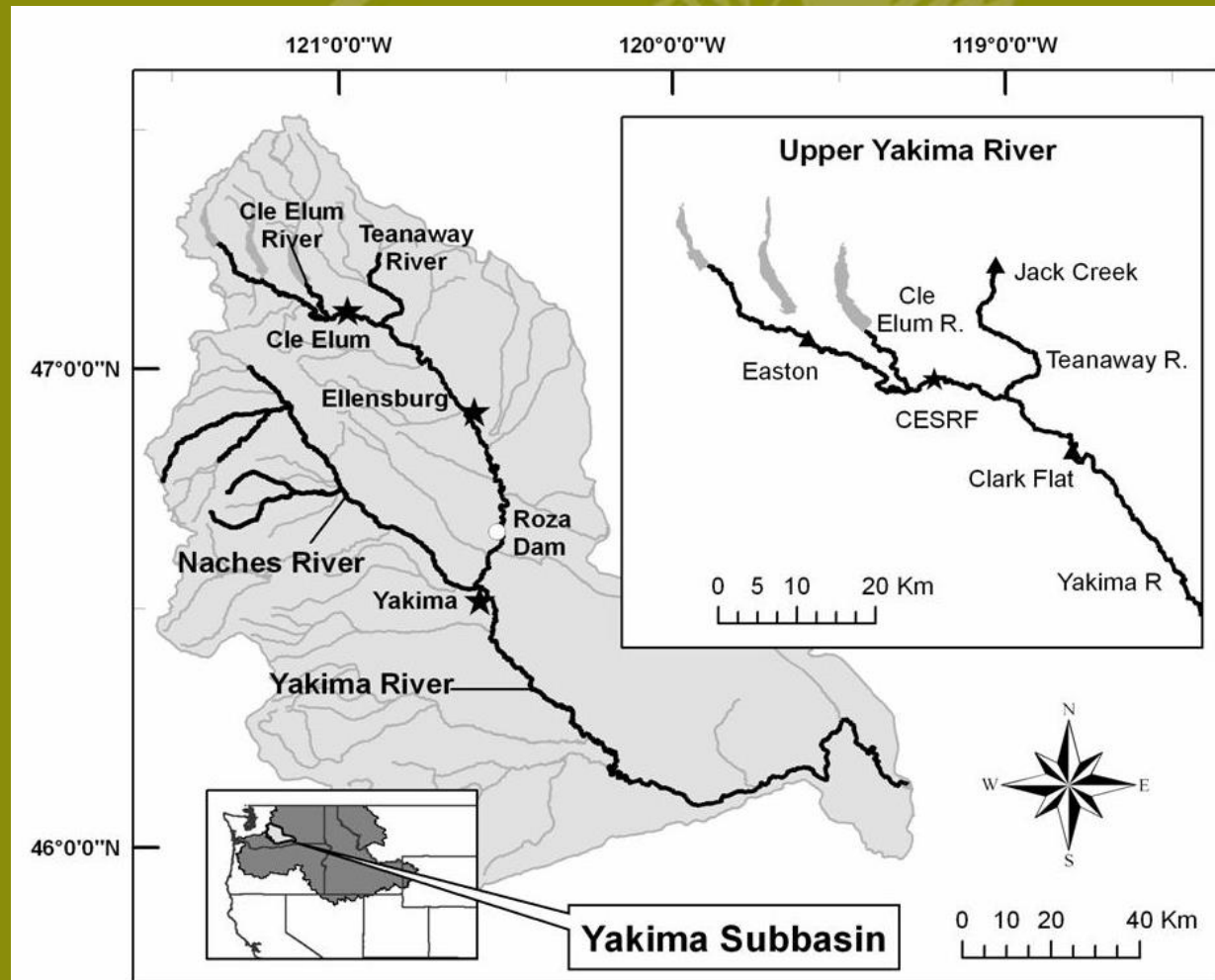


# Relationships Between Acclimation Site Exit Timing, Downstream Detects, and Age-at Return: Some Observations

Presented by:  
Bill Bosch, YN/YKFP

June 12, 2019



# Flow and Water Temps near Prosser



# Key Questions



1. Do earlier migrating fish have better juvenile survival to downstream dams than later migrating fish?
2. Do earlier migrating fish have better survival to adult return than later migrating fish?
3. Are age-at-return data different by exit month (e.g., do earlier migrating fish produce more age-3 returns)?
4. To what extent do flows drive migration timing?

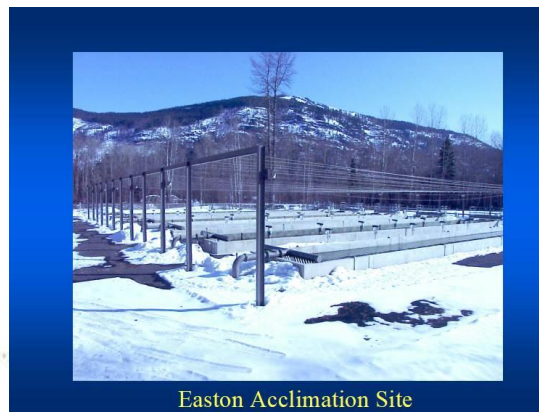


# Methods – PIT Detections

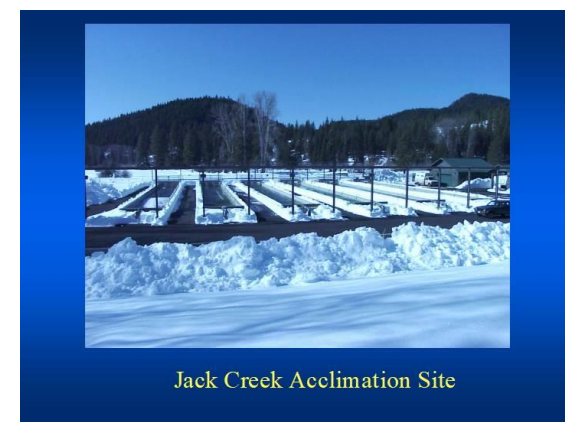


| Brood Year | CFJ   | ESJ   | JCJ   | Total |
|------------|-------|-------|-------|-------|
| 2003       | 12904 | 12974 | 13038 | 38916 |
| 2004       | 12962 | 12777 | 10687 | 36426 |
| 2005       | 13065 | 12935 | 13118 | 39118 |
| 2006       | 15177 | 11654 | 11764 | 38595 |
| 2007       | 15271 | 11683 | 11664 | 38618 |
| 2008       | 15644 | 11688 | 11681 | 39013 |
| 2009       | 15669 | 11641 | 8929  | 36239 |
| 2010       | 15424 | 11583 | 11730 | 38737 |
| 2011       | 15023 | 11486 | 11656 | 38165 |
| 2012       | 15167 | 11510 | 11666 | 38343 |
| 2013       | 15112 | 11512 | 11654 | 38278 |
| 2014       | 15256 | 11342 | 11521 | 38119 |

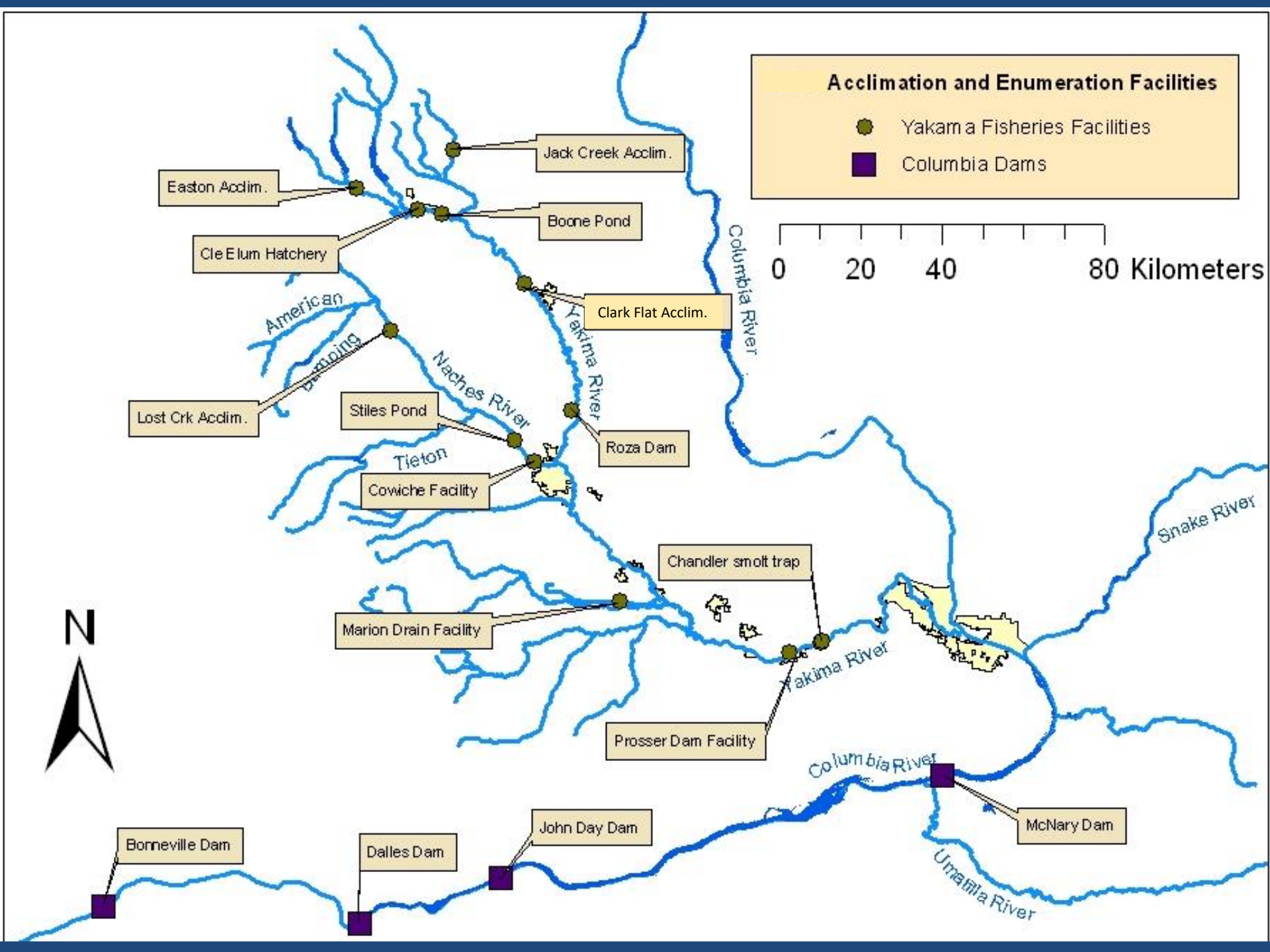
458567



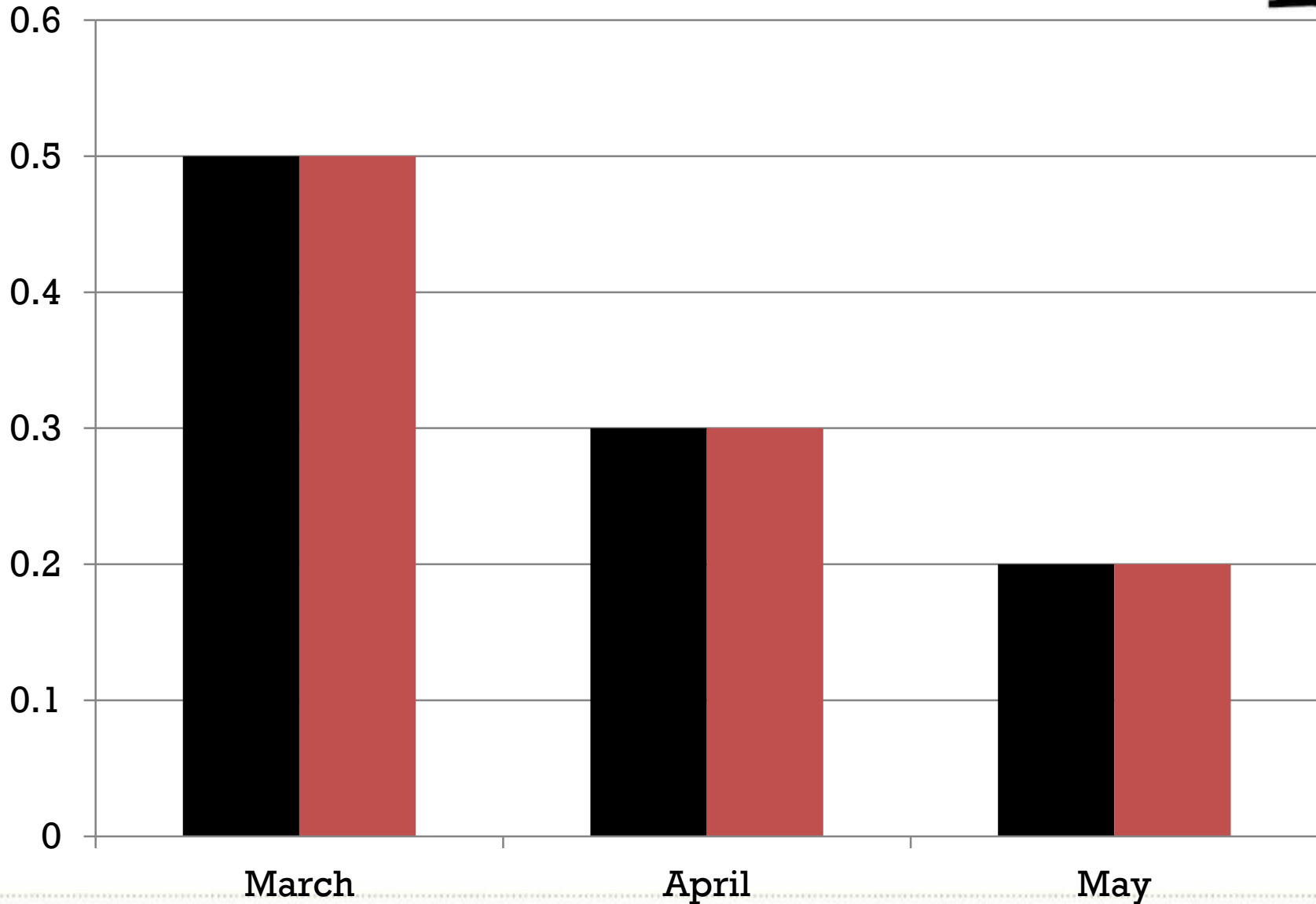
Easton Acclimation Site



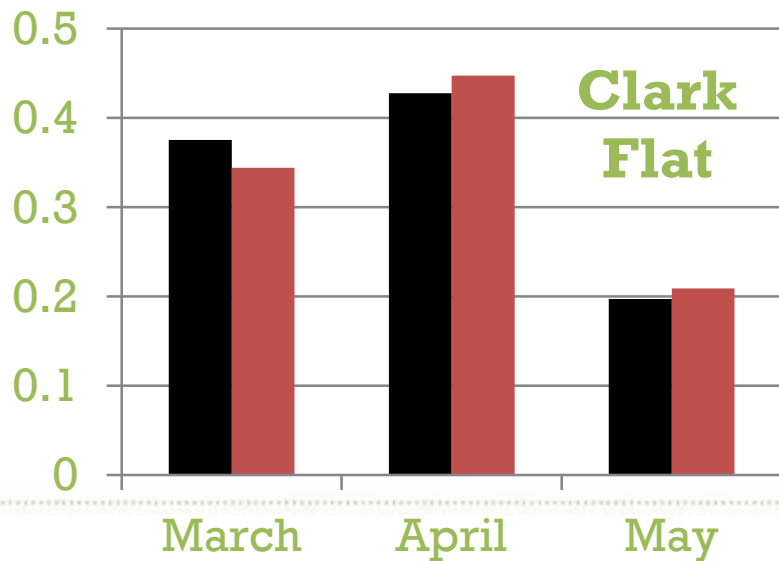
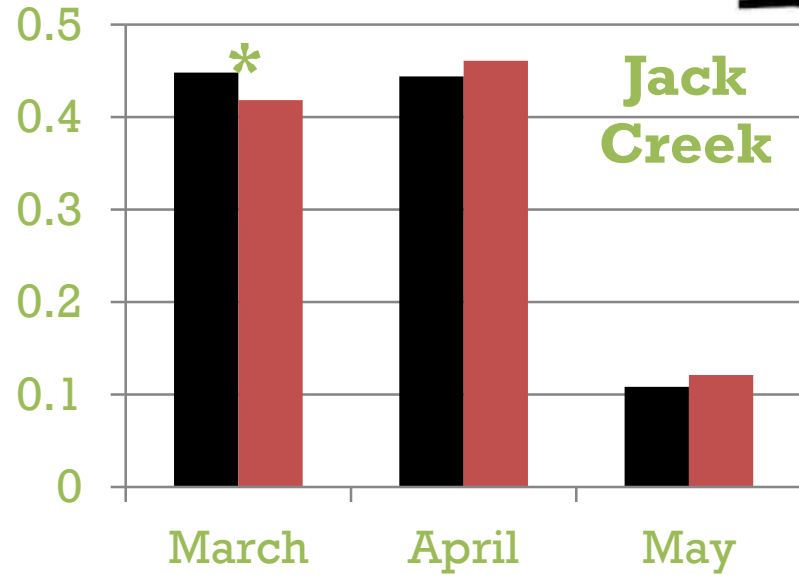
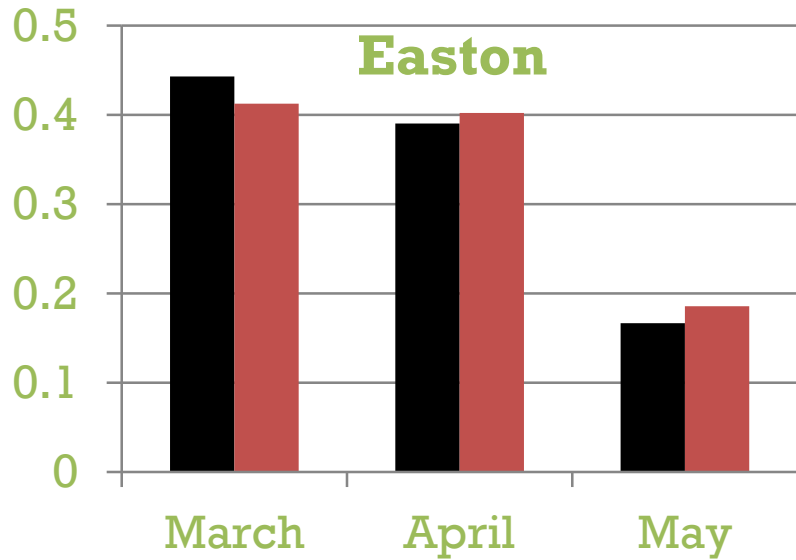
Jack Creek Acclimation Site



# $H_0$ : Exit vs Detect Proportions =



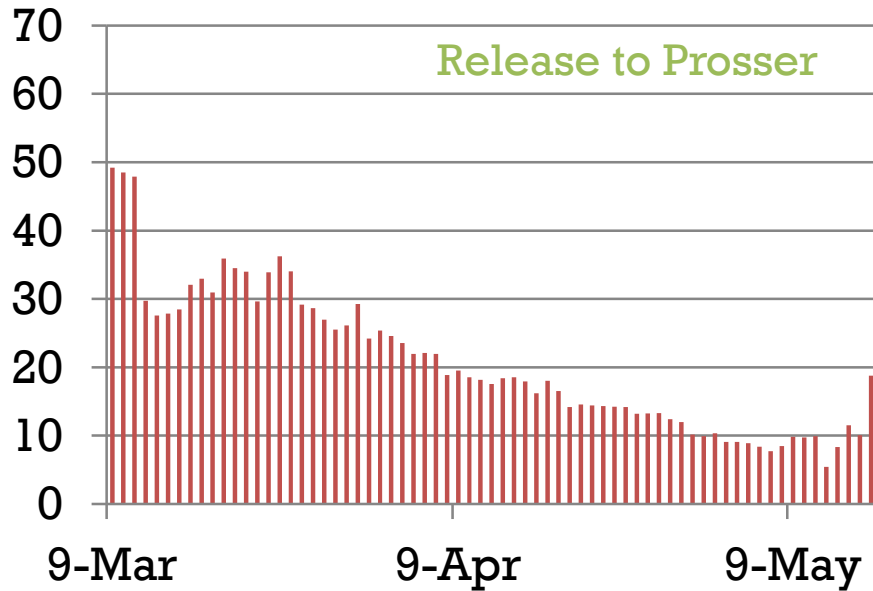
# Exit vs **BonJv** Proportions



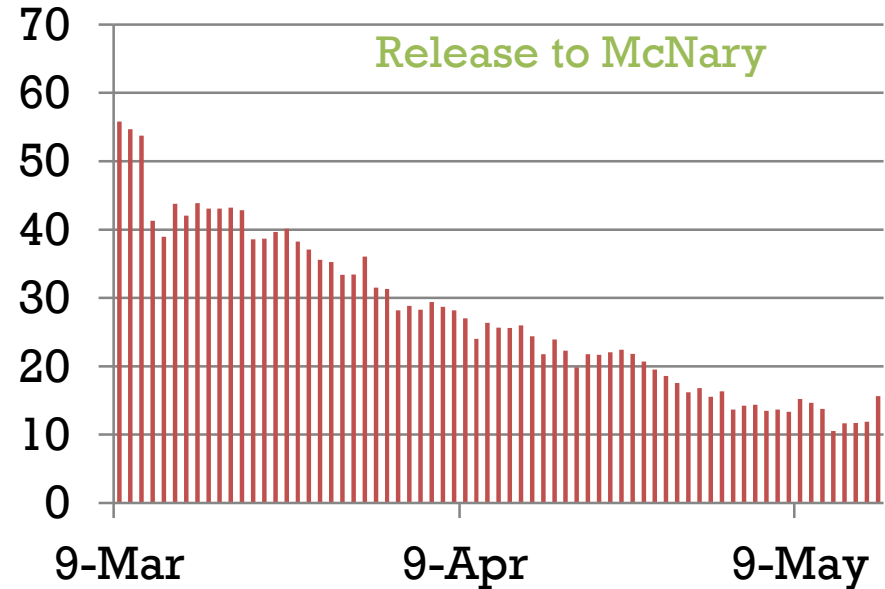
# Juvenile Travel Times (days)



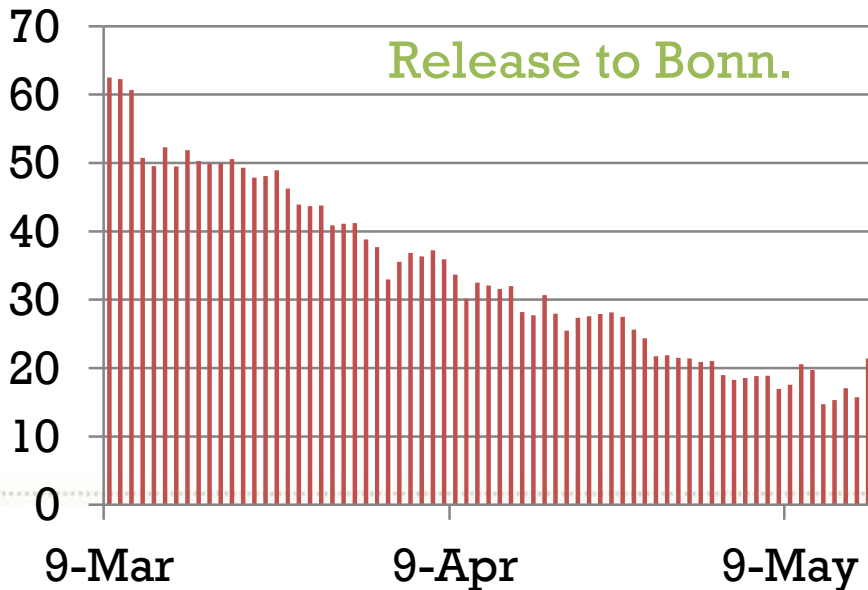
Release to Prosser



Release to McNary



Release to Bonn.

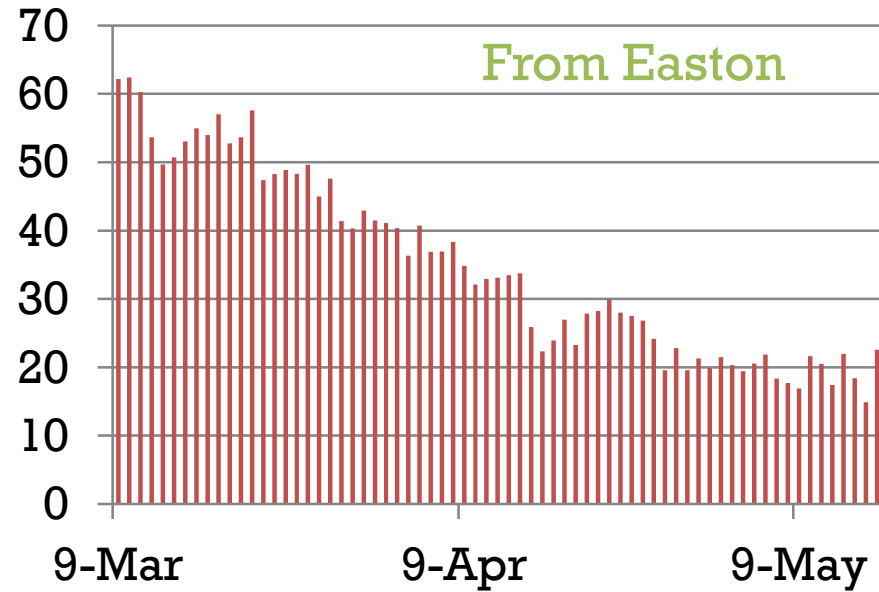




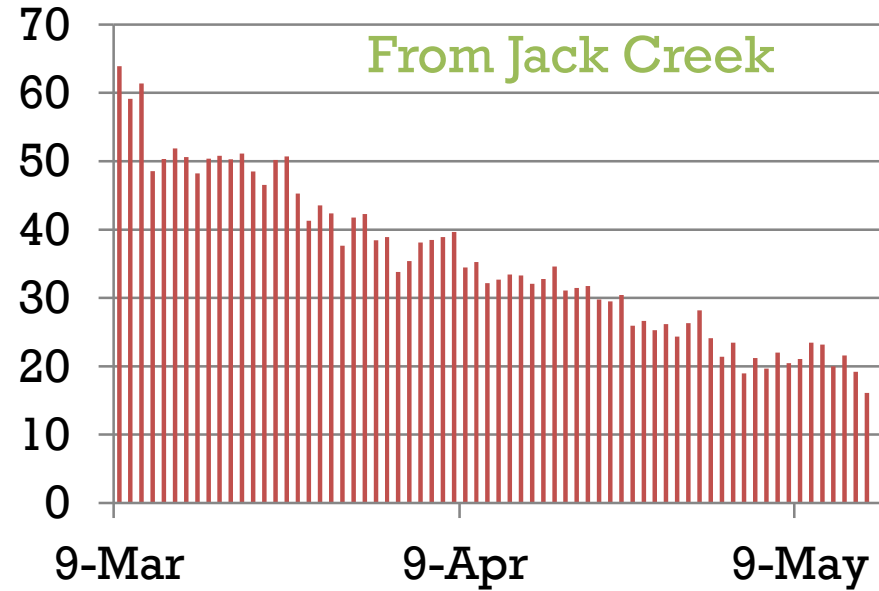
# Juvenile Travel Times (to Bonn.-days)



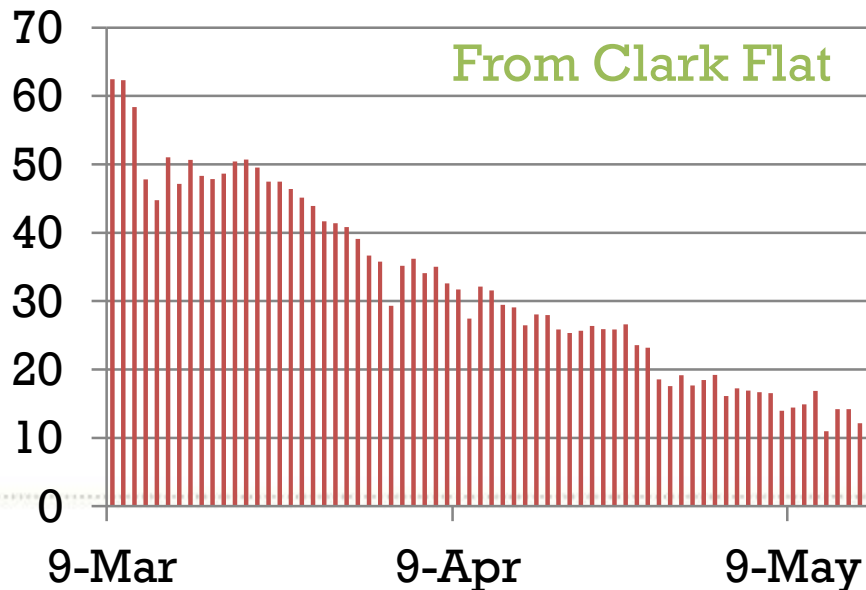
## From Easton



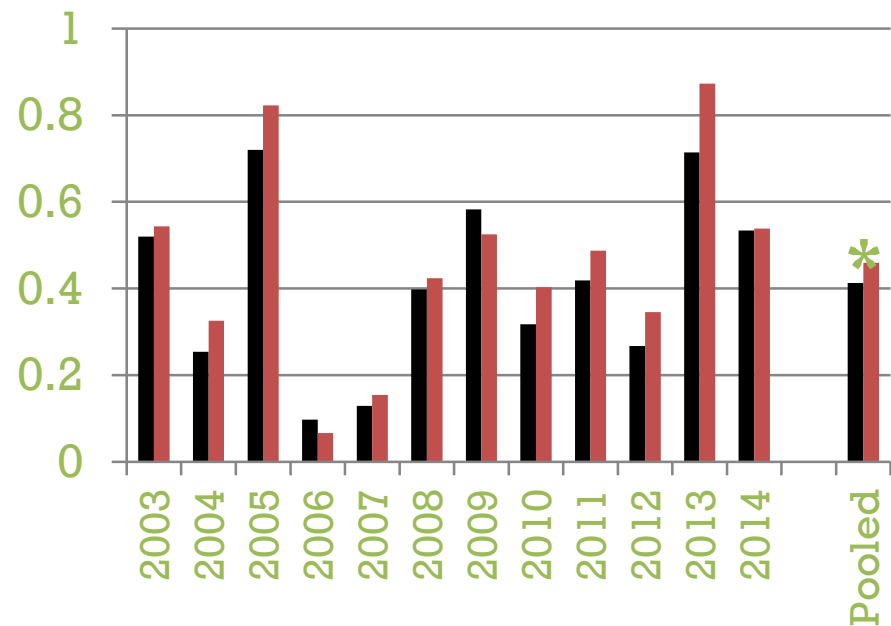
## From Jack Creek



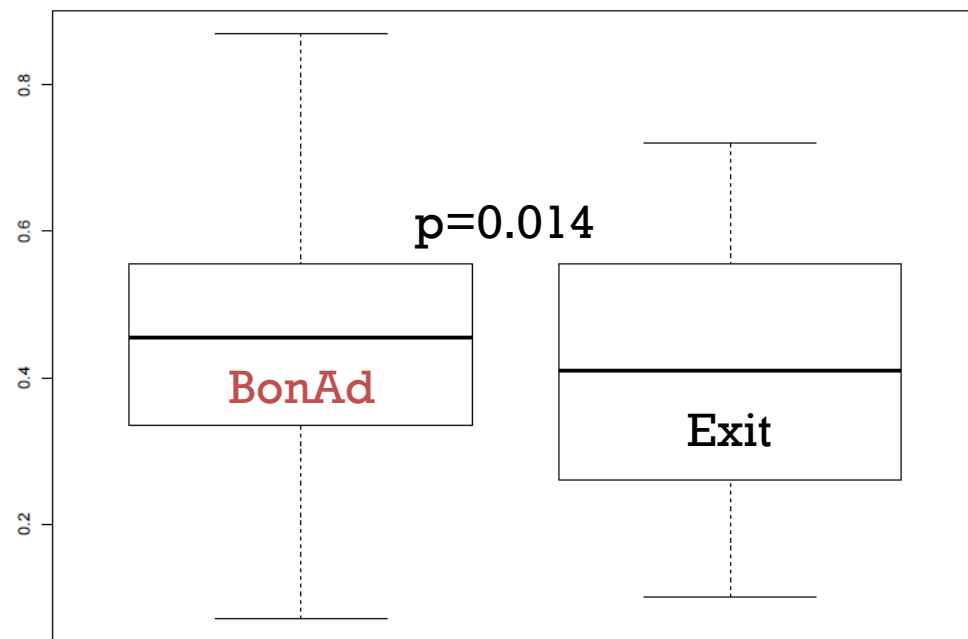
## From Clark Flat



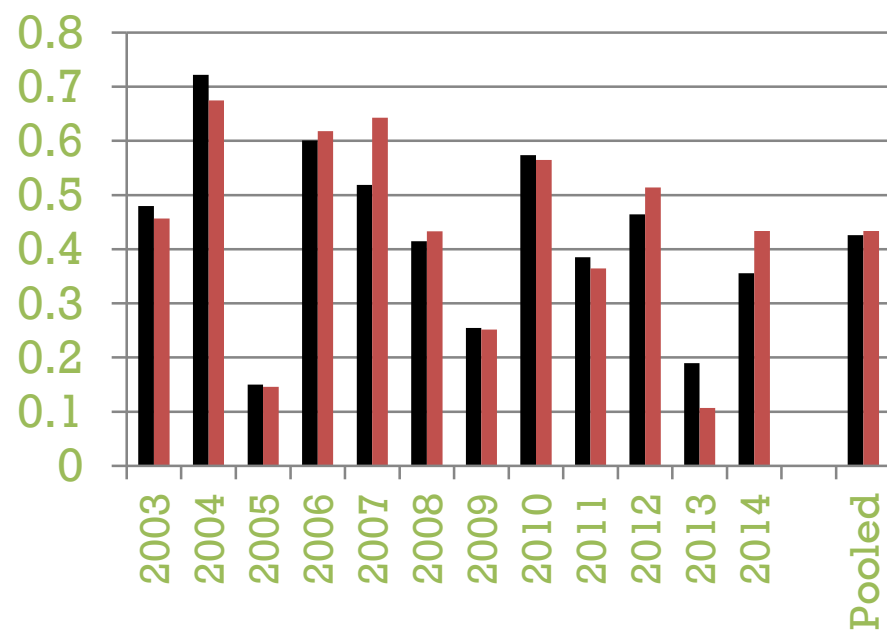
# Exit vs BonAd Proportions - March



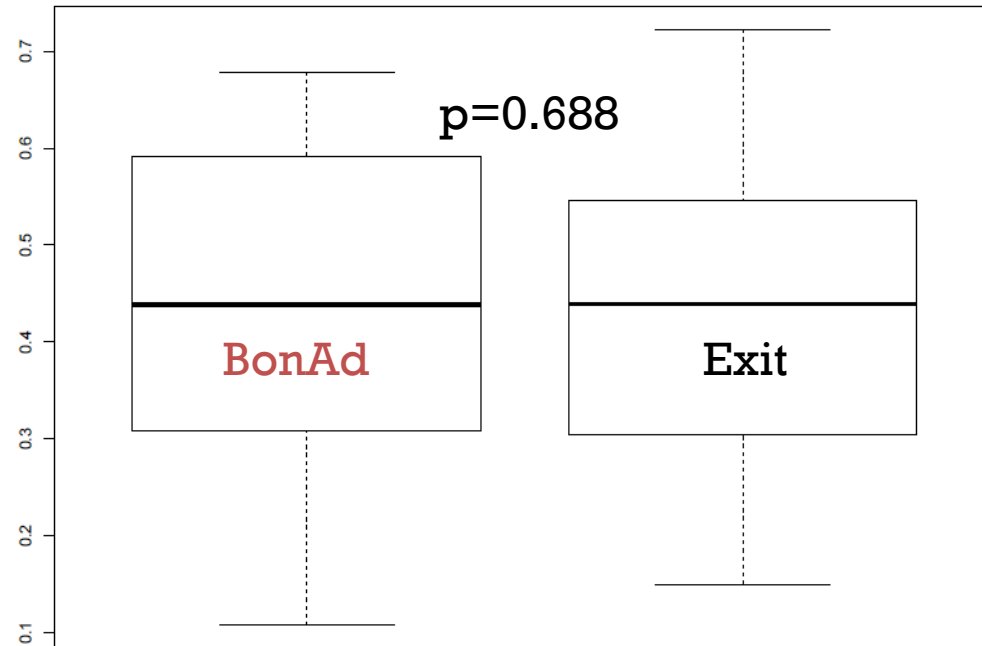
March - Box and Whisker Plot



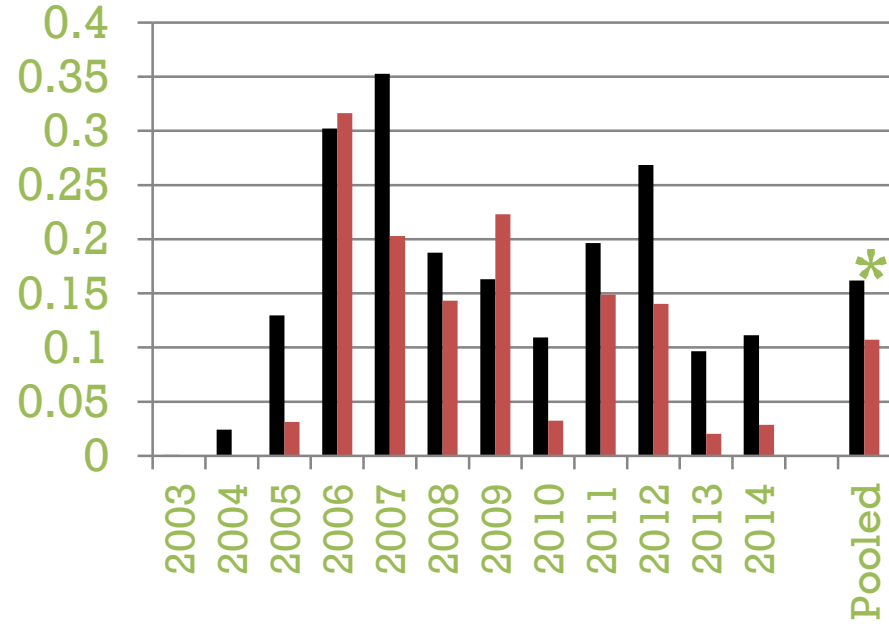
# Exit vs BonAd Proportions - April



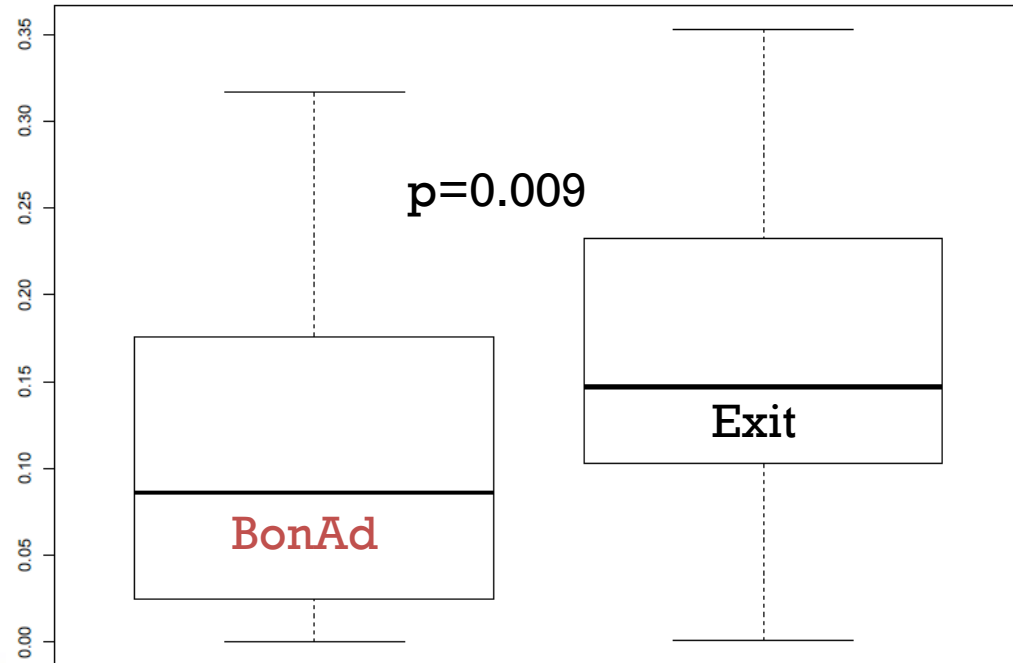
April - Box and Whisker Plot



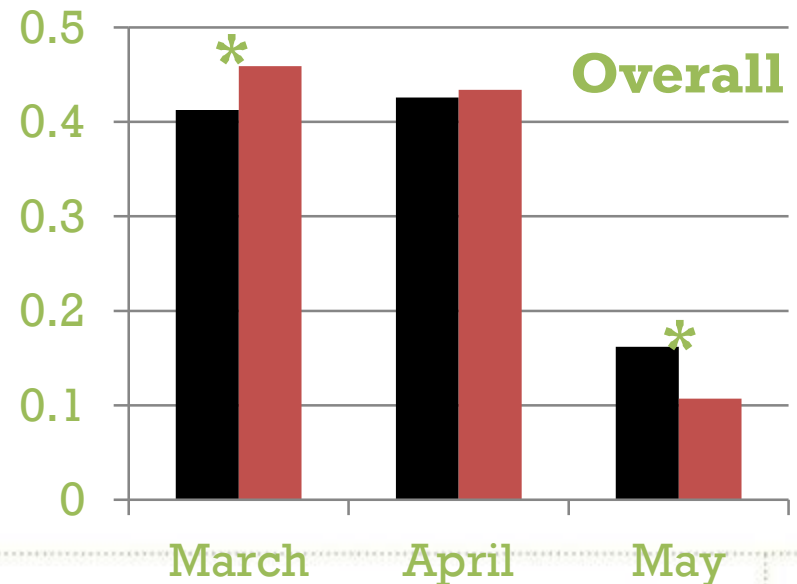
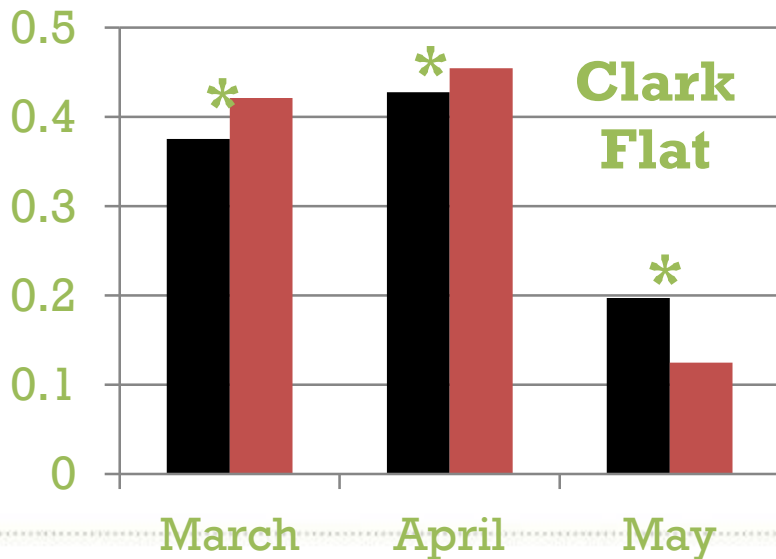
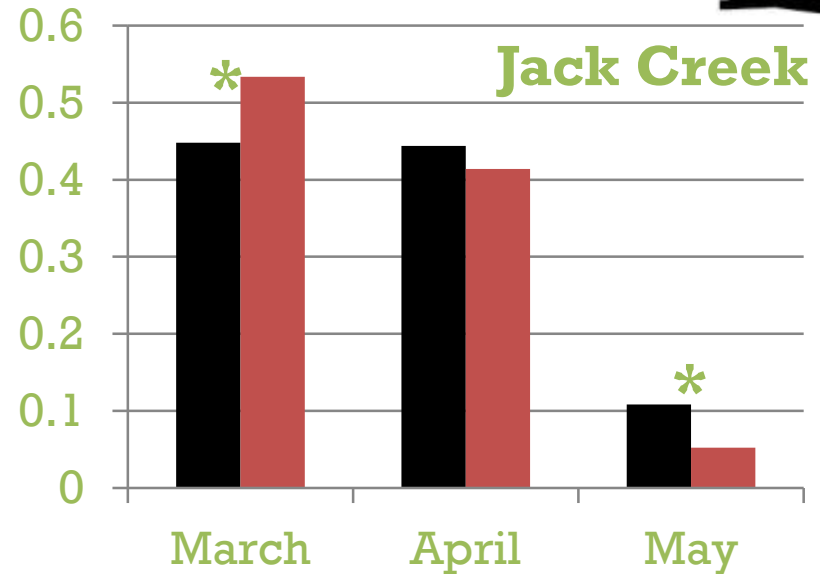
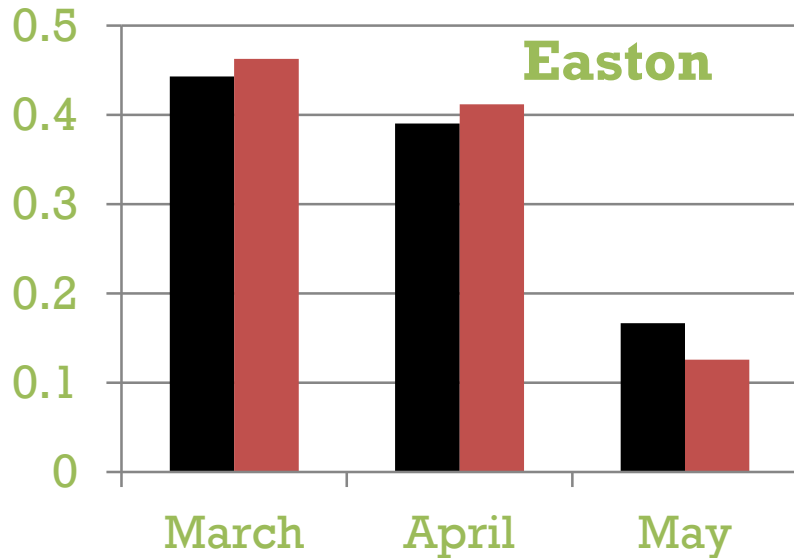
# Exit vs BonAd Proportions - May



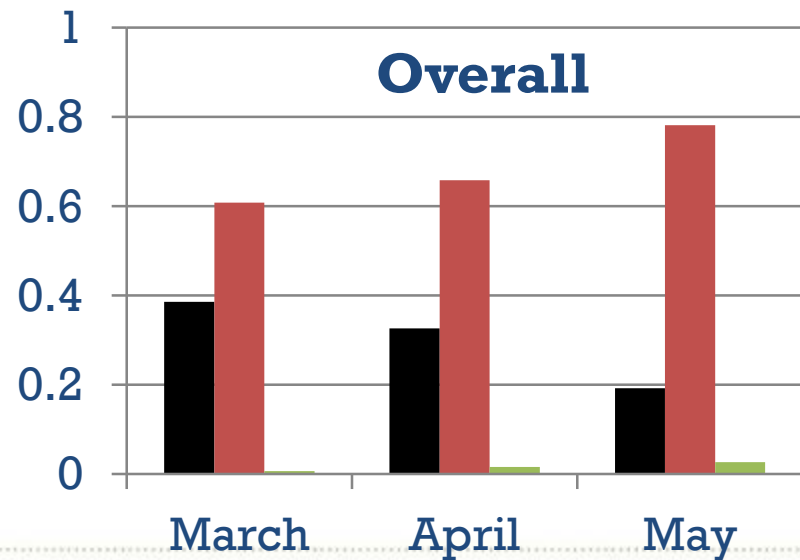
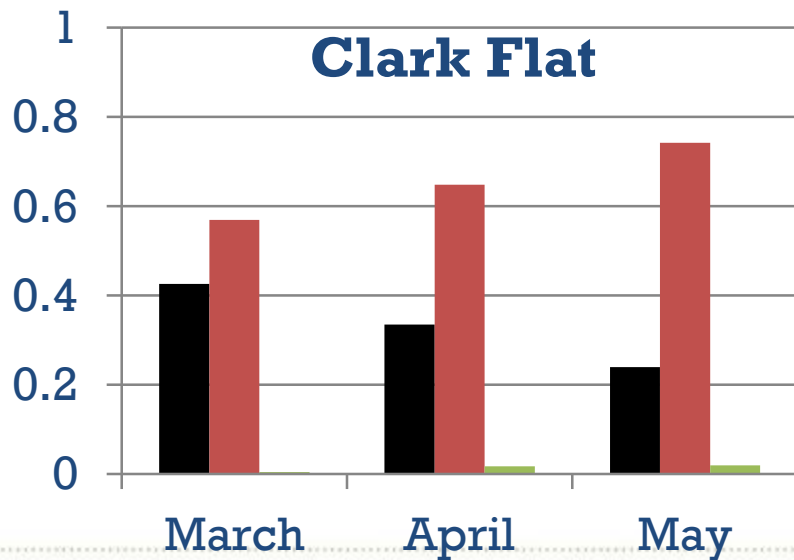
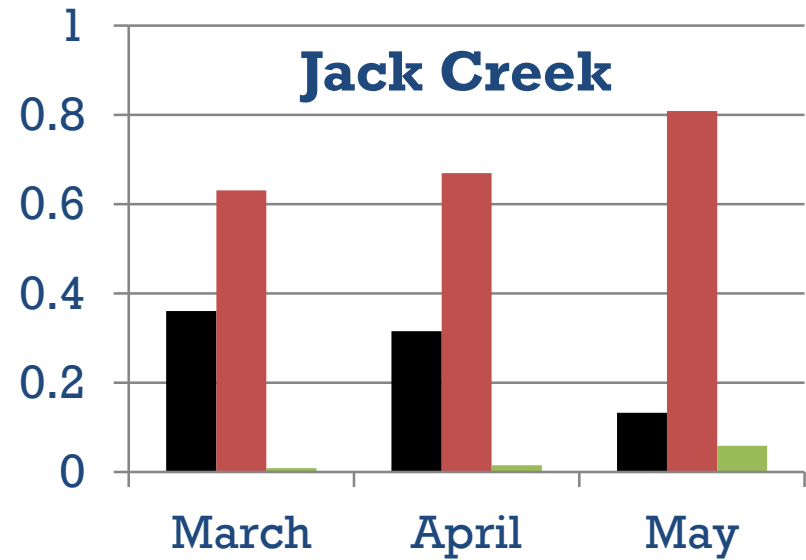
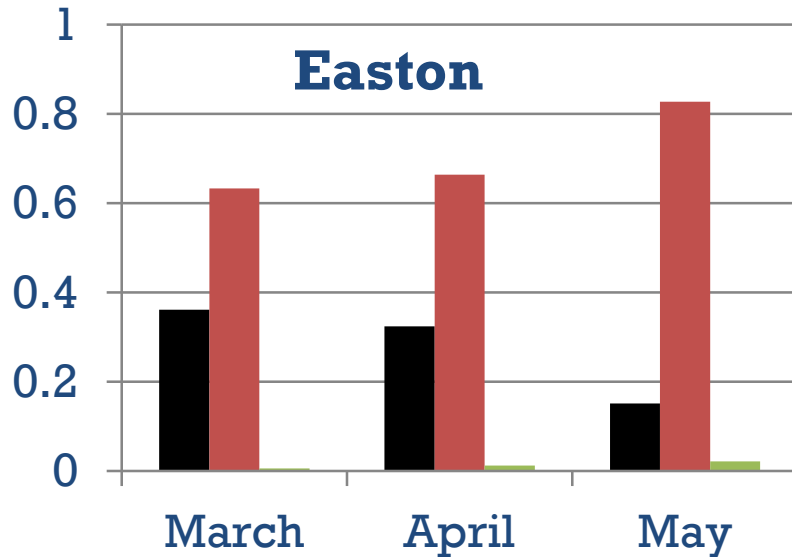
May - Box and Whisker Plot



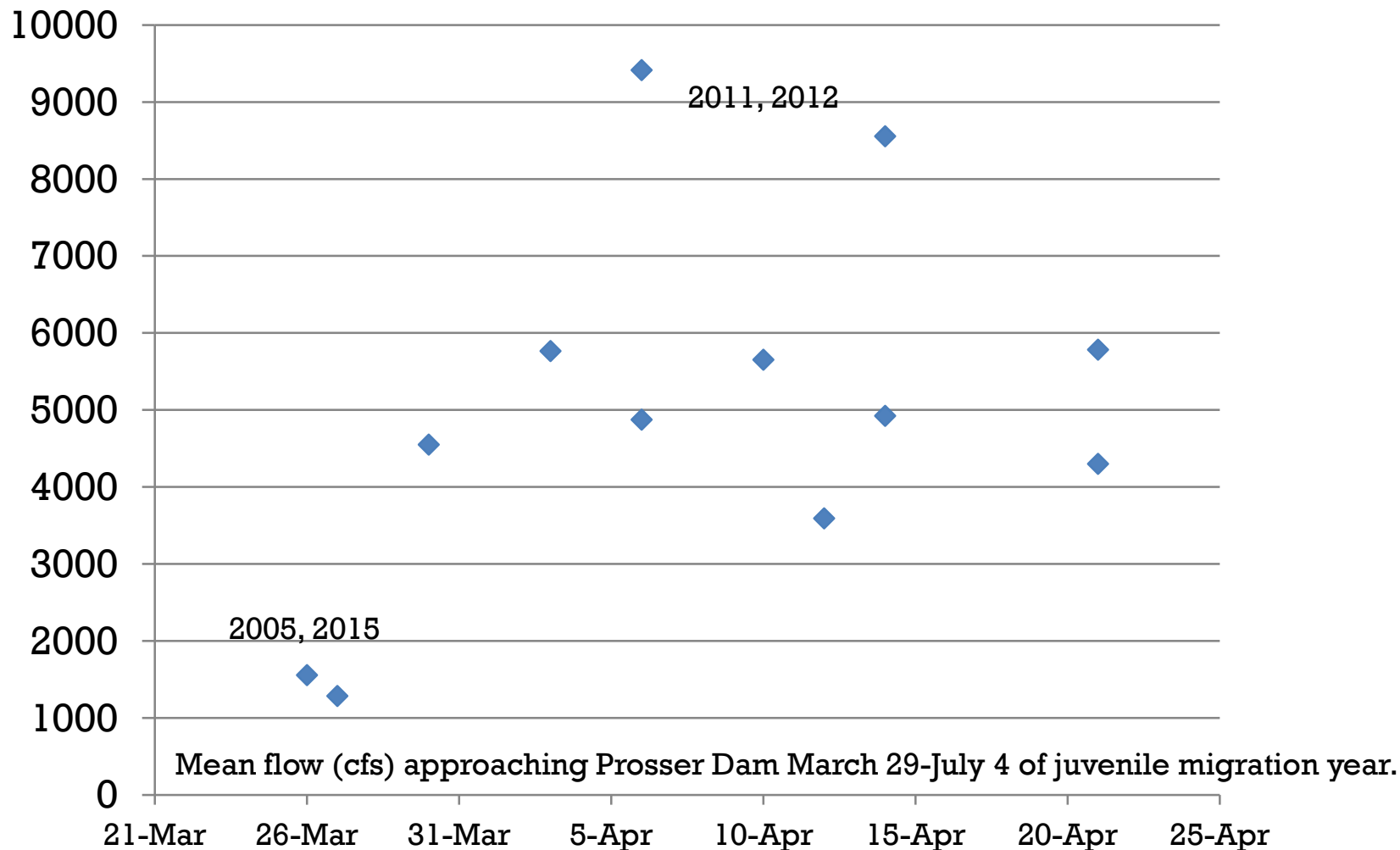
# Exit vs BonAd Proportions



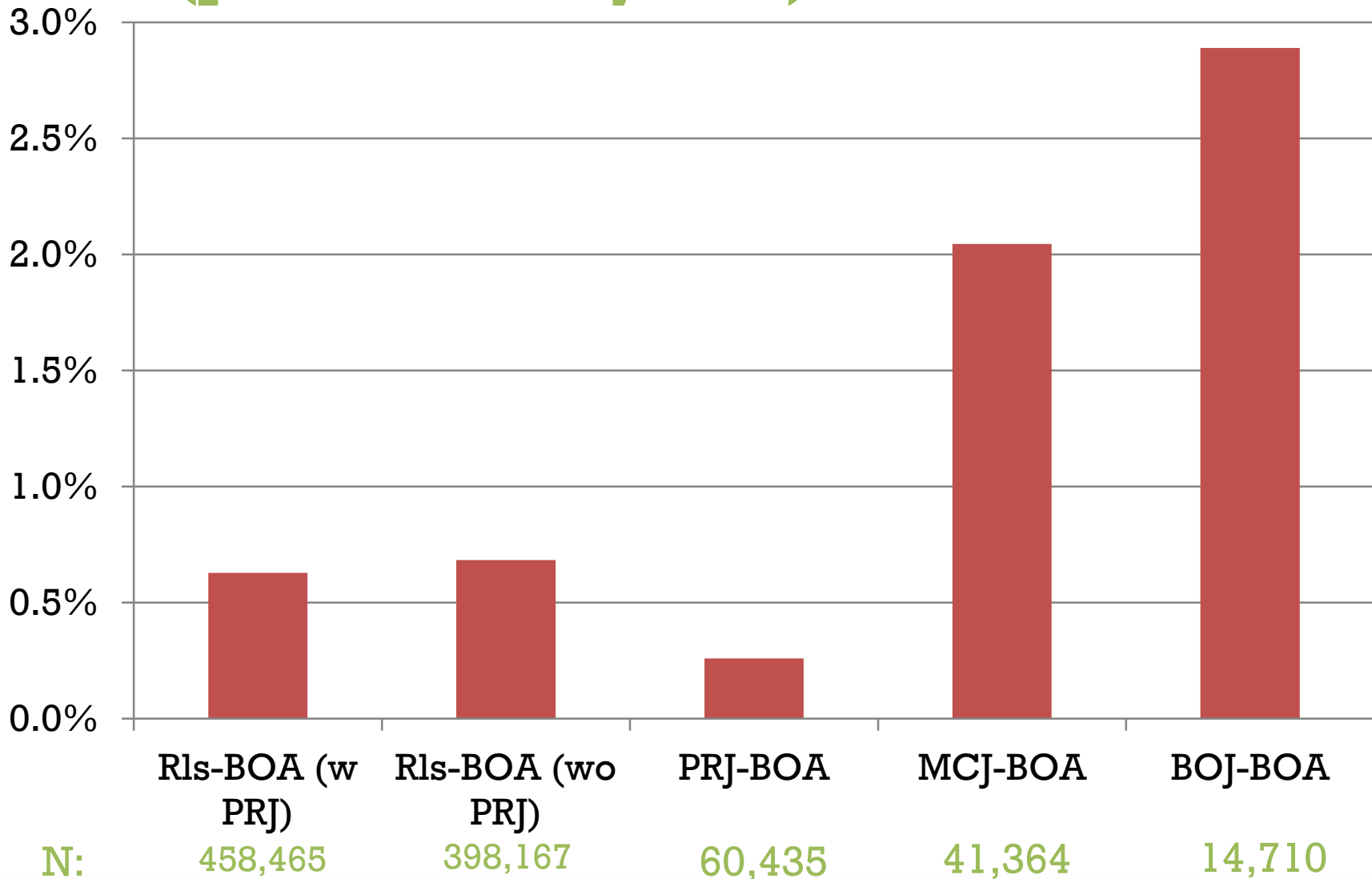
# Returns by Age (3, 4, 5)



# Acclimation Exit Date versus Mean Flows at Prosser



# Survival to Adult Return (pooled – all years)





# Results - Summary



|                            | Earlier Migrants    | Later Migrants        |
|----------------------------|---------------------|-----------------------|
| Juv. Detect. Rate downstrm | About same as later | About same as earlier |
| Travel Time                | Slower (45-60 days) | Faster (15-20 days)   |
| Adult Return rate          | Higher              | Lower                 |
| Age structure              | Younger             | Older                 |

- Survival to adult return may be more driven by age 'destiny' than by migration timing or flows\*
- Further confirmation that our biggest challenge is improving smolt survival out of the Yakima Basin