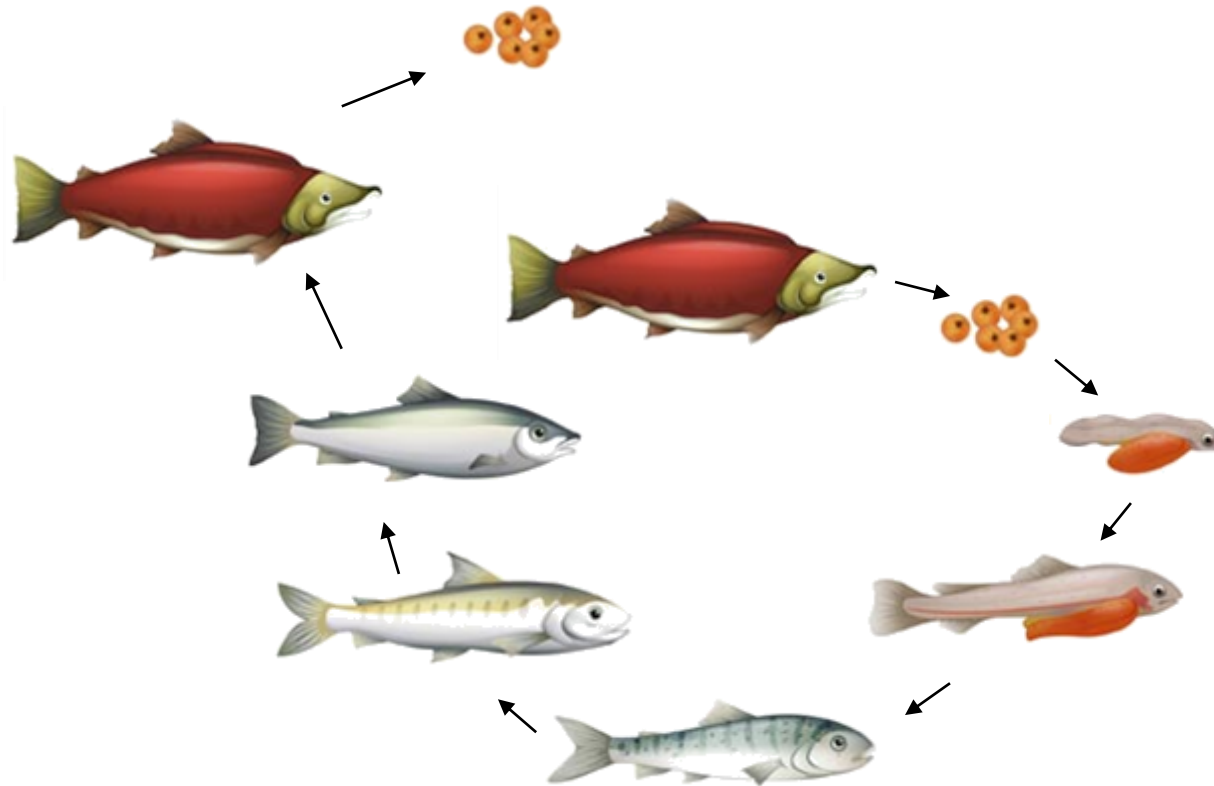


# Cle Elum Sockeye Monitoring: behavior, fates, and productivity



# Summary: what we've seen

*Transactions of the American Fisheries Society* 148:271–288, 2019

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ISSN: 0002-8487 print / 1548-8659 online

DOI: 10.1002/tafs.10133

## ARTICLE

### **Early Observations from Monitoring a Reintroduction Program: Return of Sockeye Salmon to a Nursery Lake of Historical Importance**

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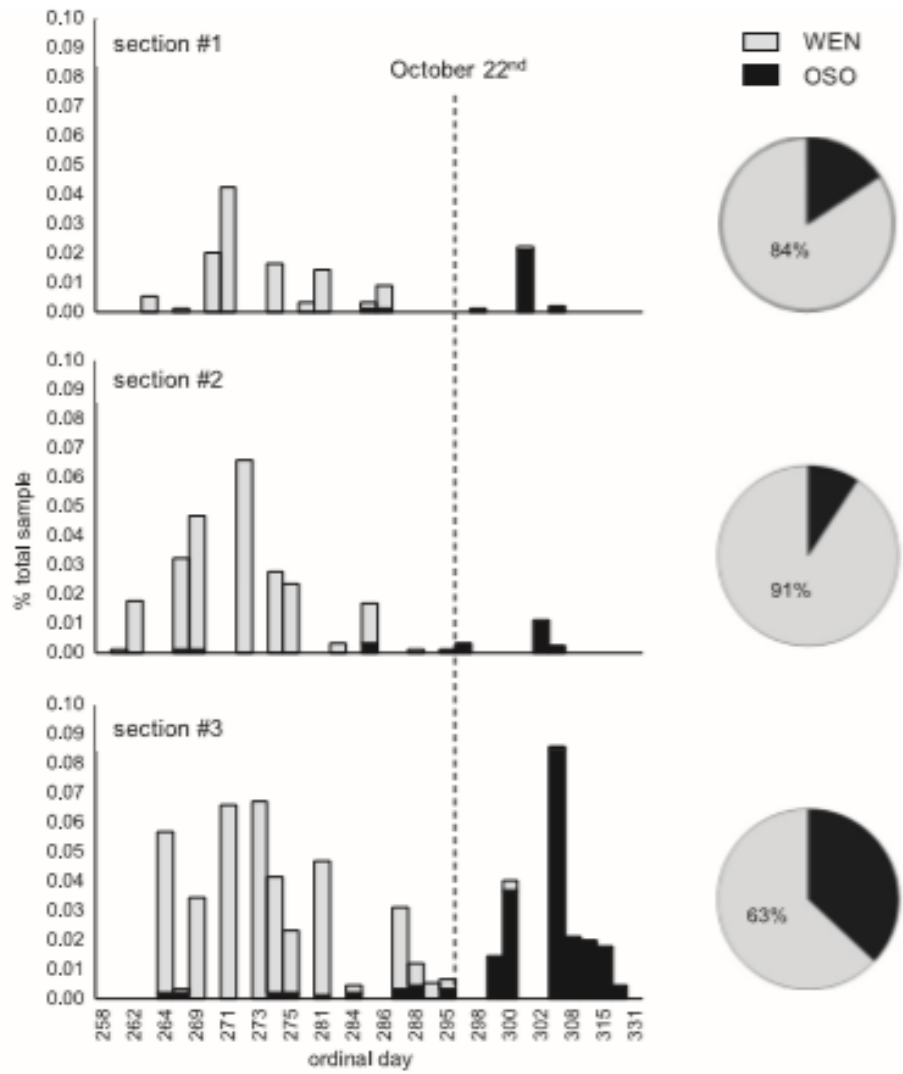
*Columbia River Inter-Tribal Fish Commission, 700 Northeast Multnomah Street, Suite 1200, Portland, Oregon 97232, USA*

**David E. Fast**

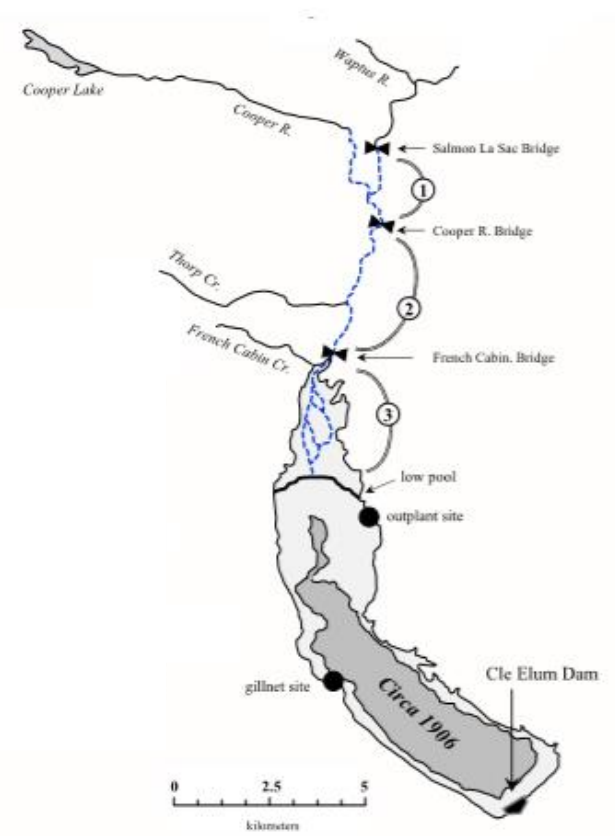
*Yakama Nation Fisheries, Post Office Box 151, Toppenish, Washington 98948, USA*

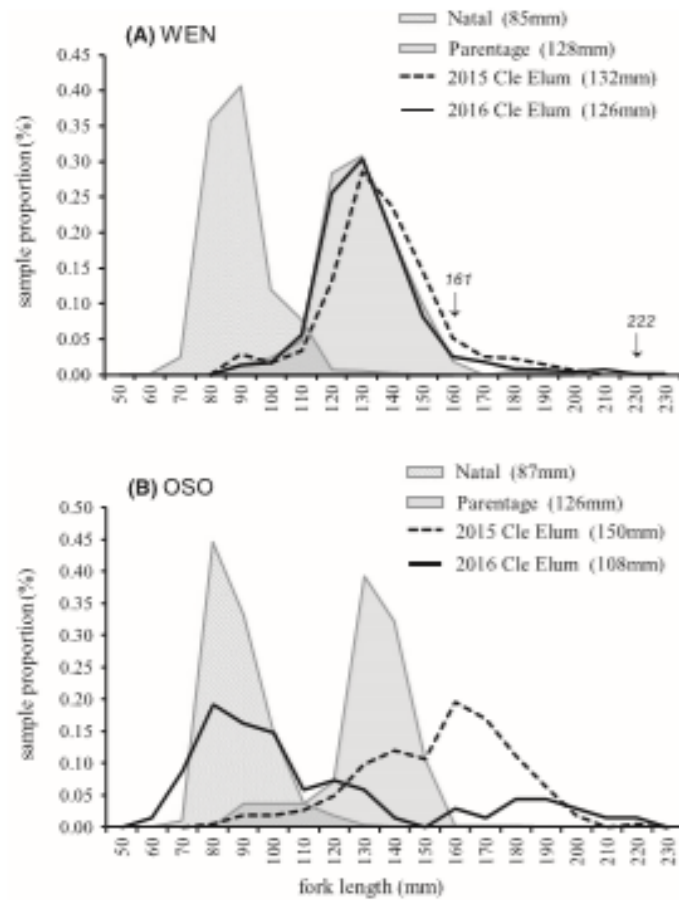
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*Columbia River Inter-Tribal Fish Commission, 700 Northeast Multnomah Street, Suite 1200, Portland, Oregon 97232, USA*



**STOCK DISTINCTION AND ACCLIMATION OF SOCKEYE SALMON**





# Info update: 2017 & 2018

What's the same?

What's new?

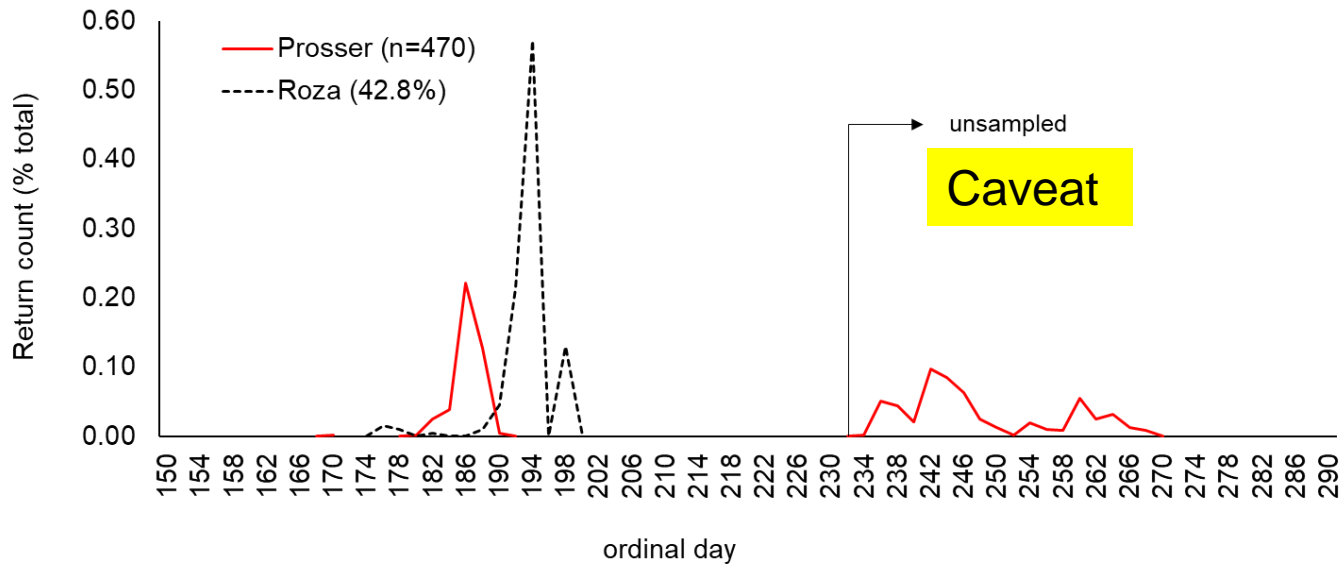
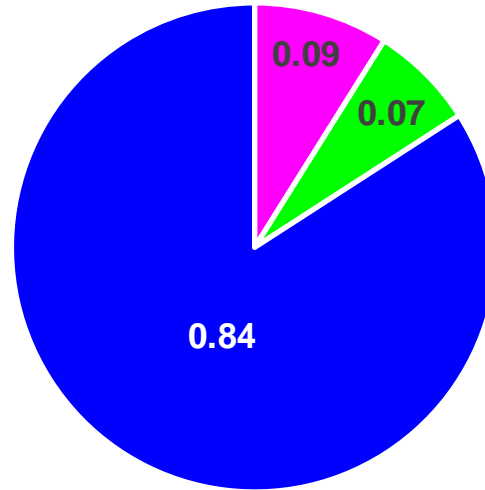
What are limiting factors  
For recruitment and escapement?

Adult returns:  
return time and escapement

# This is new!

2018 adult returns (Roza)

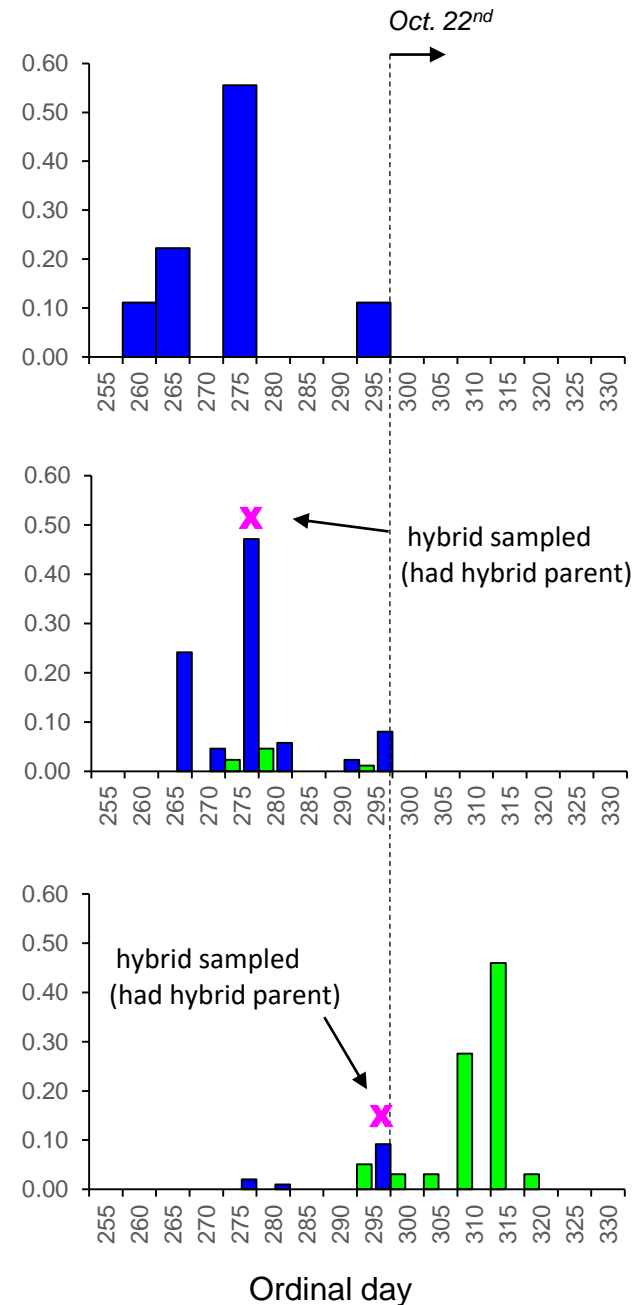
More hybrids than OSO



This was the 1<sup>st</sup> year we were able to do parentage analysis

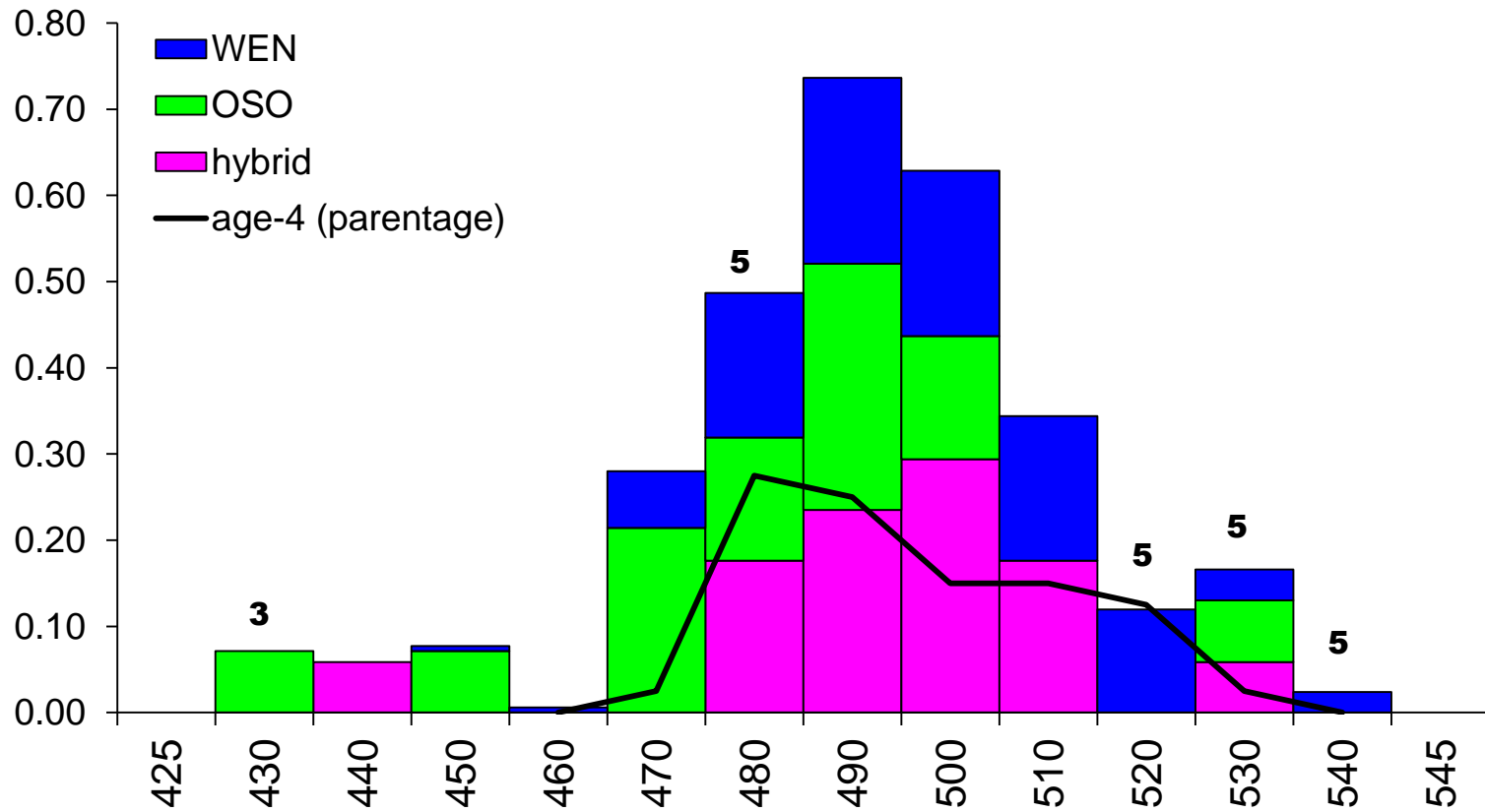
Genetic stock ID revealed that  
Two sampled carcasses were hybrids

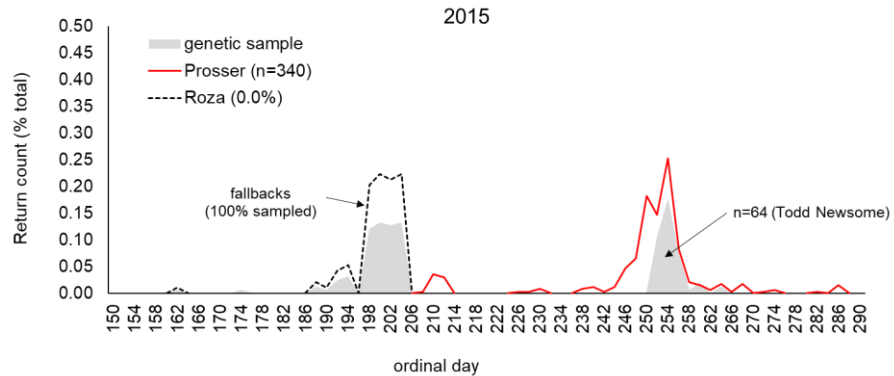
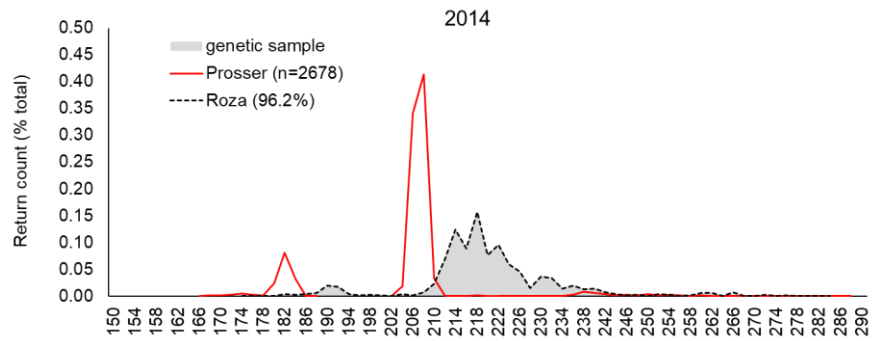
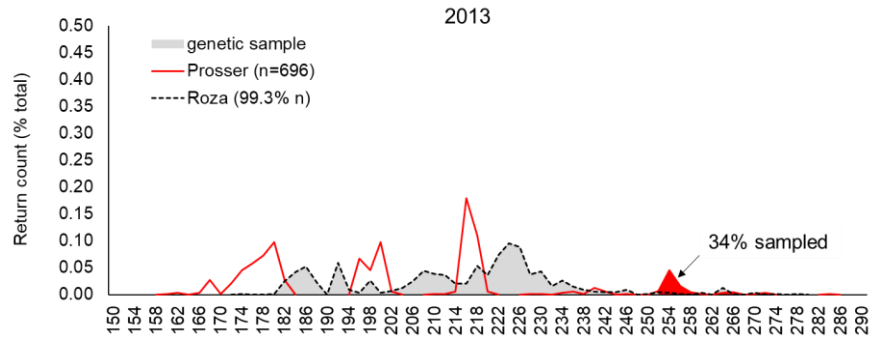
Parentage analysis revealed that each  
Had a hybrid parent (spawner sampled  
In 2014)

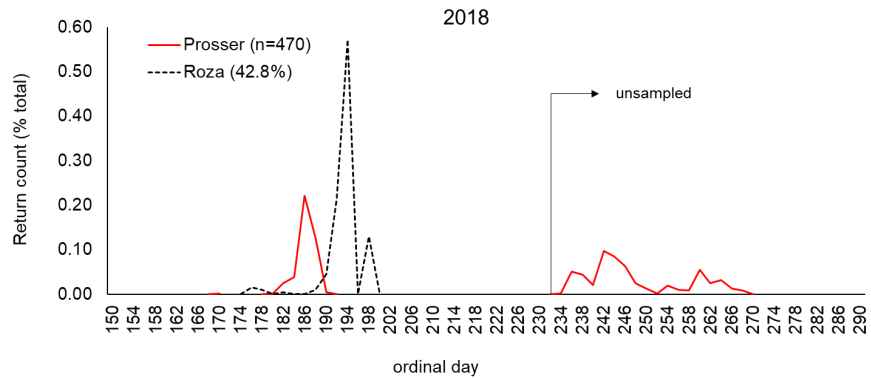
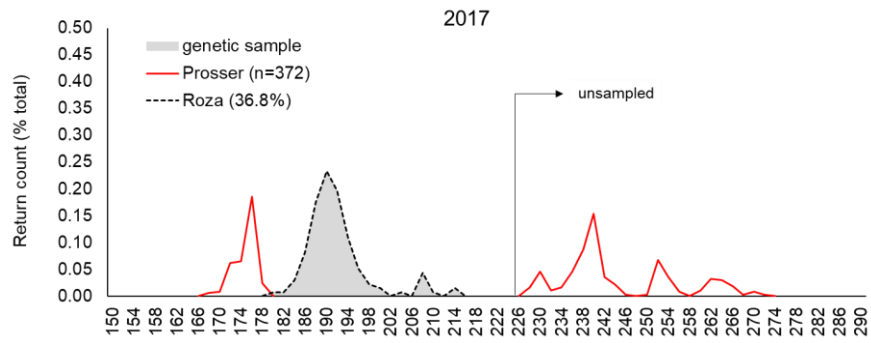
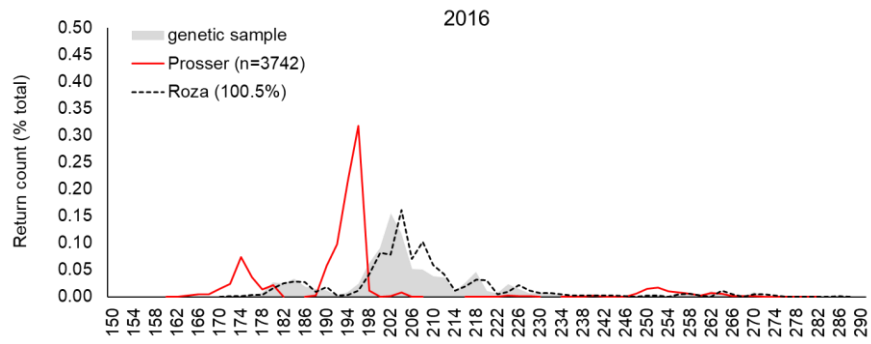




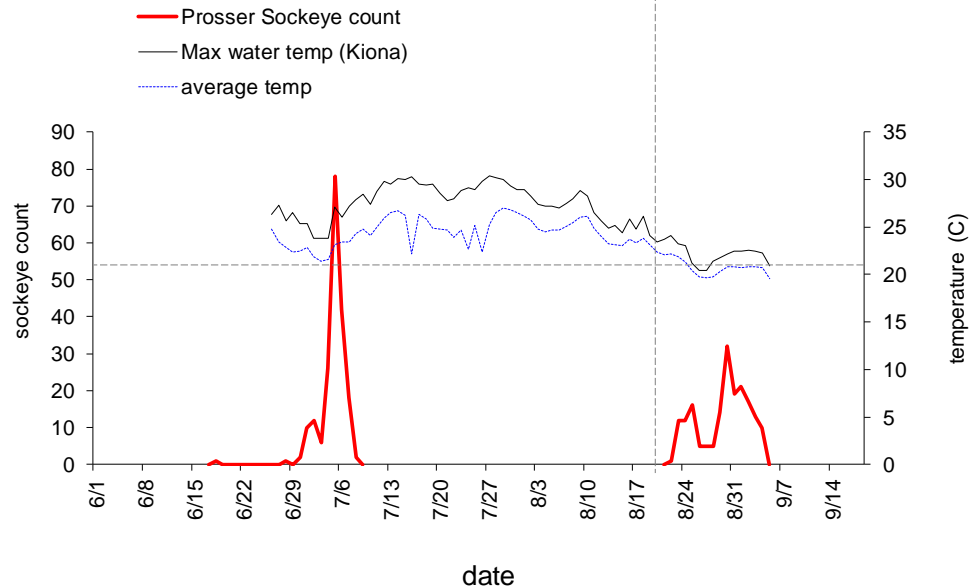
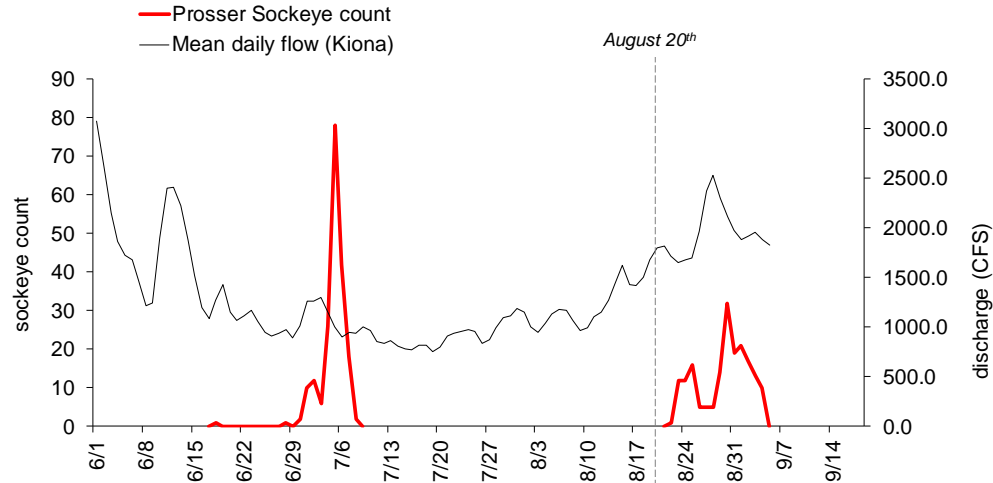
# Adult returns: typical age structure



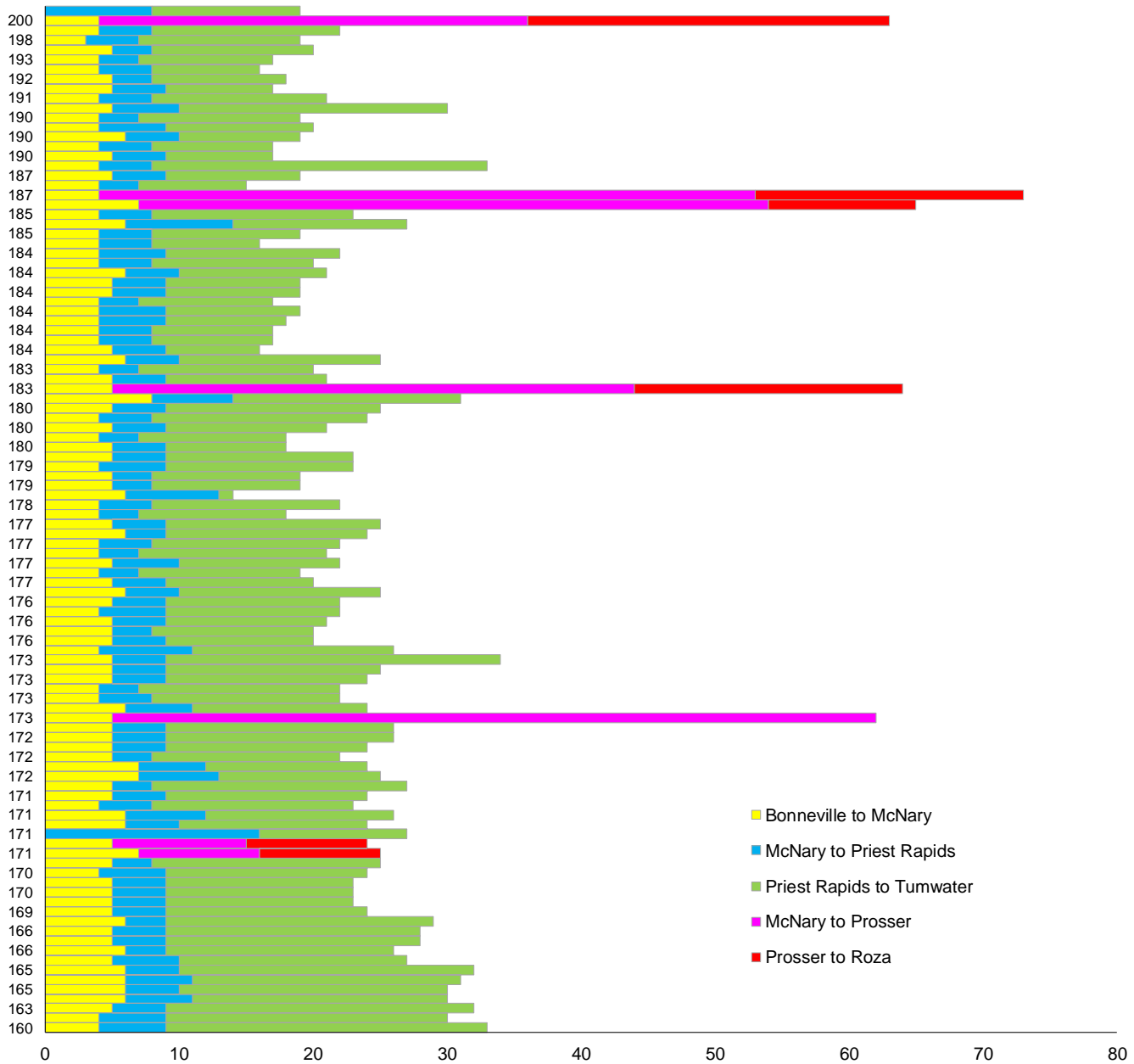




# Influence on migration timing

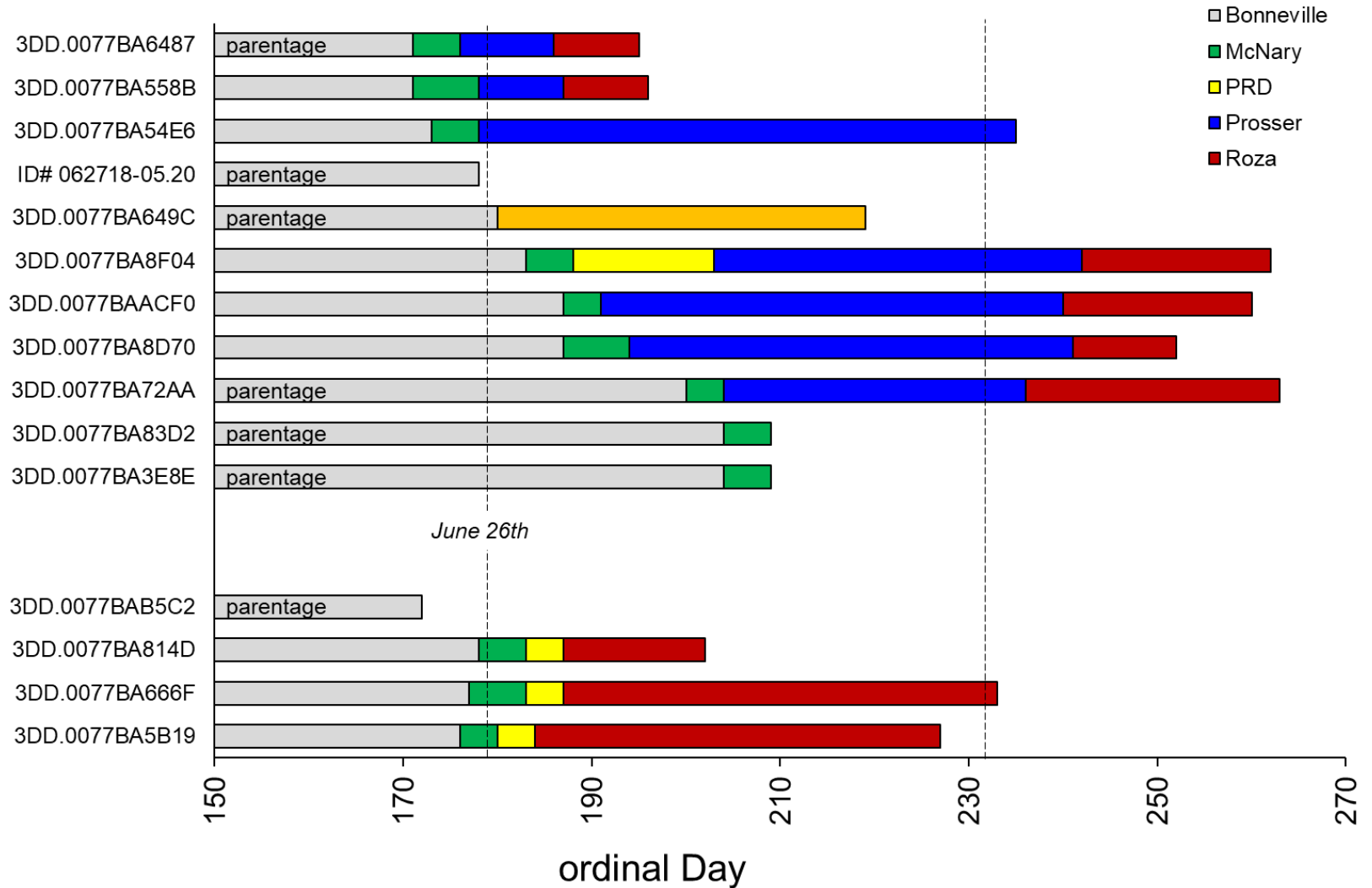


Tag Day - Bonneville



number of migration days between detections

# Fish PIT-tagged at Bonneville

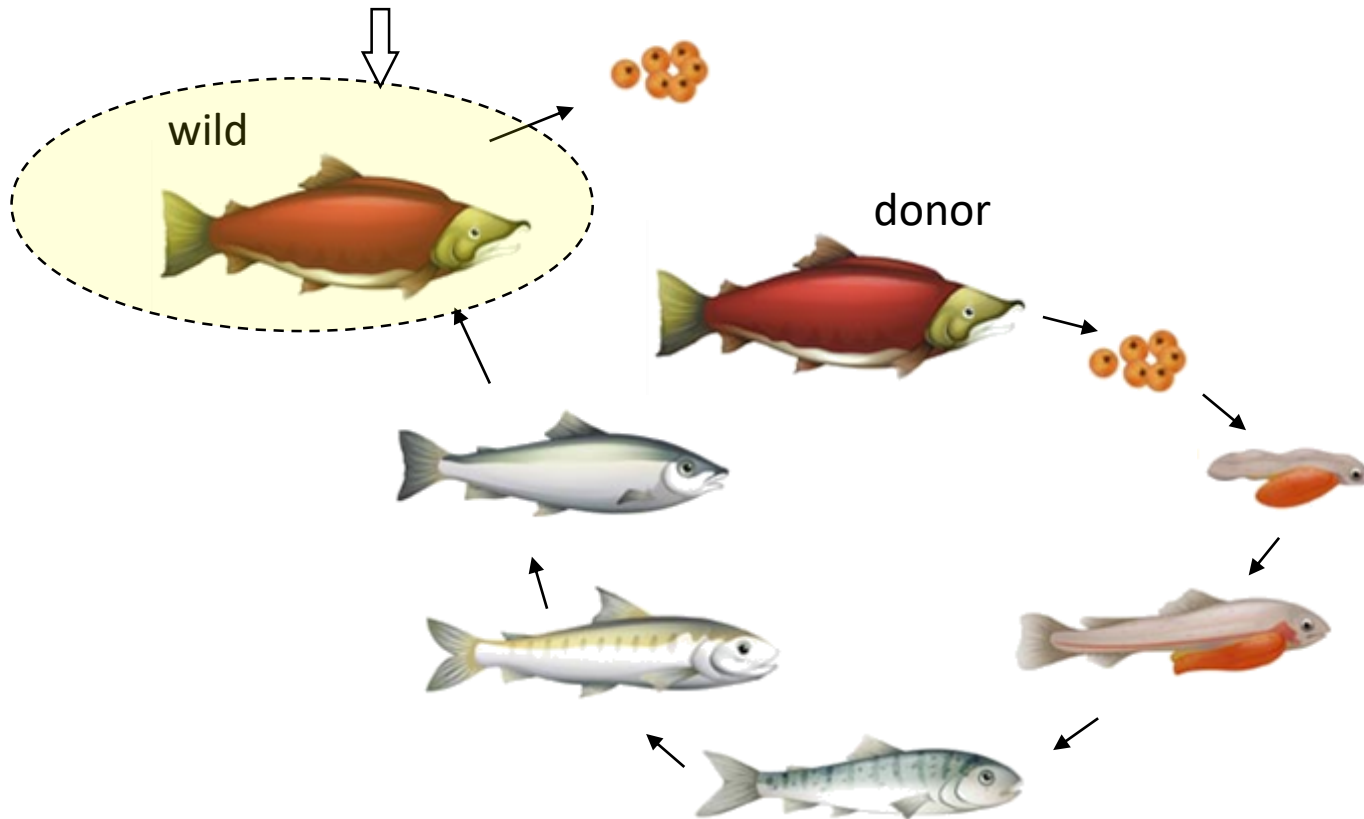


# Suggests we should ask.....

“what is the actual escapement?”

“what is the actual productivity potential of Cle Elum lake?”

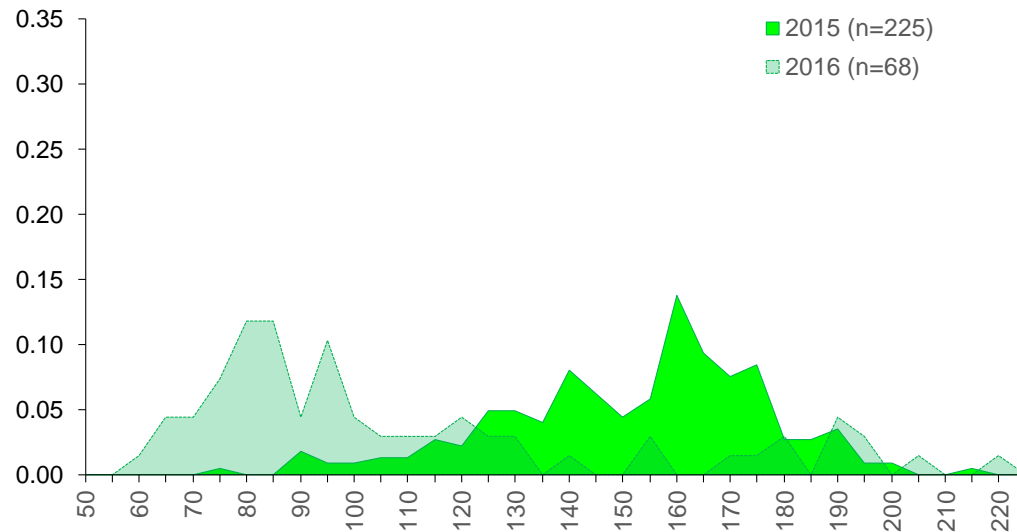
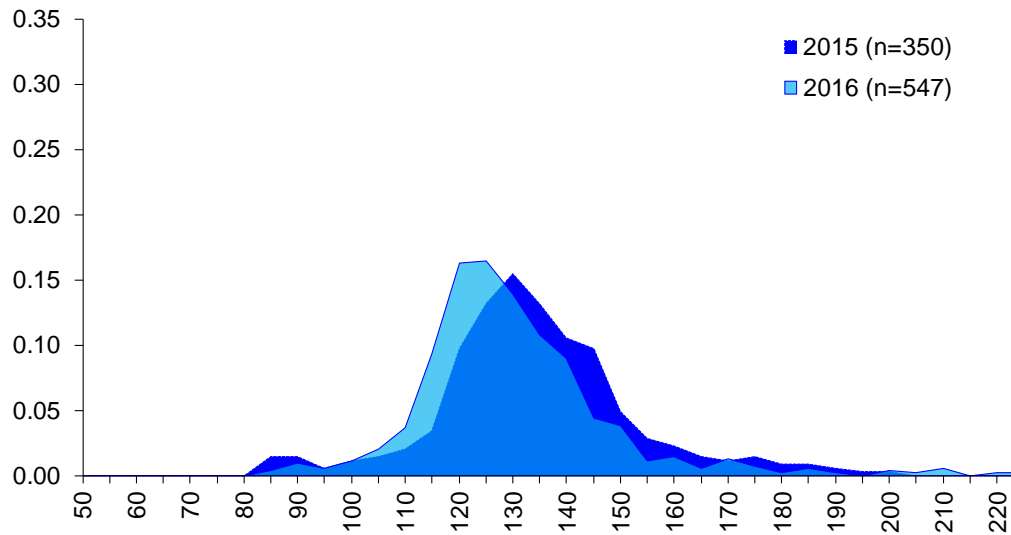
differential limiting life stage

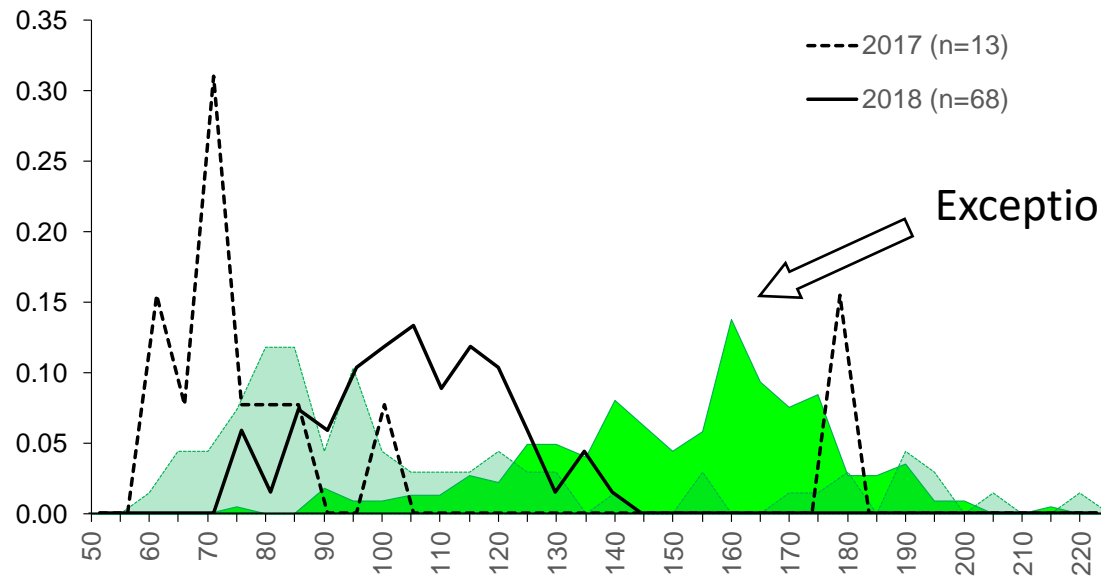
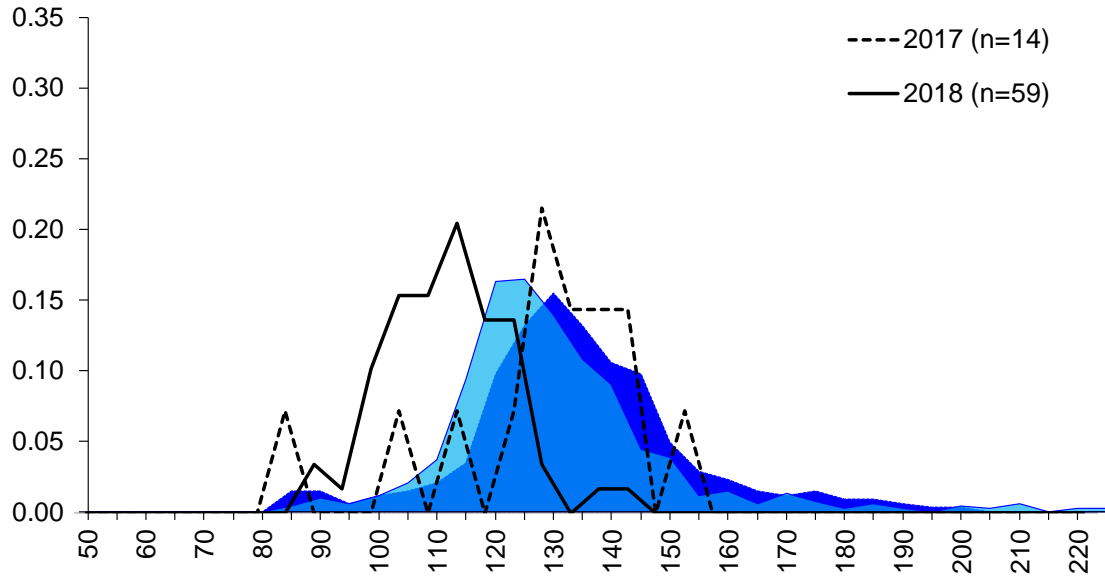


**Smolt production:  
Size, age, emigration**



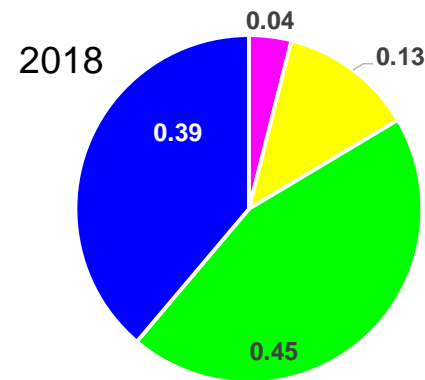
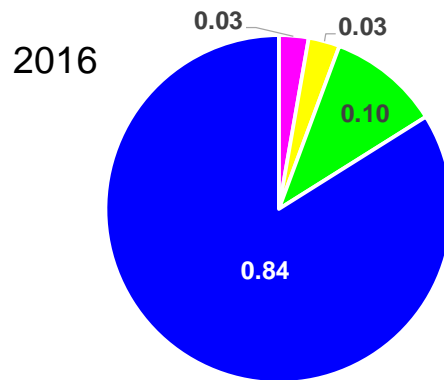
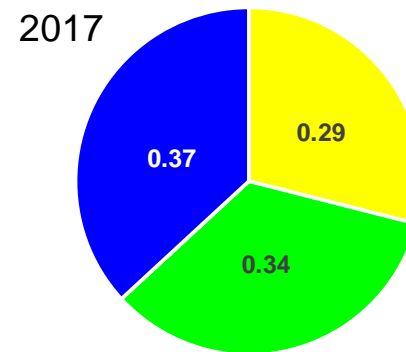
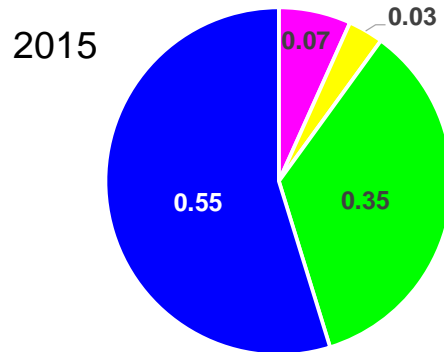
# Smolt size distribution: from pub





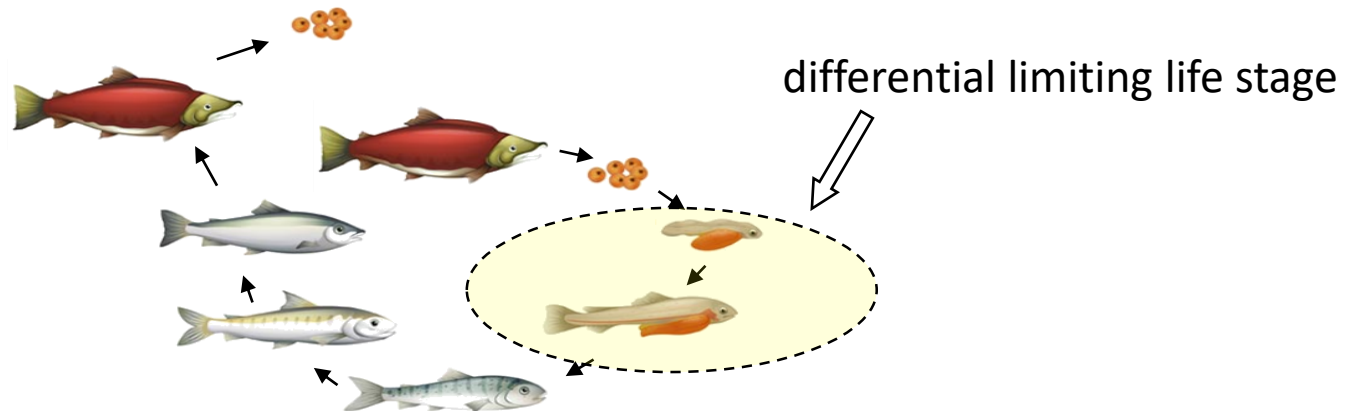
# Smolt Stock proportions

- Note that both stocks have been successfully reproducing
- Much variation in sampled proportions....a swing toward OSO recently



# Smolt summary

- no age difference between OSO and WEN, emigration at age-1
- early OSO growth variable, often slow or stunted
- early growth for WEN appears stable and robust (larger smolts).
- What was different about 2014 rearing conditions (larger 2015 emigrants)?







Seriously!...sockeye are spawning here





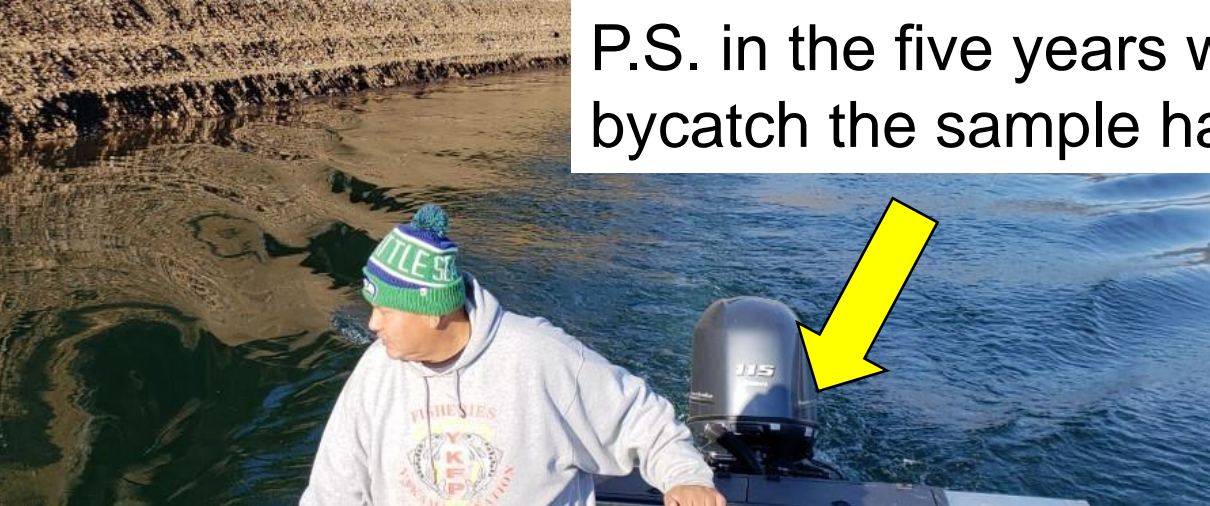
I mean look at that slope







P.S. in the five years we've monitored gillnet bycatch the sample has been 100% OSO



P.S. Sockeye in the Osoyoos lake population  
DO NOT shore spawn



**kokanee**

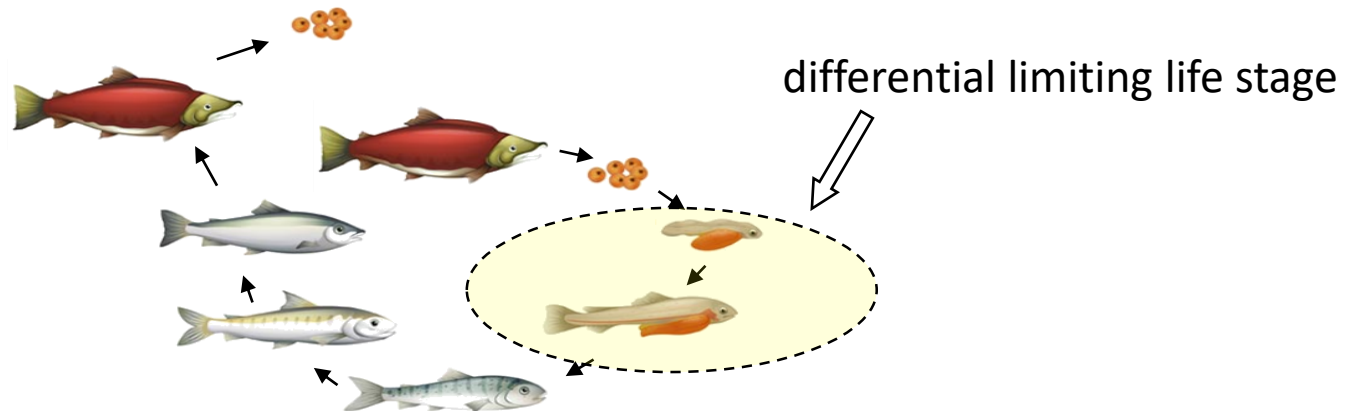


**OSO – i.e. residualized fish**



# Smolt summary

- no age difference between OSO and WEN, emigration at age-1
- early OSO growth variable, often slow or stunted
- early growth for WEN appears stable and robust (larger smolts).
- What was different about 2014 rearing conditions (larger 2015 emigrants)?



I think its related to lake conditions during early life following direct emergence of OSO juveniles into the lake