

# Emigration and survival of hatchery-reared Coho Salmon released as parr and smolts in a reintroduction program



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Acknowledgements: átwai Melvin Sampson, Yakama Nation, MRS and Prosser staff, Coho techs, Charlie Strom, Daniel Brownlee, Michael Fiander, Daylen Isaac, Anneliese Myers, WDFW, NOAA, USFWS, BOR, CRITFC, PSMFC, and BPA



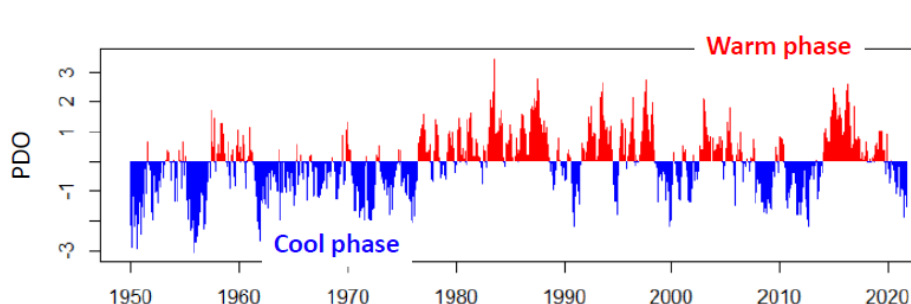


“We have been too content with turning out a nice looking report of the number of fish hatched, reared, and presumably planted; and not sufficiently concerned with what actually happened to the fish afterward” – WM Keil 1935.



# Ecological implications of changing hatchery practices for Chinook salmon in the Salish Sea

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MICHAEL J. FORD,<sup>3</sup> AND ERIC J. WARD<sup>3</sup>



**Are current hatchery strategies designed to engage with future ocean variation?**  
(this will be very Chinook salmon-centric)

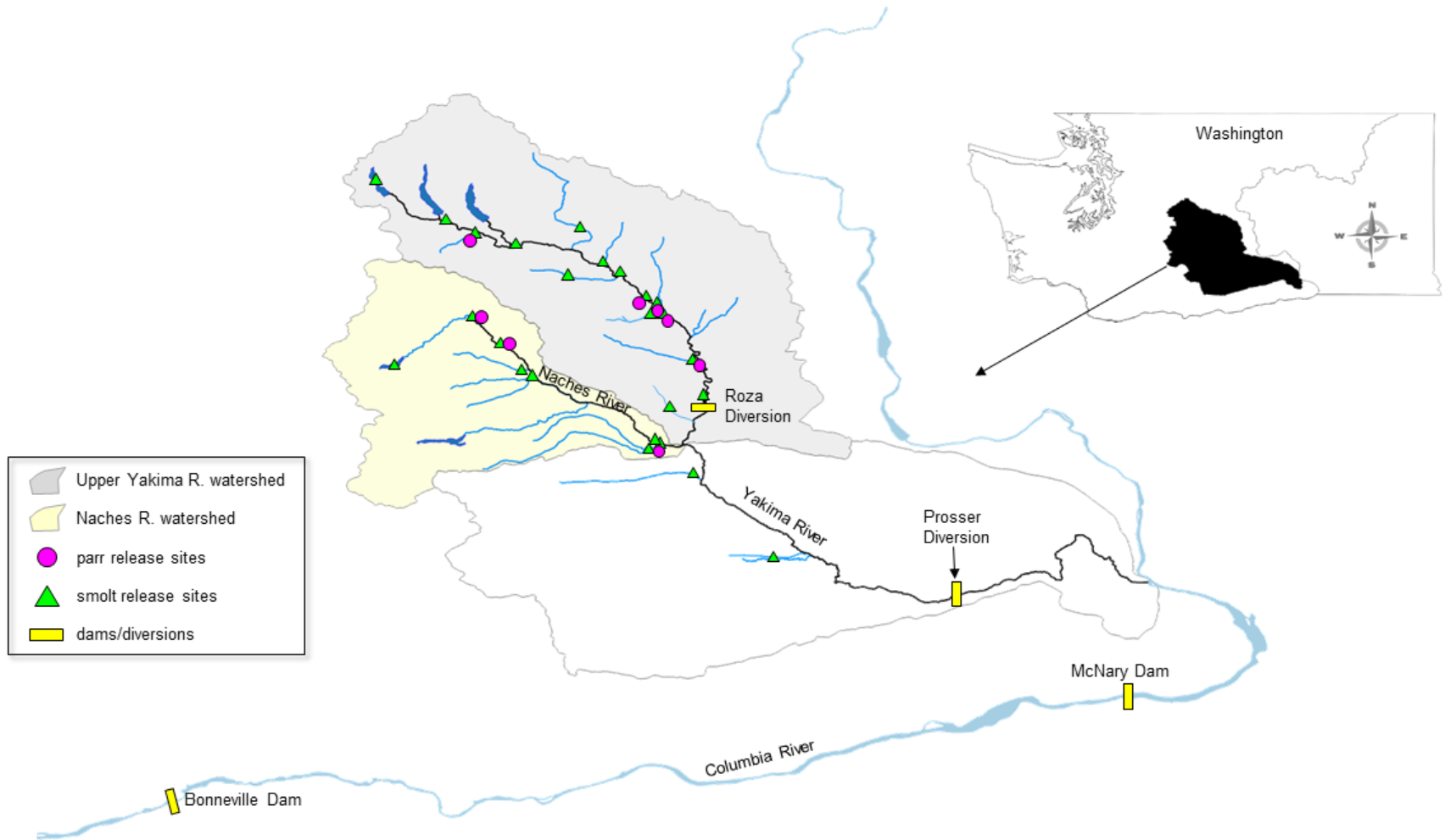
Brian Beckman  
NWFS, NMFS, Seattle

**Reared to become wild-like: addressing behavioral and cognitive deficits in cultured aquatic animals destined for stocking into natural environments—a critical review**

Bull Mar Sci. 97(4):489–538. 2021  
<https://doi.org/10.5343/bms.2020.0039>

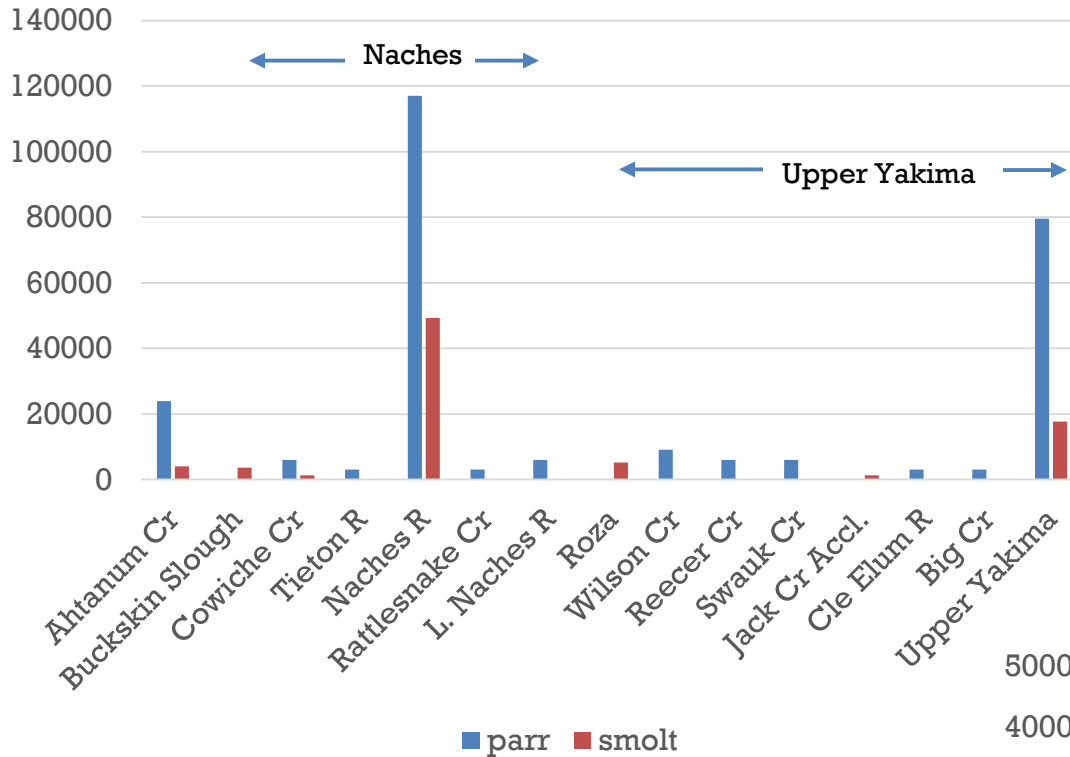
*Joacim Näslund*

Can reducing the homogenization that hatchery-reared fish experience under present practices improve survival?

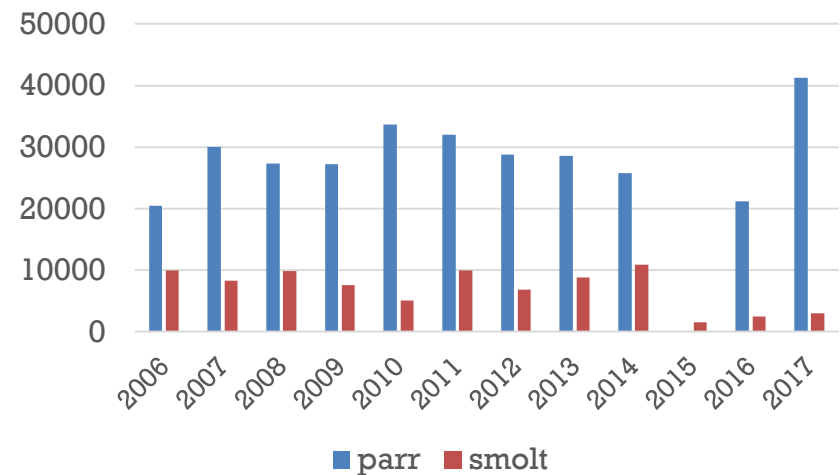


- Targeted Tributaries upstream of Union Gap
- Smolt and Parr Releases
- Brood Years 2006-2017

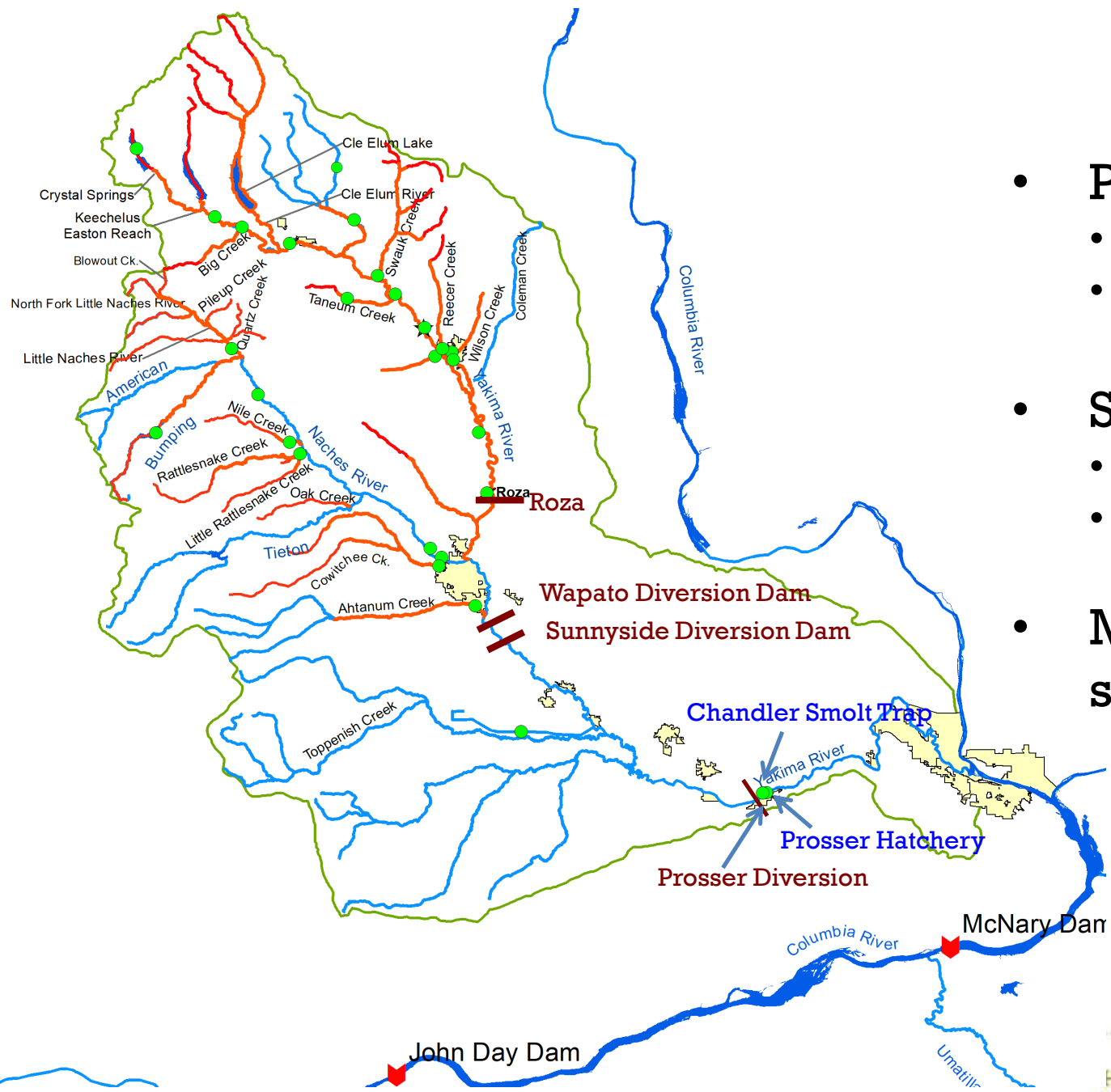
# Methods – PIT-tagged Coho Releases



	Parr	Smolt
Ahtanum	9%	5%
Naches	50%	68%
Upper YR	41%	27%
<b>Total PITs</b>	<b>316,414</b>	<b>84,372</b>







- **Parr**
  - 90mm FL
  - Jun-Aug release
- **Smolts**
  - 113mm FL
  - Mar/Apr release
- **Migrate to sea in same year**

# Methods – Downstream PIT Detects



Complete Tag History for

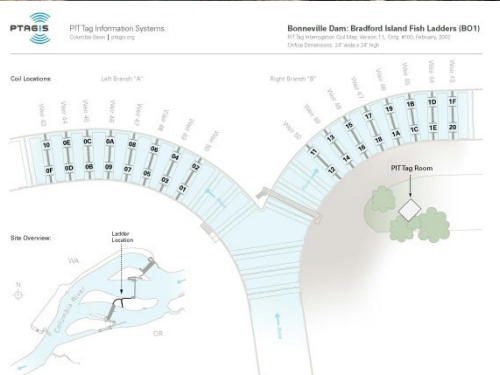
3D9.1C2CF08FFD

Mark and Release Information		File and Project Information	
Species	Hat. Coho	MRR Project	DTL - David Lind Projects
Mark Date	07/28/2009	Coordinator	Daylen Isaac
Mark Site	YAKIM1 - Yakima River - mouth to Naches River (km 0-187)	File Name	DTL-2009-209-PLN.xml
Mark Site Type	River Segment	Session Message	COHO PARR PLANTS MY2010: LITTLE NACHES R
Release Date	08/08/2009	Tag Distribution Information	
Release Site	NATCHR - Naches River	Tag Distributed By	PTAGIS
Release Site Type	River	FWP Project	1995-063-25 - YKFP - Monitoring And Evaluation
Release Site RKM	539.187.072	Project Contact	Mel Sampson
Event Capture Method	Dip Net	Tag Recipient	Ida Ike
Length (mm)	87	Ship Date	12/04/2008
Weight (g)		Tag Type	12 millimeter PIT tag
Conditional Comments		Tag Model	TX140055T
Text Comments			

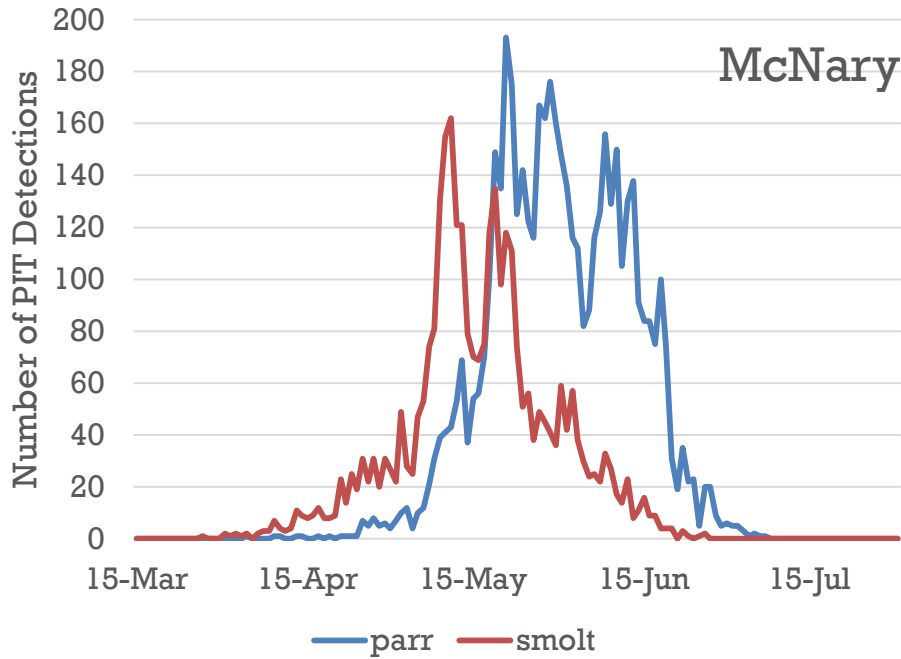
## Event Summary

Tag	Event Date	Event Type	Event Site	Event Site RKM	Event Release Date	Event Release Site	Event Release RKM
3D9.1C2CF08FFD	07/28/2009	Mark	YAKIM1	539	08/08/2009	NATCHR	539.187.072
	05/27/2010	Observation	PRO	539.076			
	06/02/2010	Observation	BCC	234			
	09/17/2011	Observation	BO1	234			
	09/18/2011	Observation	BO1	234			
	09/27/2011	Observation	MC1	470			
	10/12/2011	Observation	PRO	539.076			

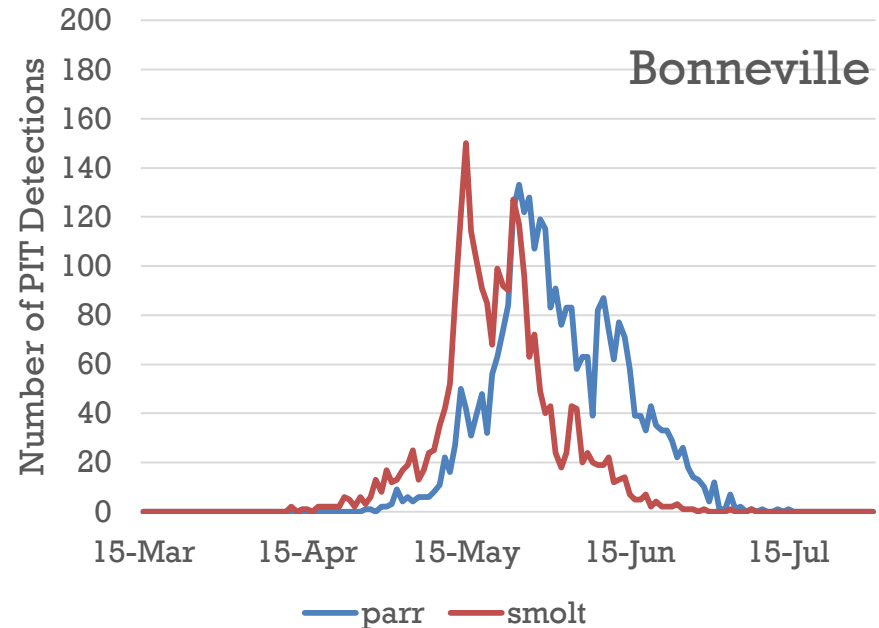
- Emigration Timing – McNary and Bonn.
- Emigration Survival – McNary
- Release to Bonn. adult survival
- Bonn. juv. to Bonn. adult survival
- Age-at-return



# Results – Juvenile Emigration Timing

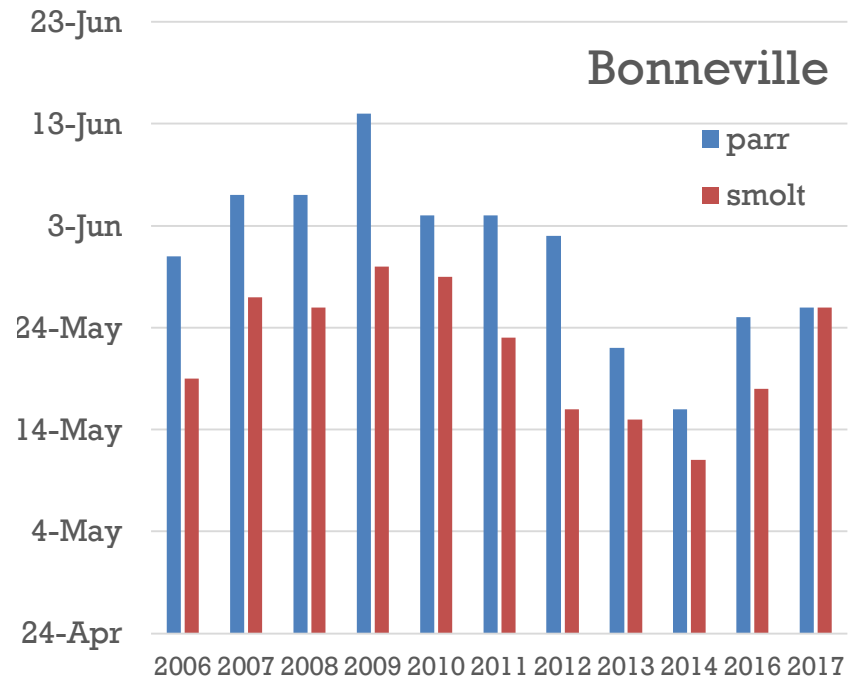
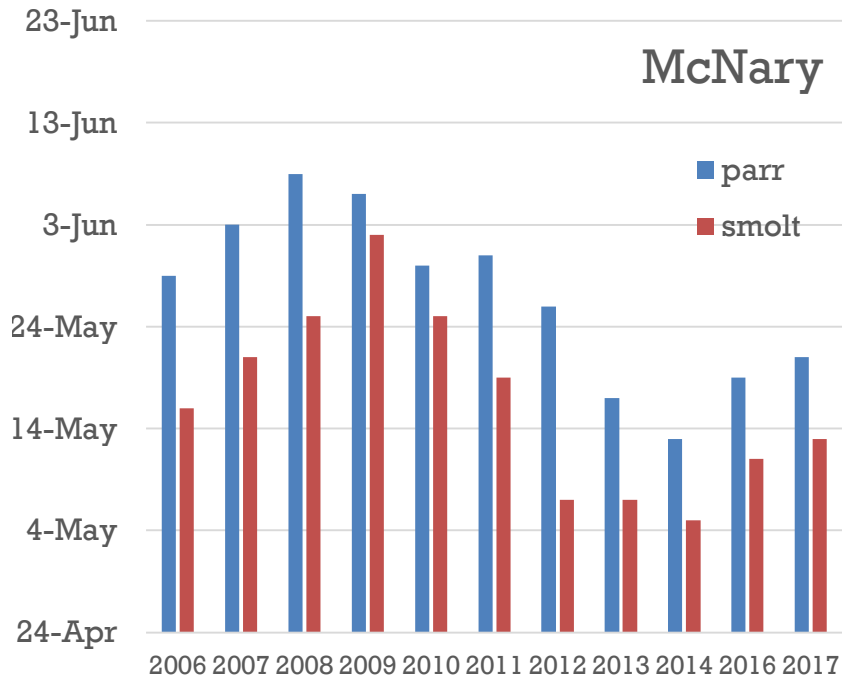


	Parr	Smolt
McN	30-May	16-May
Bonn	1-June	21-May





# Results – Juvenile Emigration Timing

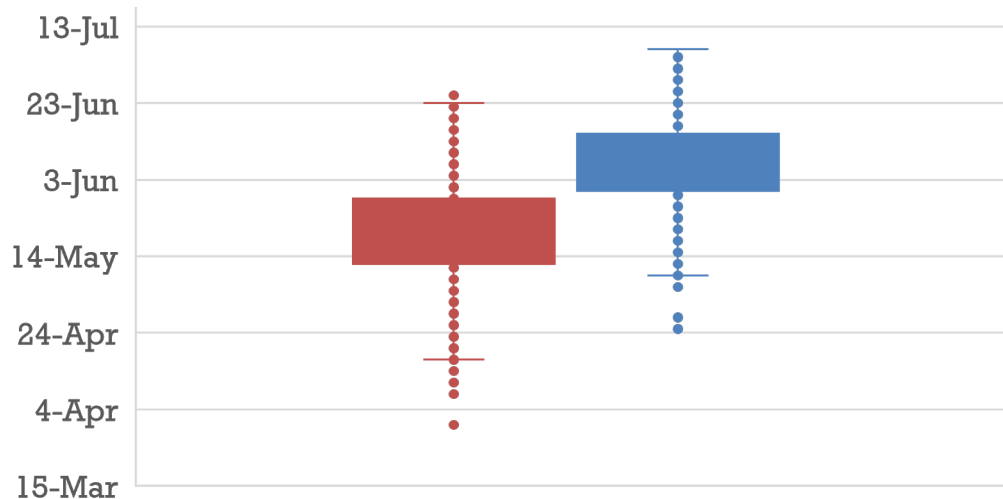


# Results – Juvenile Emigration Timing to McN



## Naches

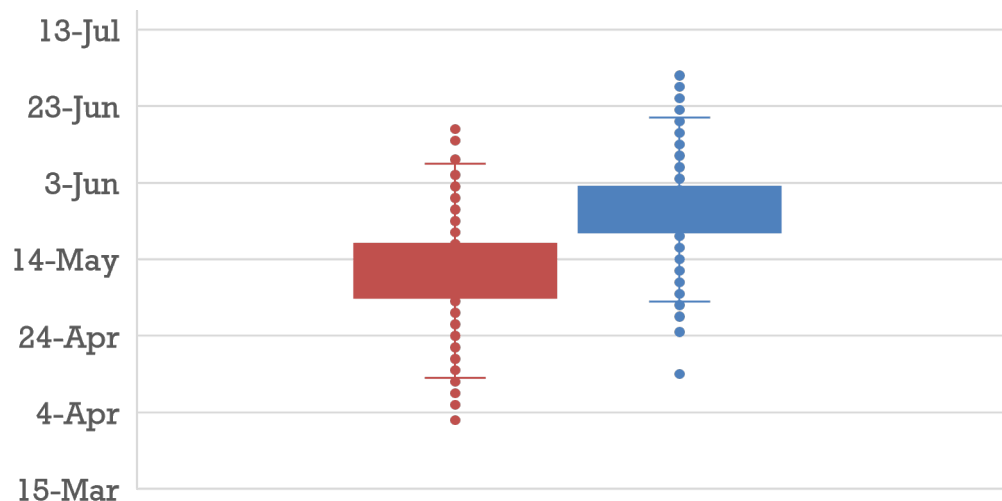
■ smolt ■ parr



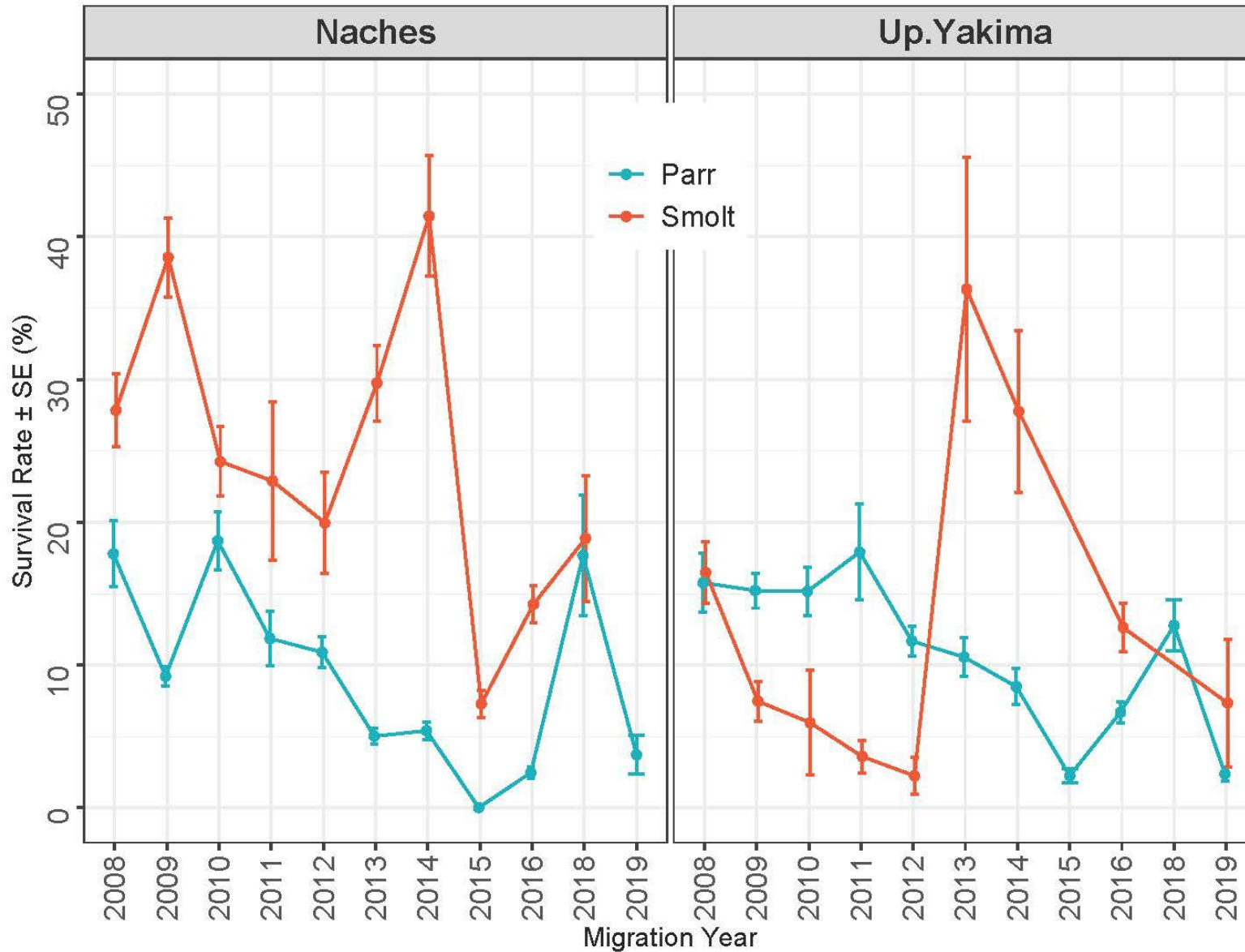
	Parr	Smolt
Naches	04-Jun	17-May
UppYak	25-May	10-May

## Upper Yakima

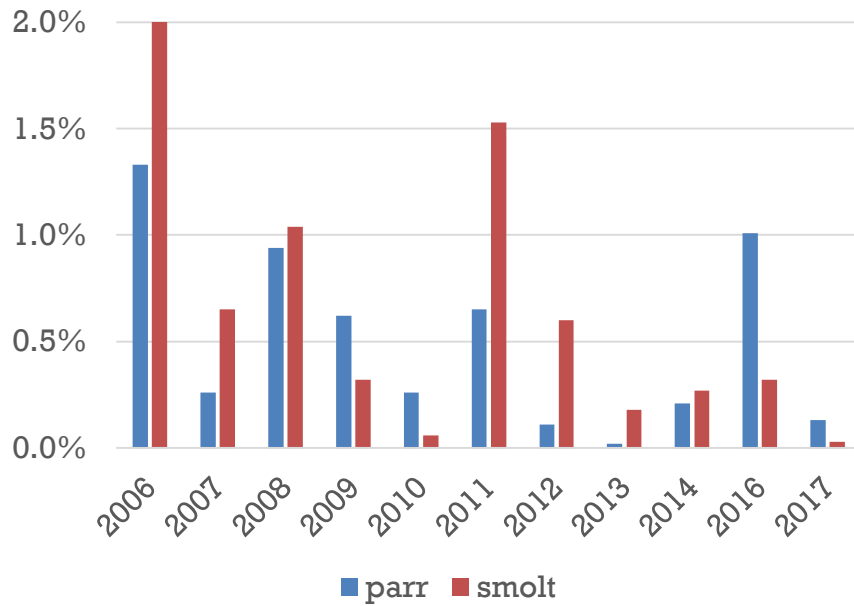
■ smolt ■ parr



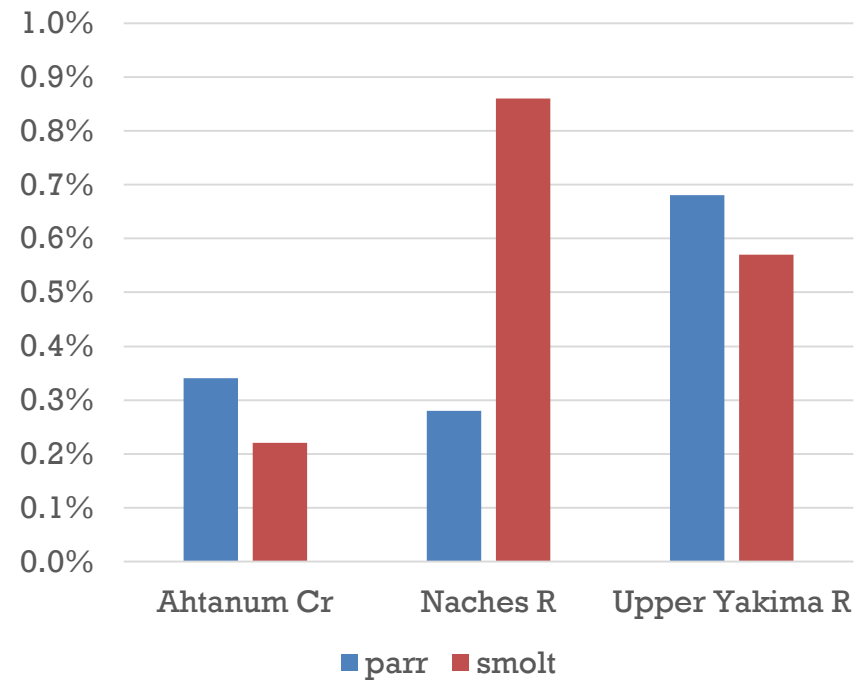
# Results – Juv. Survival to McNary Dam



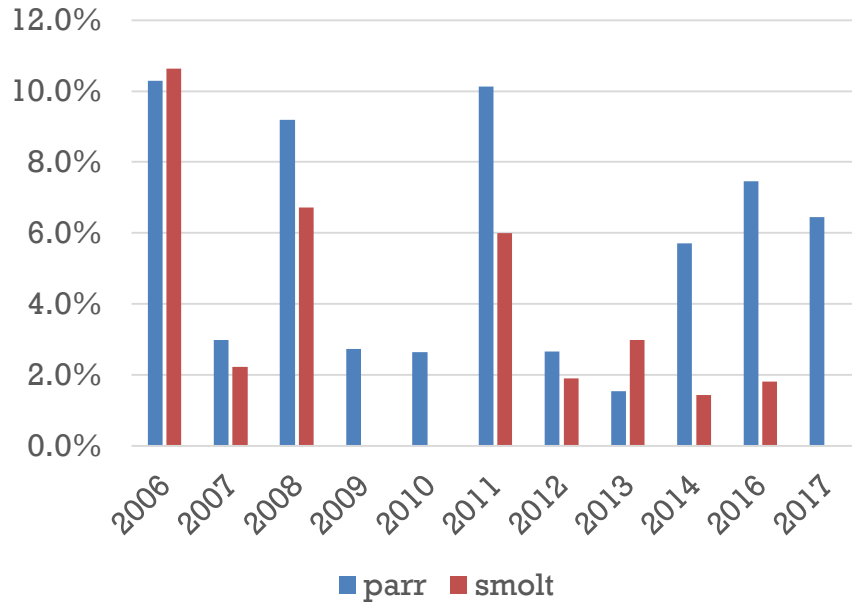
# Release to Bonn. Adult Returns



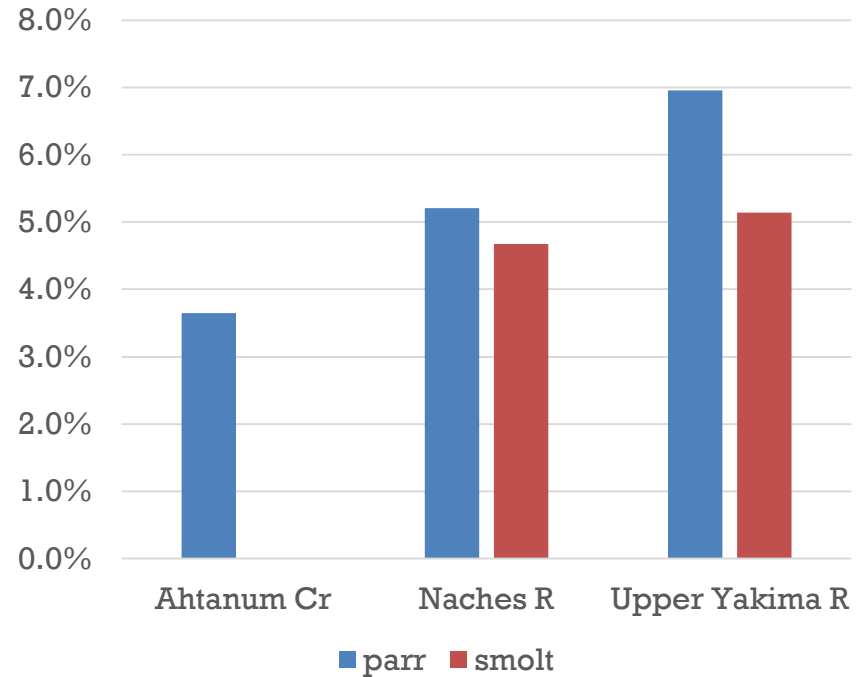
<b>P = 0.57</b>	<b>Parr</b>	<b>Smolt</b>
Mean	0.50%	0.64%
$\pm$ SE	0.13%	0.19%



# Results – Bonn. smolt to Bonn. adult returns



<b>P = 0.03*</b>	<b>Parr</b>	<b>Smolt</b>
Mean	5.15%	2.31%
± SE	0.97%	0.75%



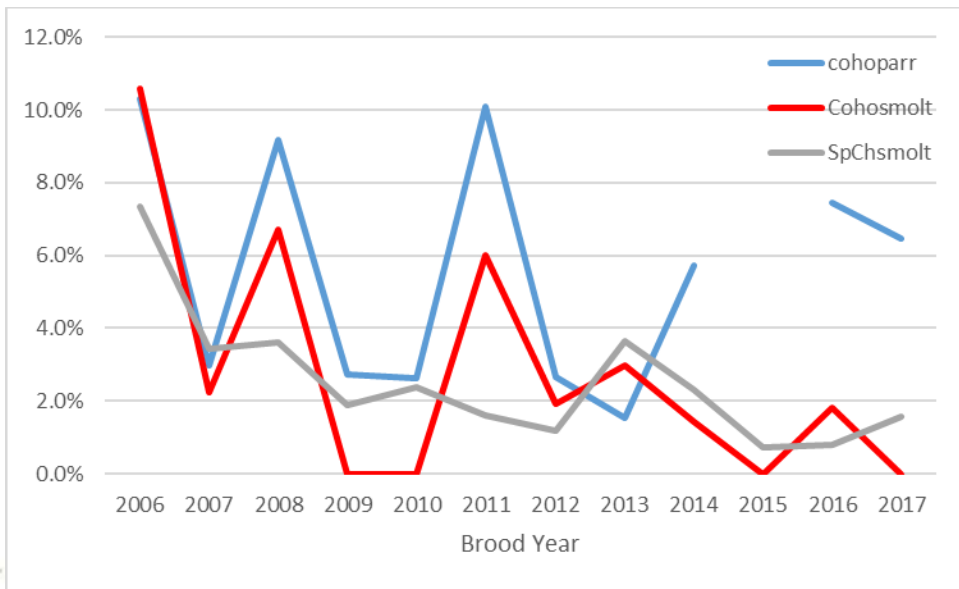
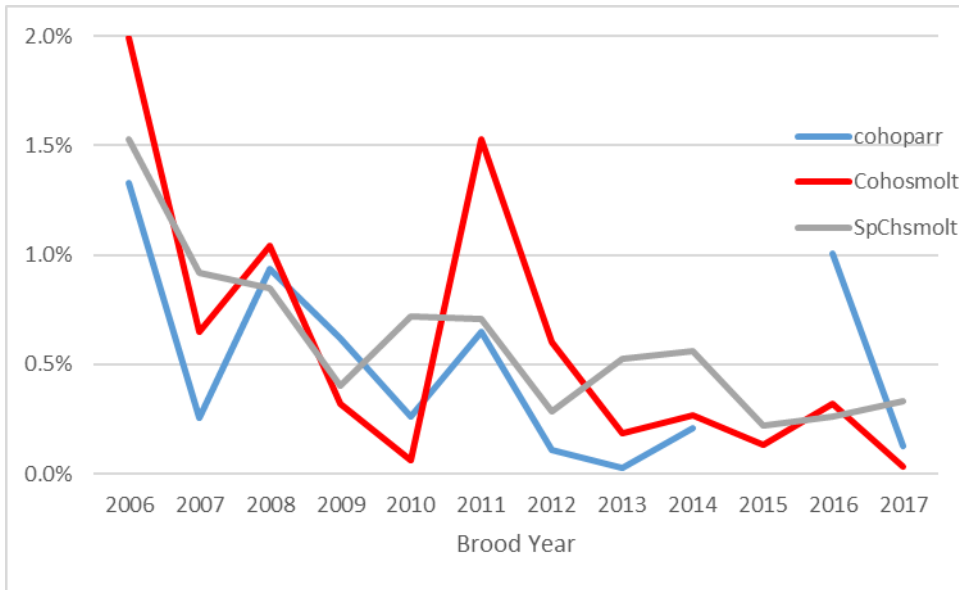


# SARs with Spring Chinook

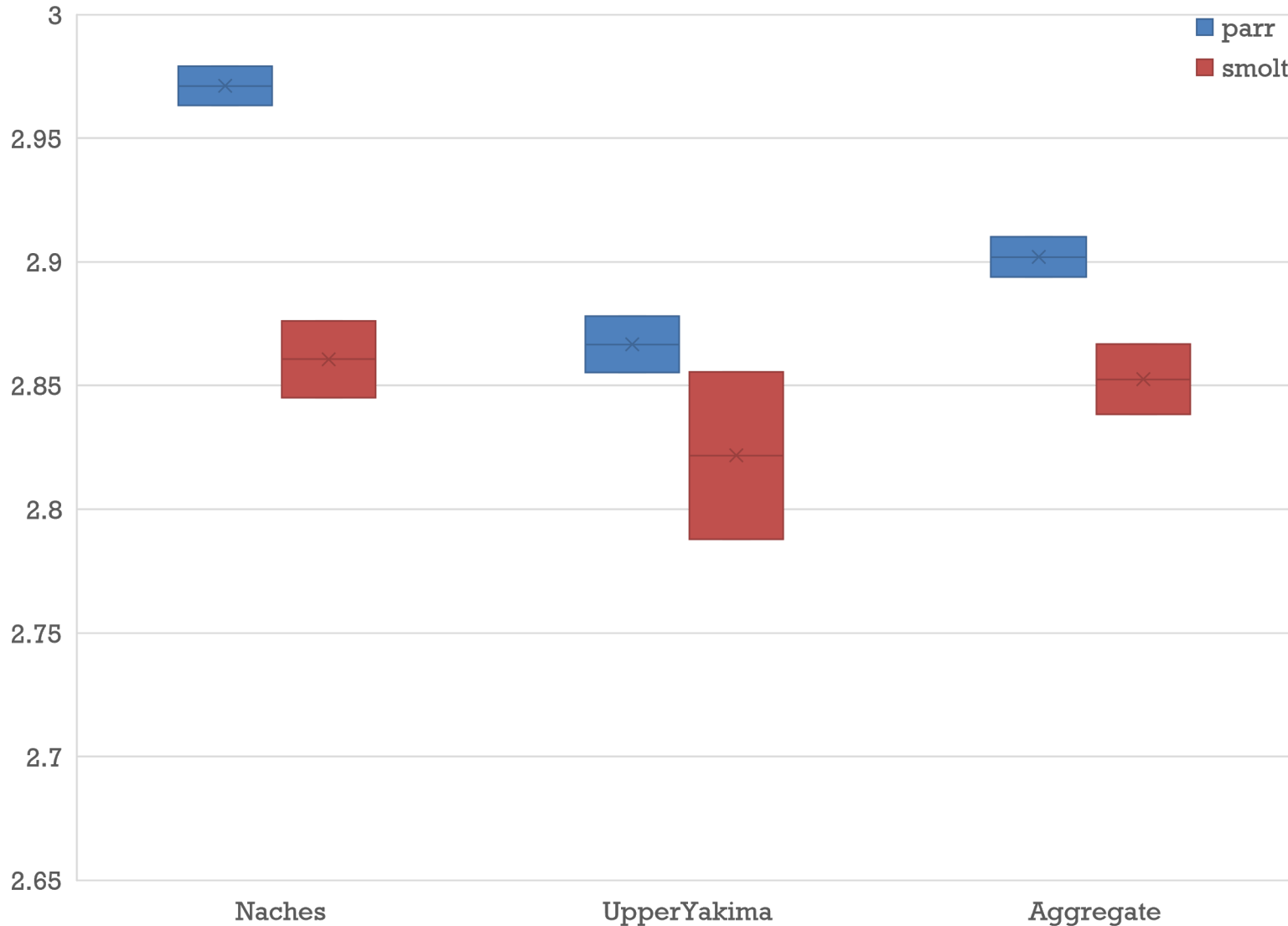


Release to  
Bonn. Adult

Bonn. Juv.  
Bonn. Adult  
(marine index)



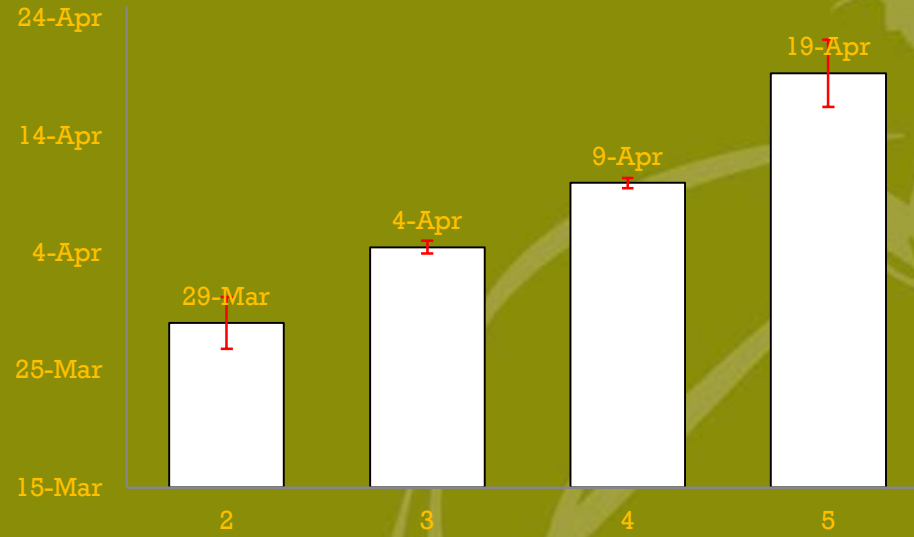
# Results – Age at adult return



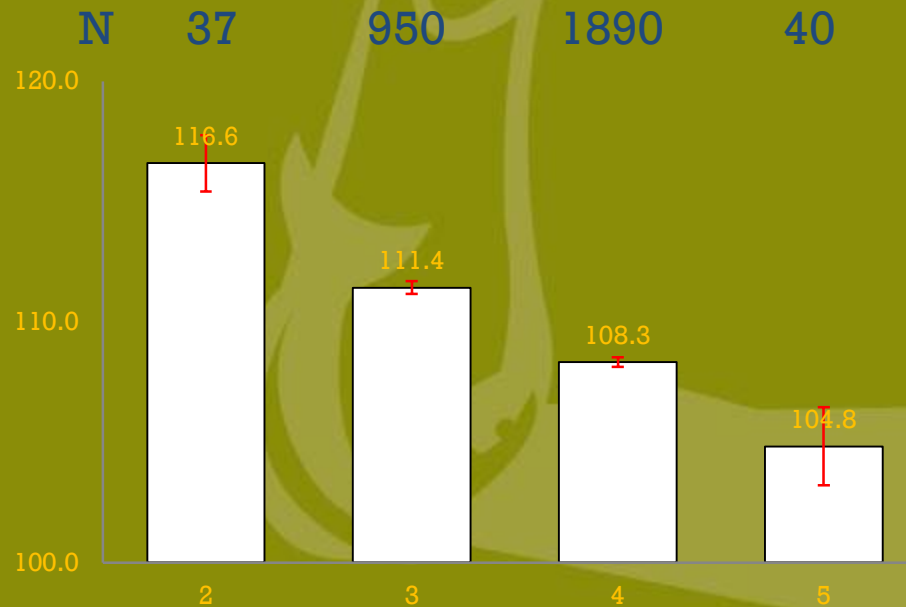
# SpCh Returns to Bonneville Dam by Age, Bosch et al. 2023



Mean Date of  
Acclimation  
Exit



Mean fork  
length at time  
of PIT-tagging



N

37

950

1890

40

# Summary & Take-Homes



- Diversity in 3 metrics: emigration timing, marine survival, and age-at-return
- Differences by watershed
- Explore different release strategies consistent with watershed goals and conditions
- Your comments & questions

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