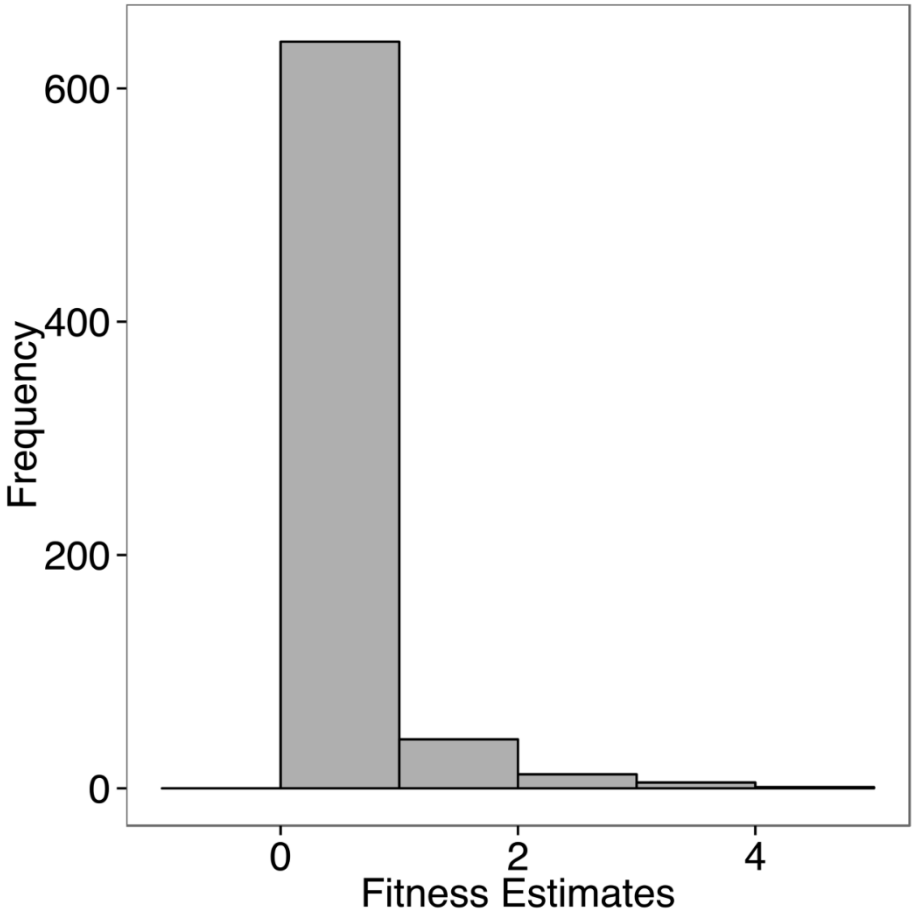




- 48% (198/412) of salmon produced offspring
- TLF = 2.84±5.35 SD

2010 Results: Fitness of Reintroduced Salmon

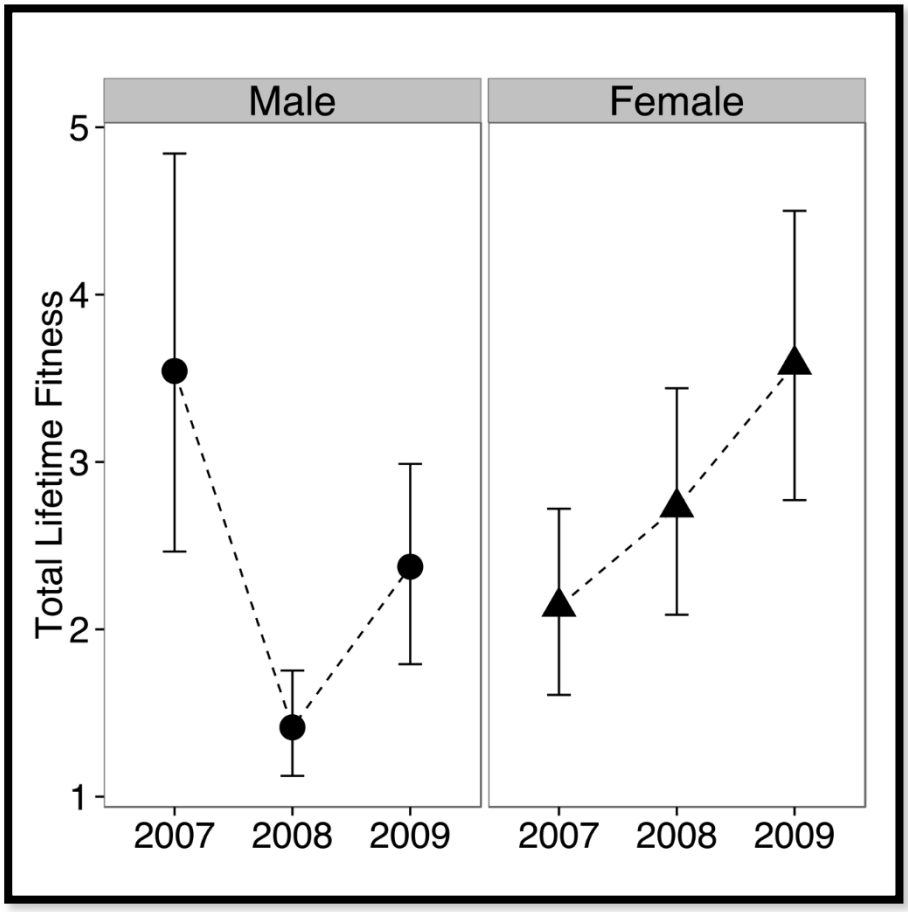


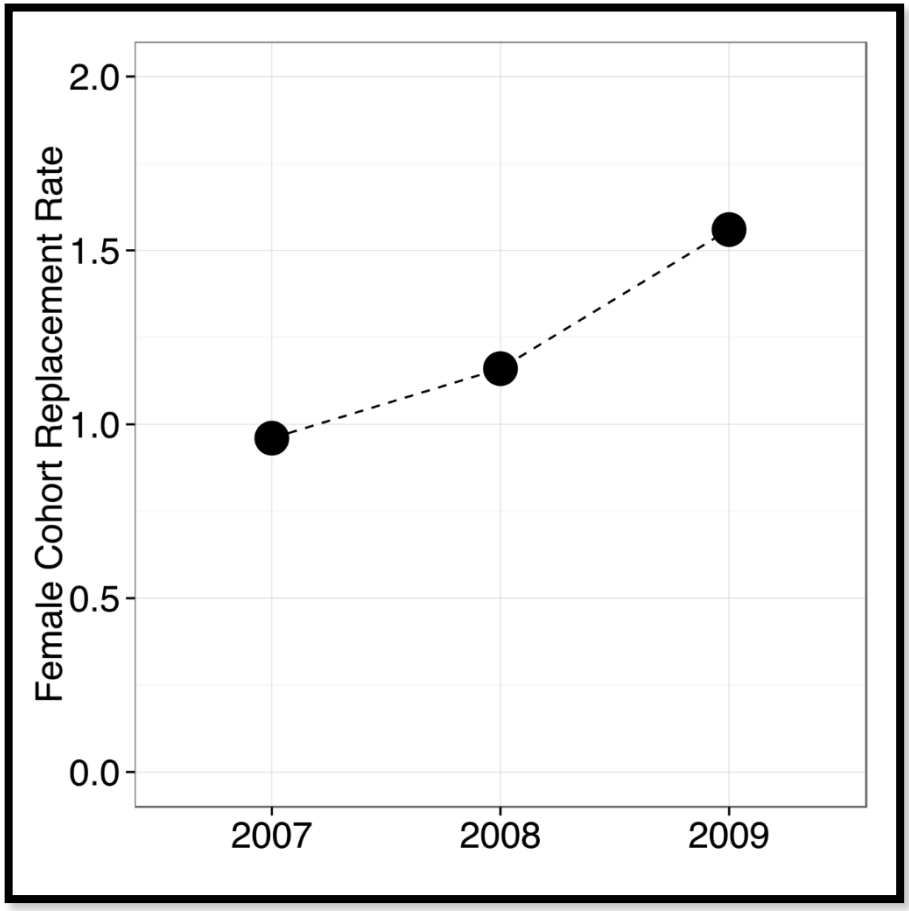


- 46% (190/412) of 2009 salmon produced offspring
- Fitness est. = 2.39±4.48 SD

- 8% (58/700) of salmon produced offspring
- Fitness est. = 0.113±0.42 SD

Summary: Population Productivity 2007-2009





Ongoing Research

Parentage assignment for 2015 adult returns

- Will provide two consecutive years of CRR/TLF for NOR fish
- Insight into population productivity of salmon reintroduced in 2011
  - 1210 salmon reintroduced above Foster Dam
  - Useful contrast with 2010 metrics
- Continued extension of South Santiam genetic pedigree
  - Provide higher resolution into the efficacy of the reintroduction program

Acknowledgements

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- Evans et al. (In Press) *Canadian Journal of Fisheries and Aquatic Sciences*
- Evans et al. (2015) *Conservation Genetics*