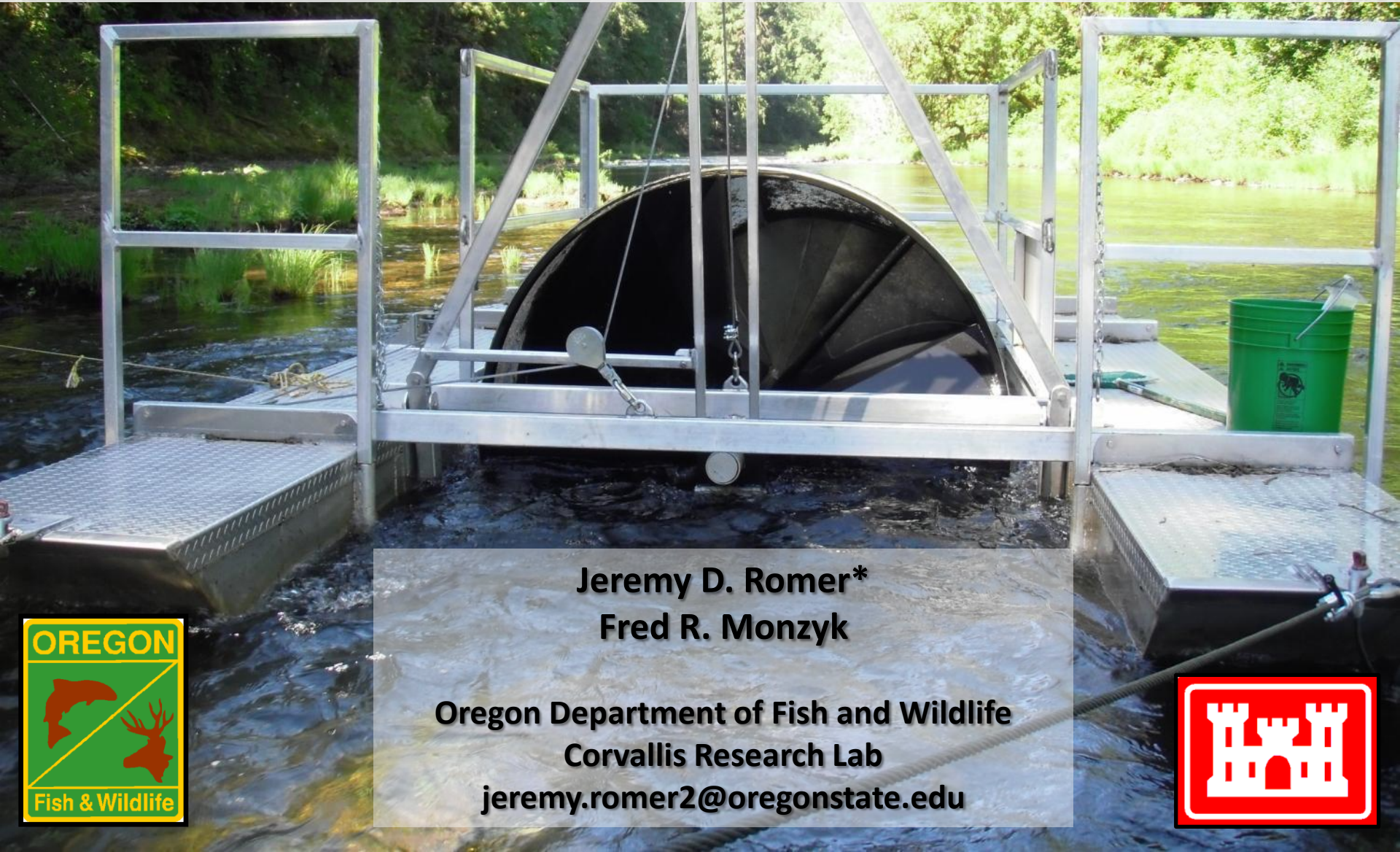
Migration Timing and Size of Juvenile Spring Chinook Entering and Exiting Upper Willamette Reservoirs



Jeremy D. Romer*
Fred R. Monzyk

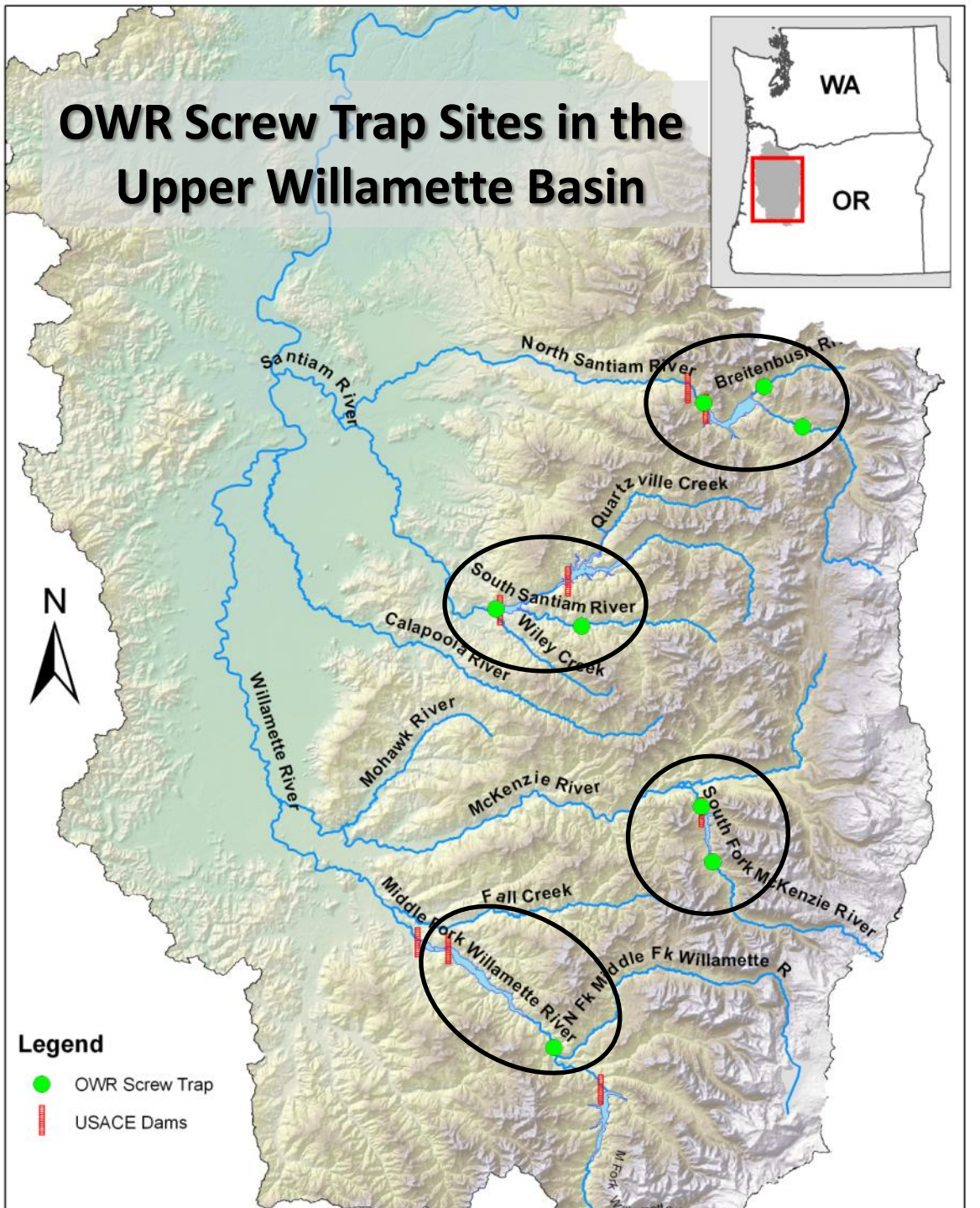
Oregon Department of Fish and Wildlife
Corvallis Research Lab
jeremy.romer2@oregonstate.edu

Objectives:

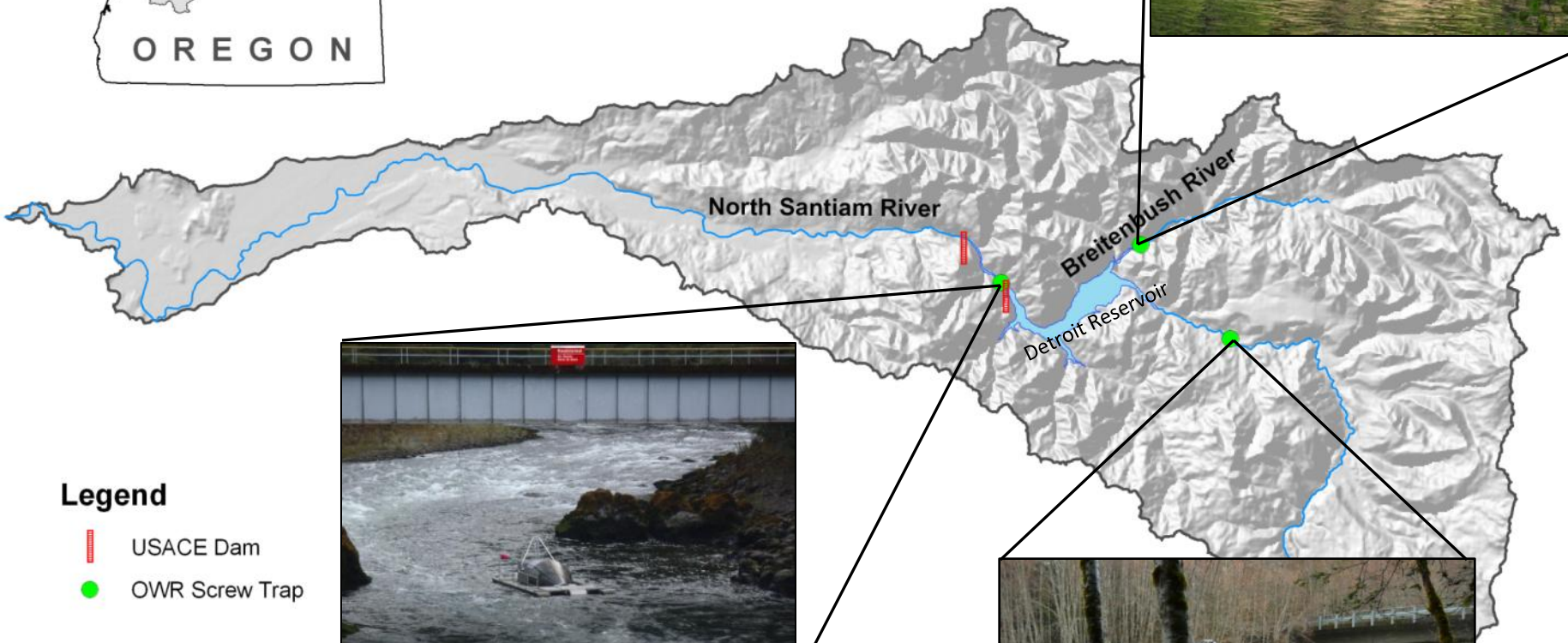
Migration Timing – Reservoir Entry and Exodus

Size – Entry and Exodus

Growth Comparison – Stream vs. Reservoir


OWR Screw Trap Sites in the Upper Willamette Basin
WA
OR
Santiam River
North Santiam River
Breitenbush R.
Quartzville Creek
South Santiam River
Wiley Creek
Calapooia River
Willamette River
Mohawk River
McKenzie River
South Fork McKenzie River
Fall Creek
Middle Fork Willamette River
N Fk Middle Fk Willamette R
N
Legend
OWR Screw Trap
USACE Dams

North Santiam River

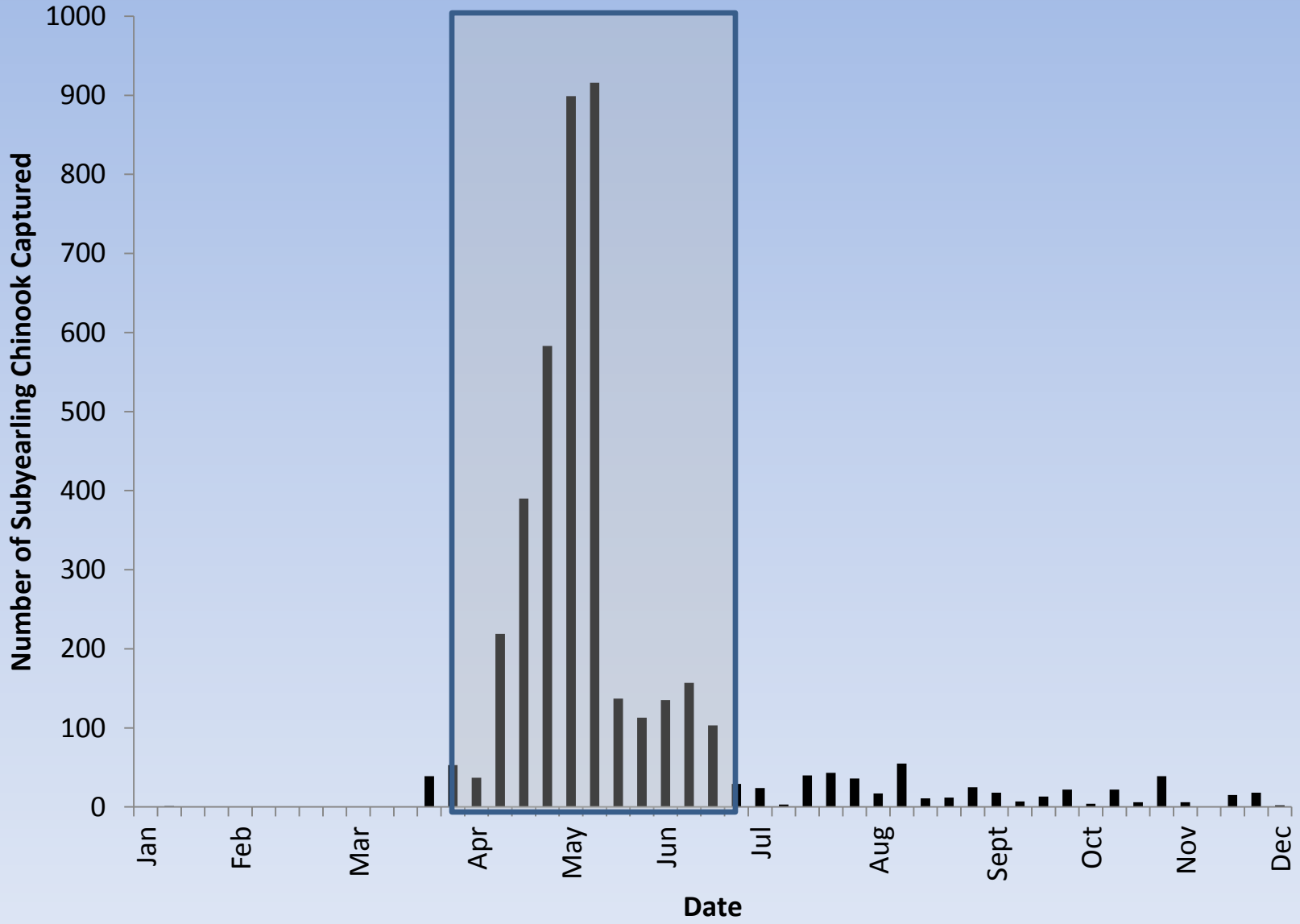


Legend

- USACE Dam
- OWR Screw Trap

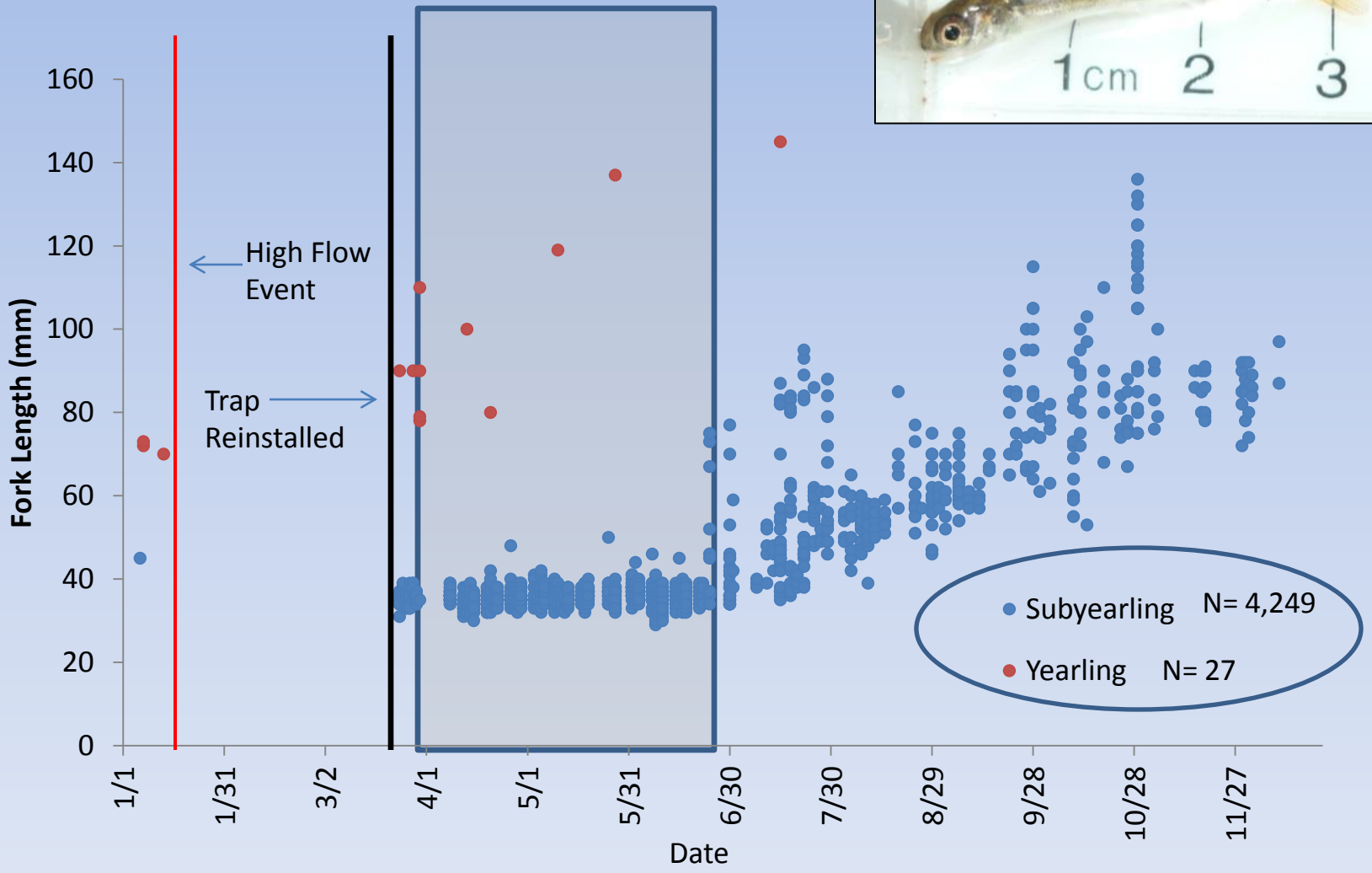
North Santiam River

Reservoir Entry – Timing and Abundance



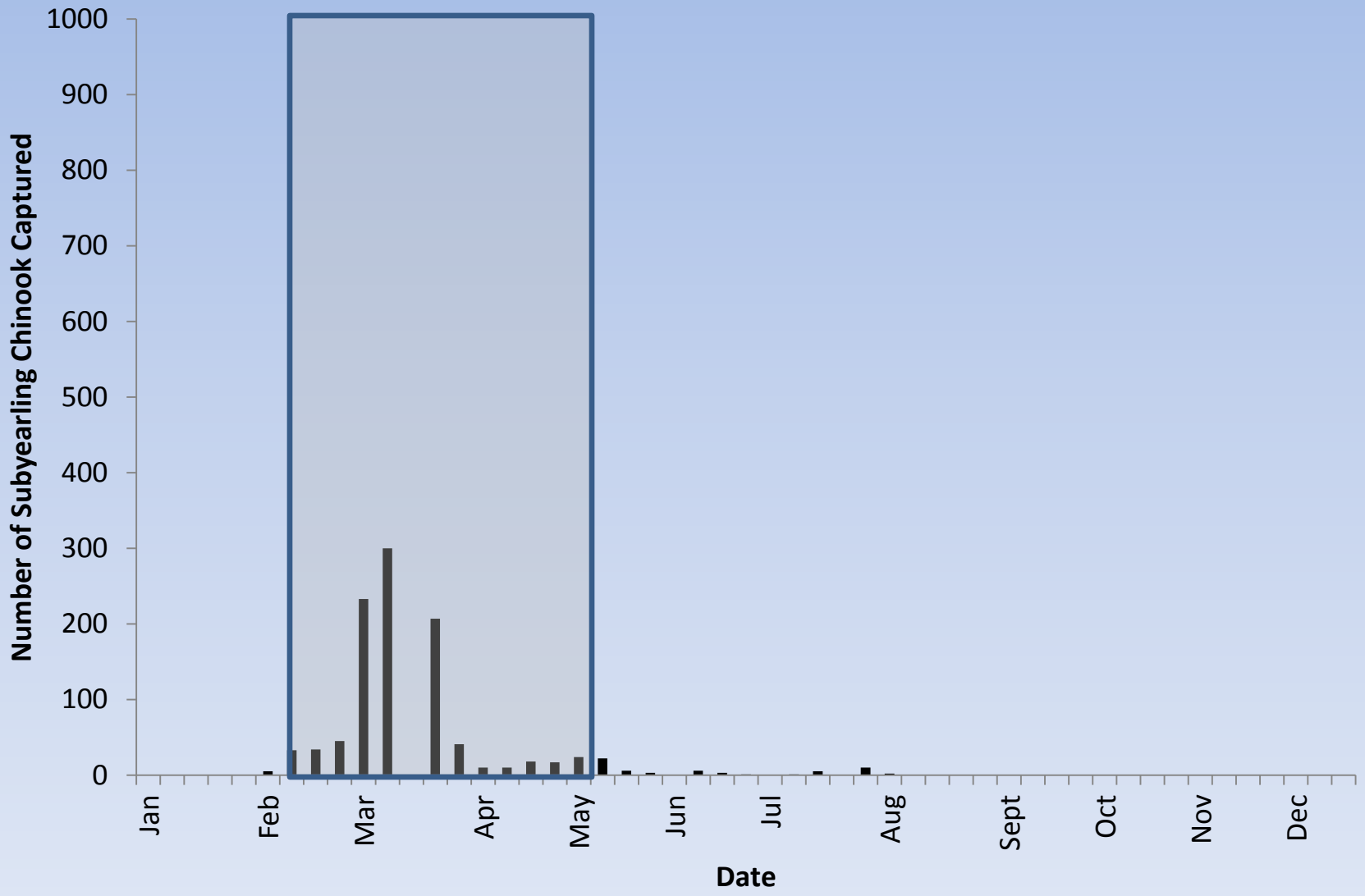
North Santiam River

Reservoir Entry - Size



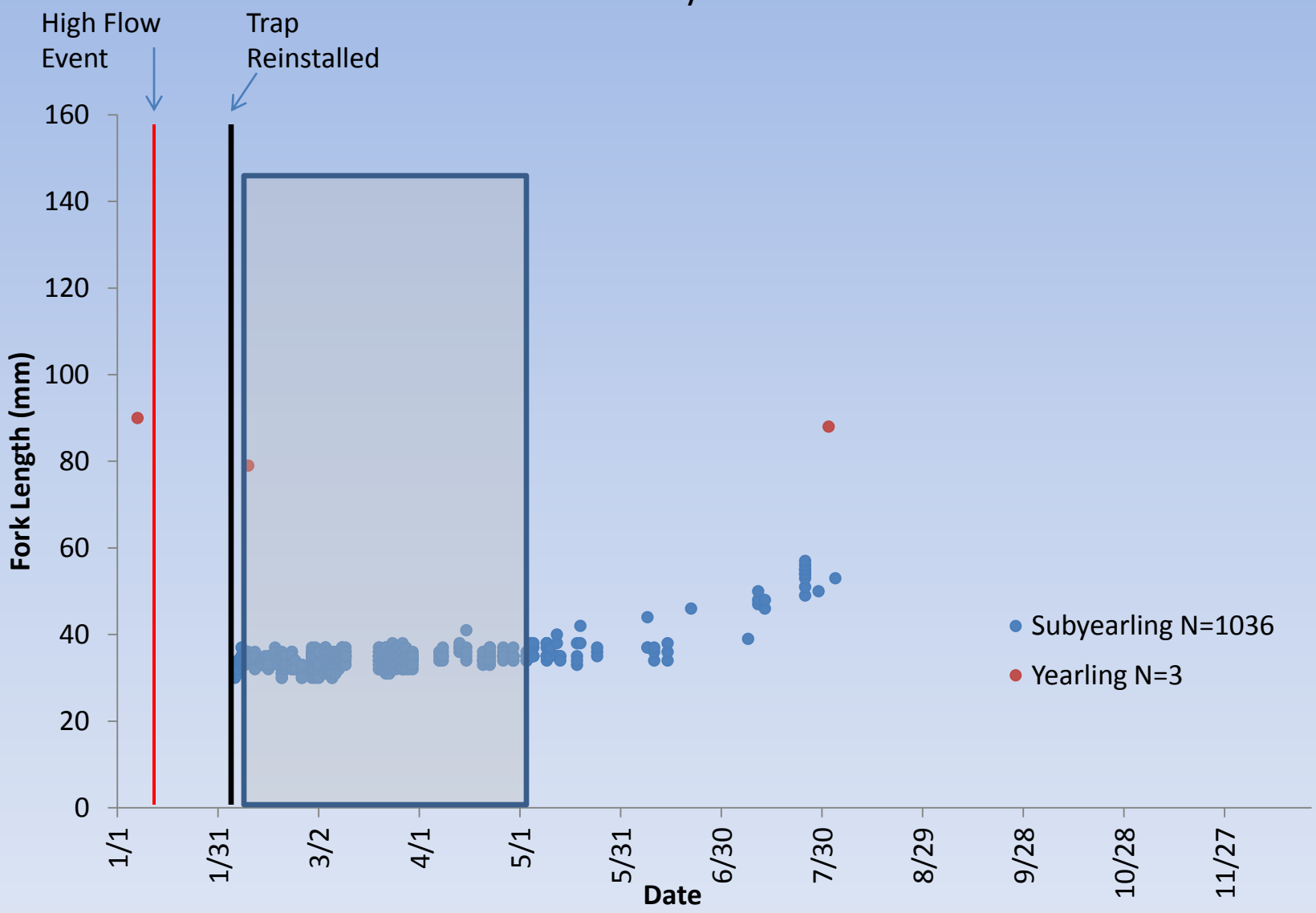
Breitenbush River

Reservoir Entry – Timing and Abundance



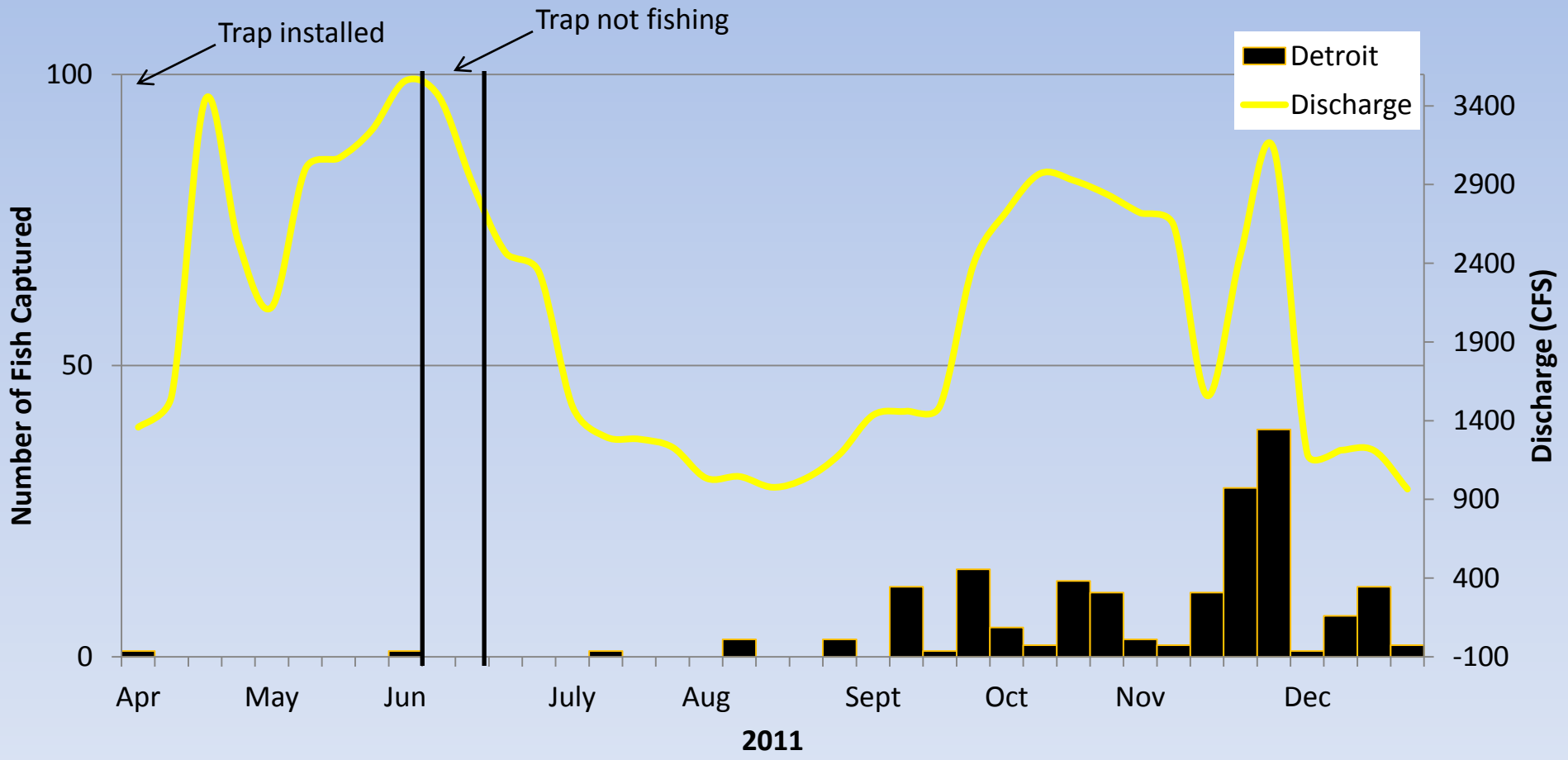
Breitenbush River

Reservoir Entry - Size



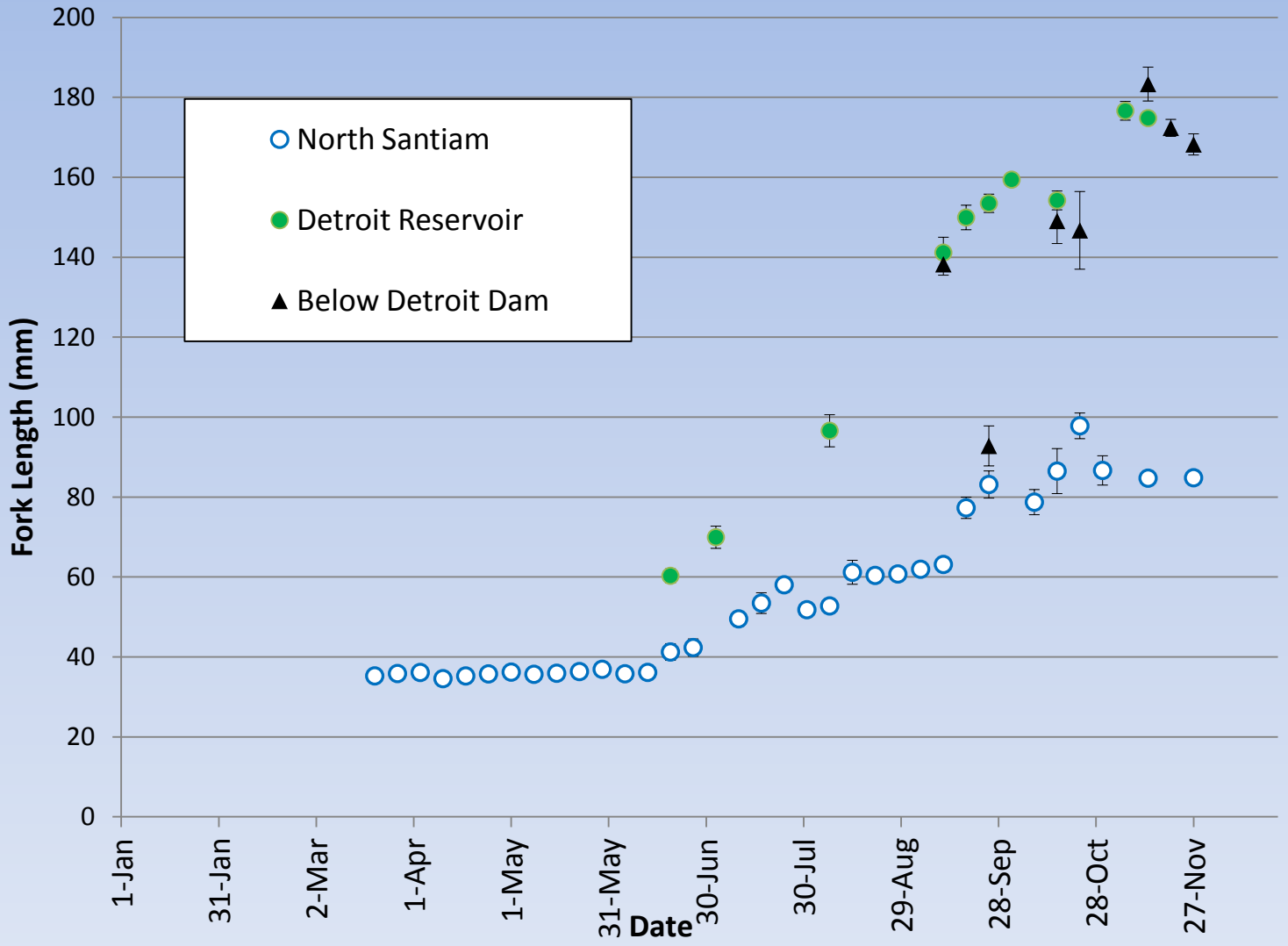
Detroit Dam

Yearling and Subyearling Cohorts Leaving Reservoir

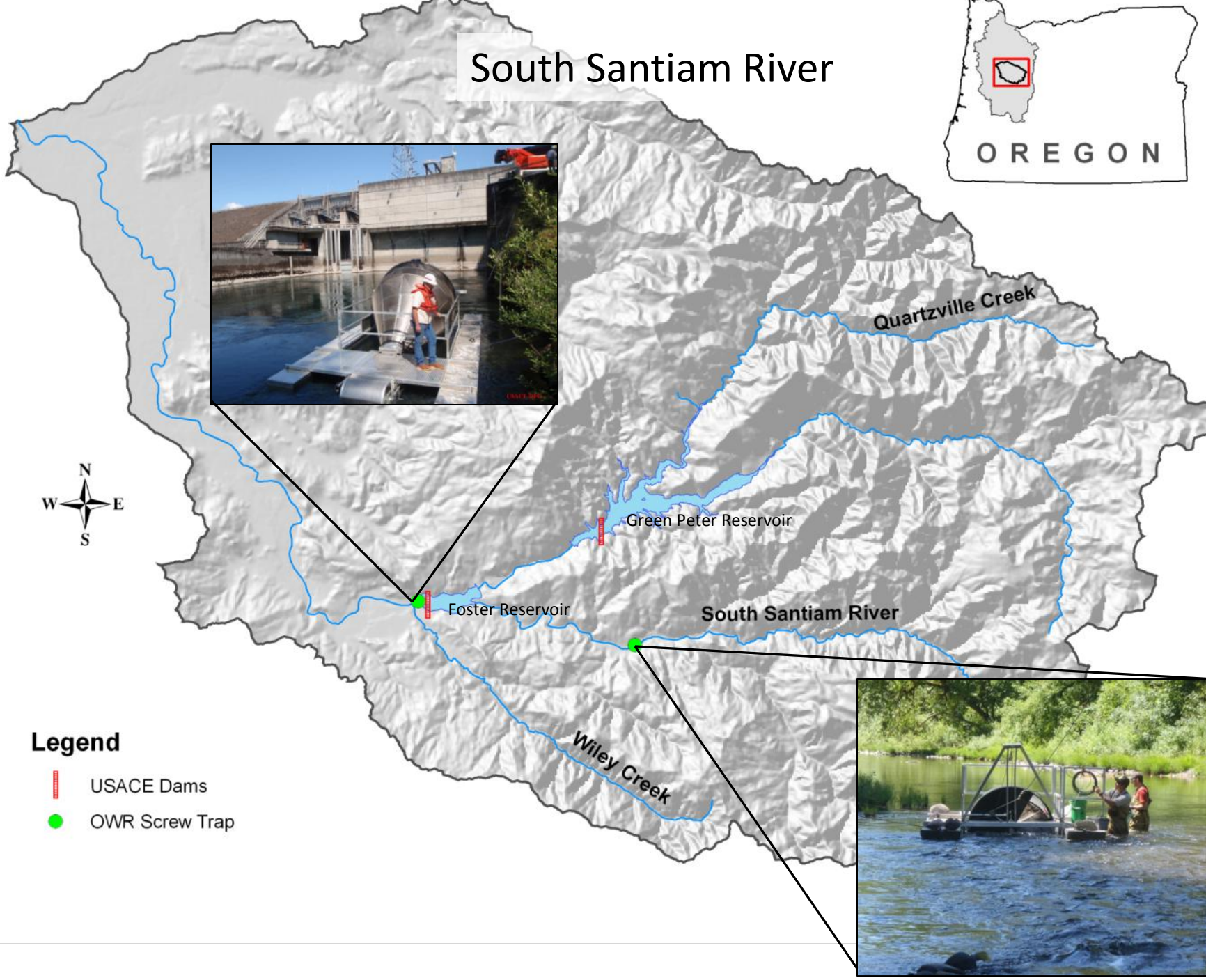


North Santiam River

Subyearling Cohort – Stream vs. Reservoir



South Santiam River

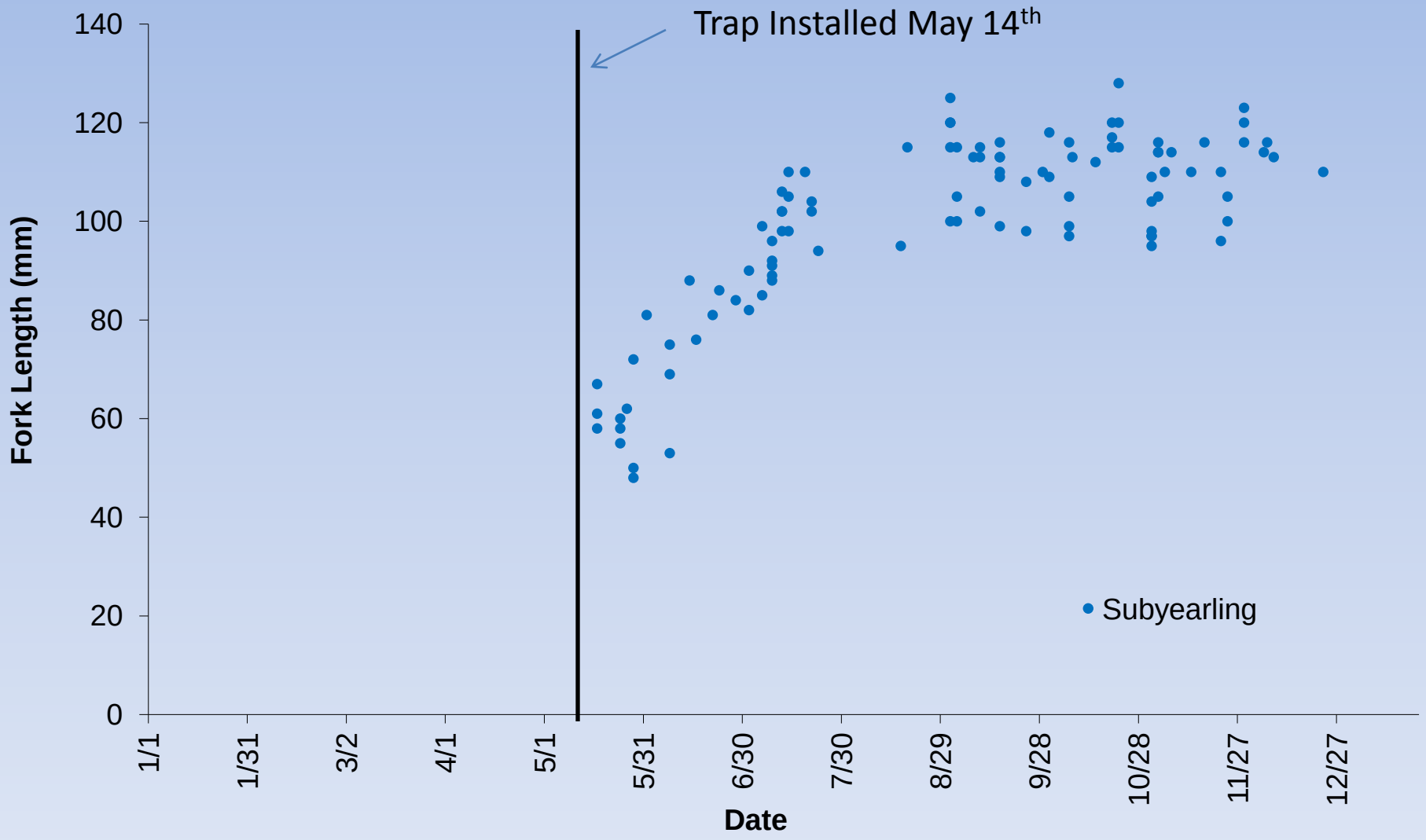


South Santiam River

Reservoir Entry - Size

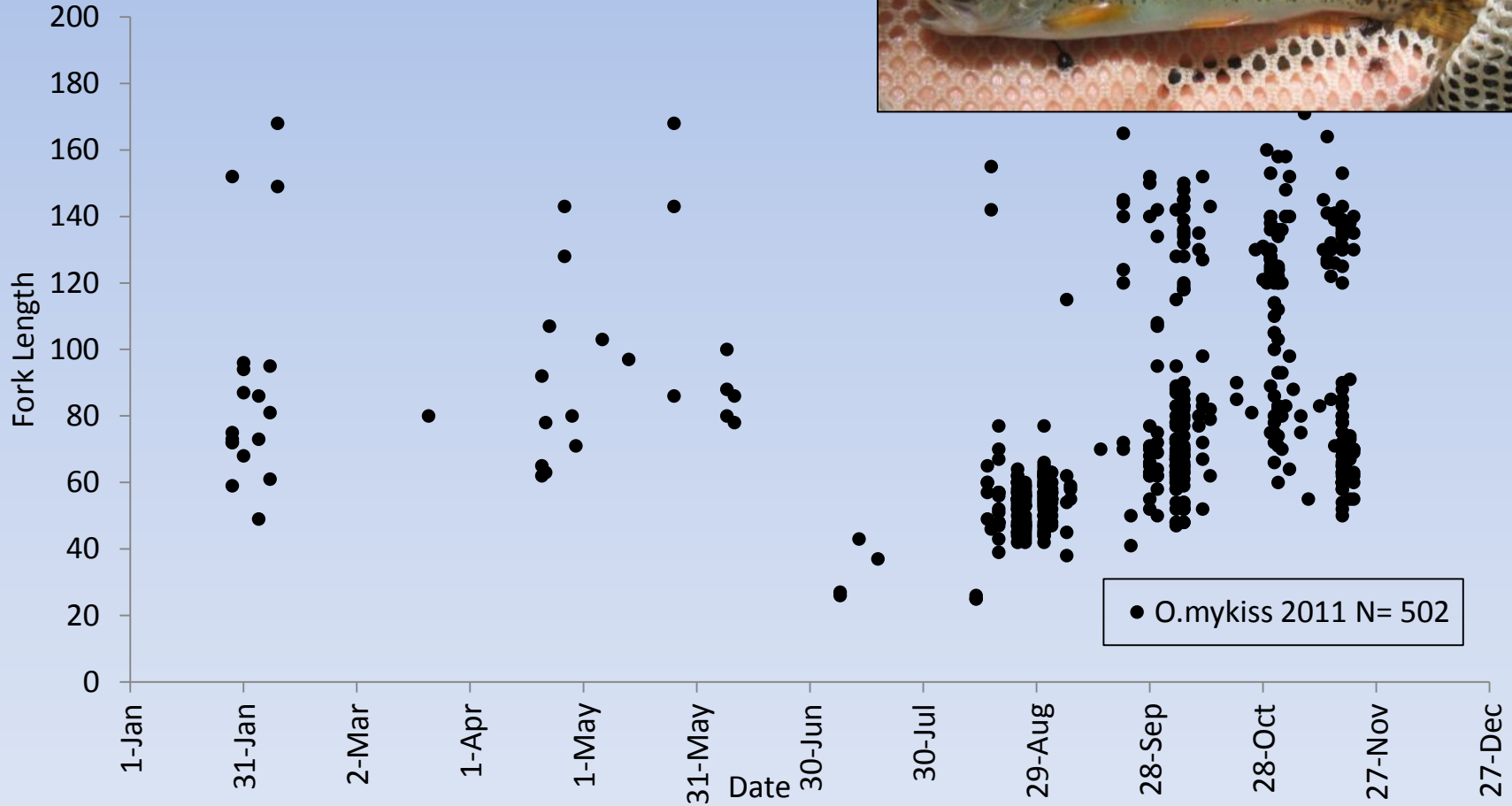
South Santiam River 2010

Reservoir Entry - Size

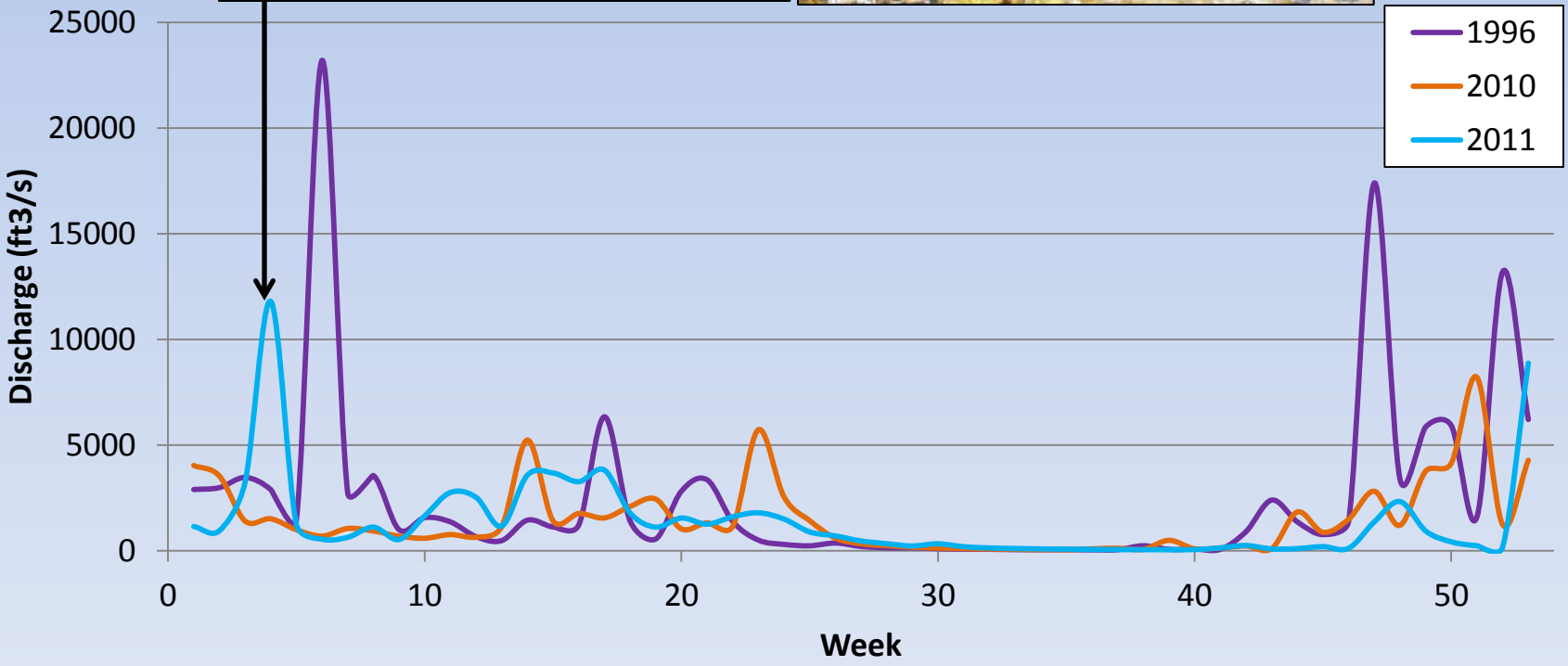


South Santiam River 2011

Oncorhynchus mykiss



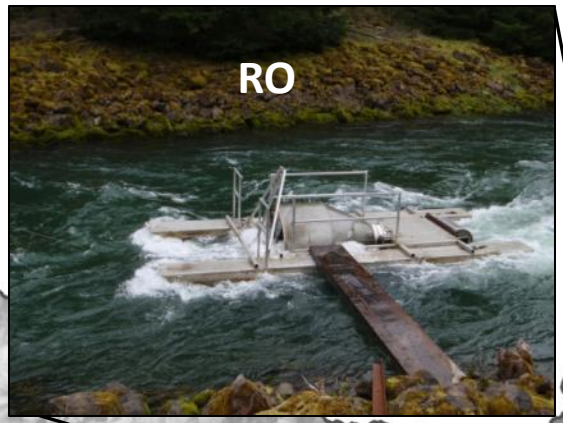
South Santiam Hydrograph



Trap Installation below Foster Dam
July 26th 2011

Photo: Doug Garletts

South Fork McKenzie River



Blue River

McKenzie River

Cougar Reservoir

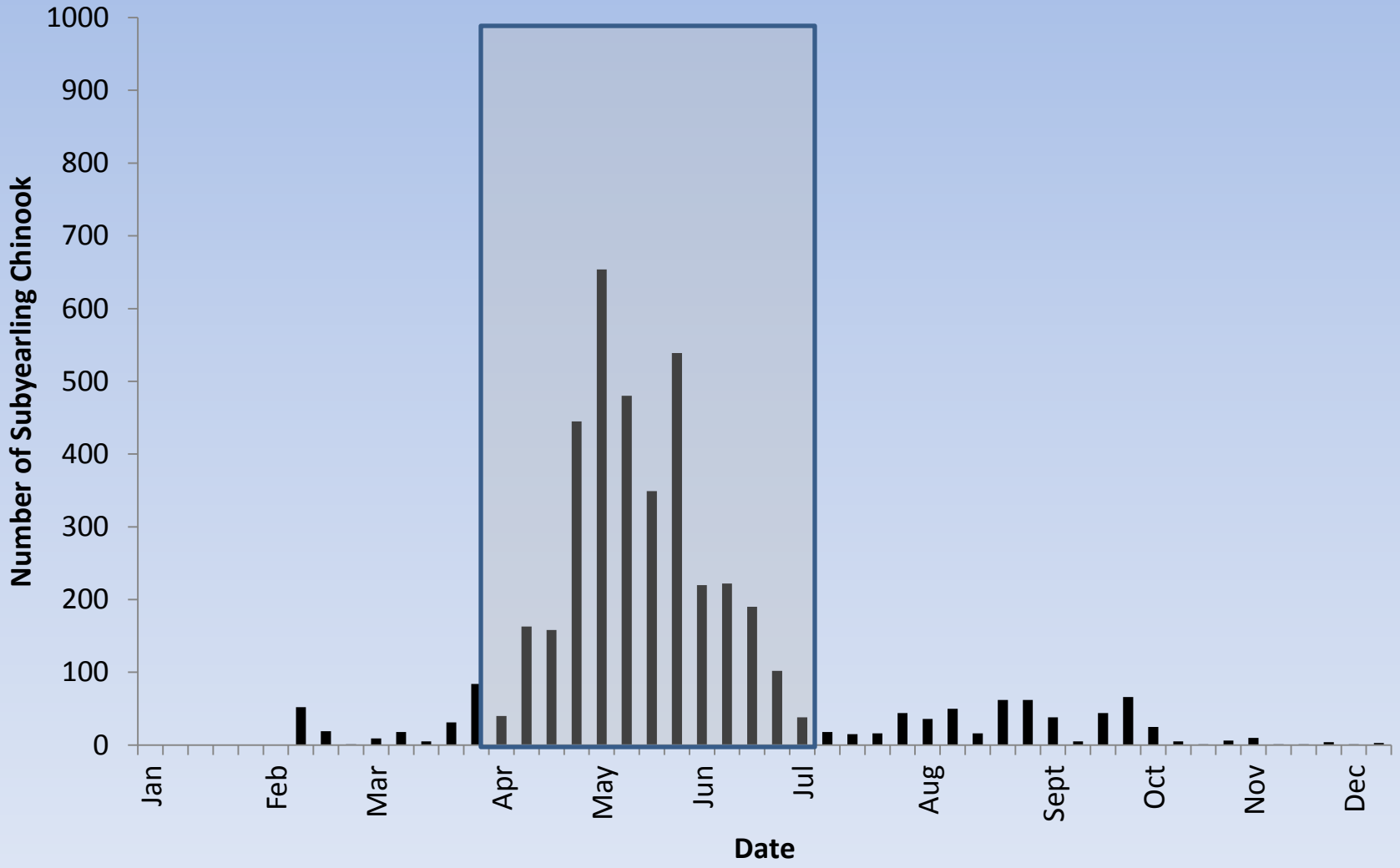
South Fork McKenzie River

Legend

- USACE Dam
- OWR Screw Trap

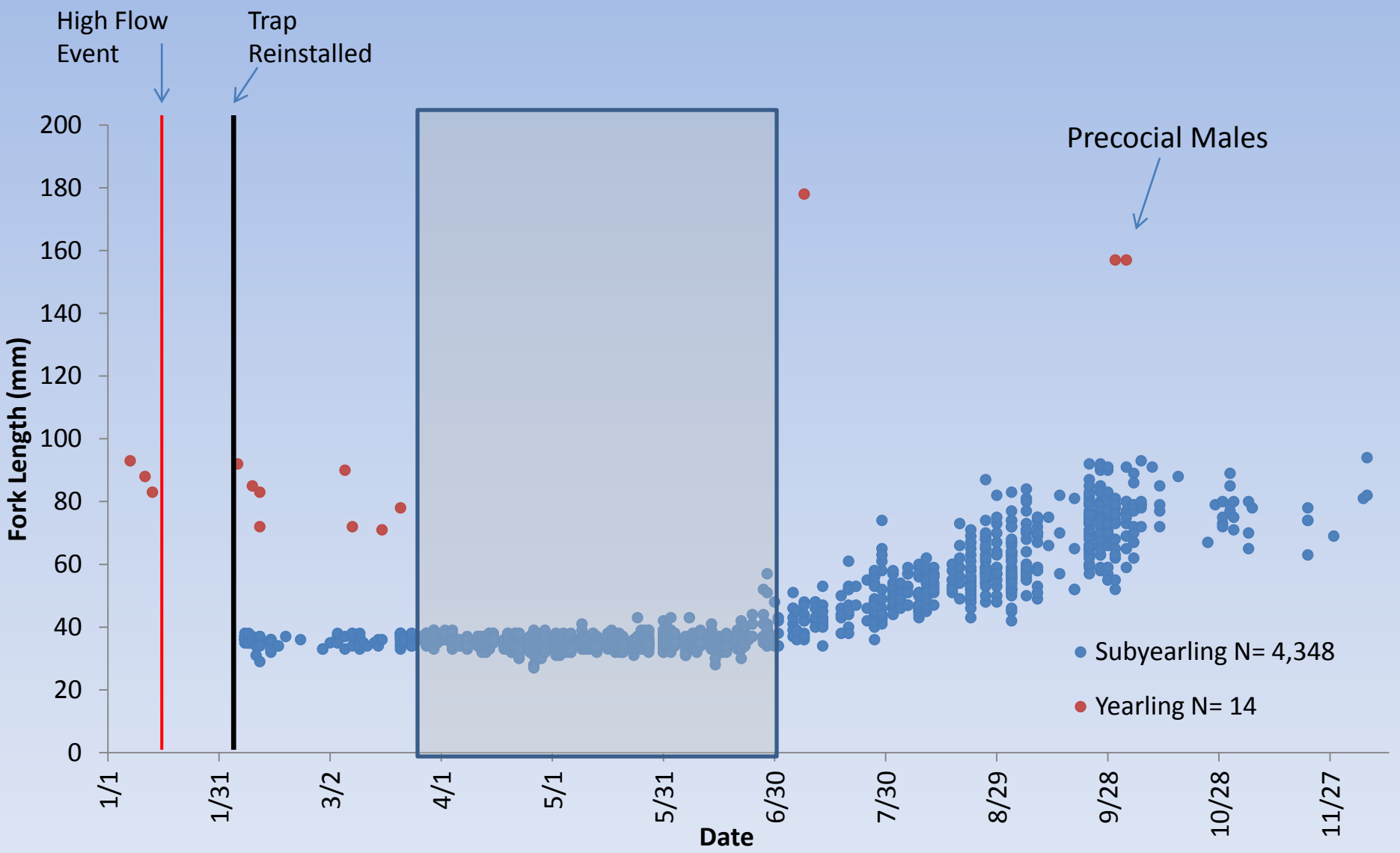
South Fork McKenzie

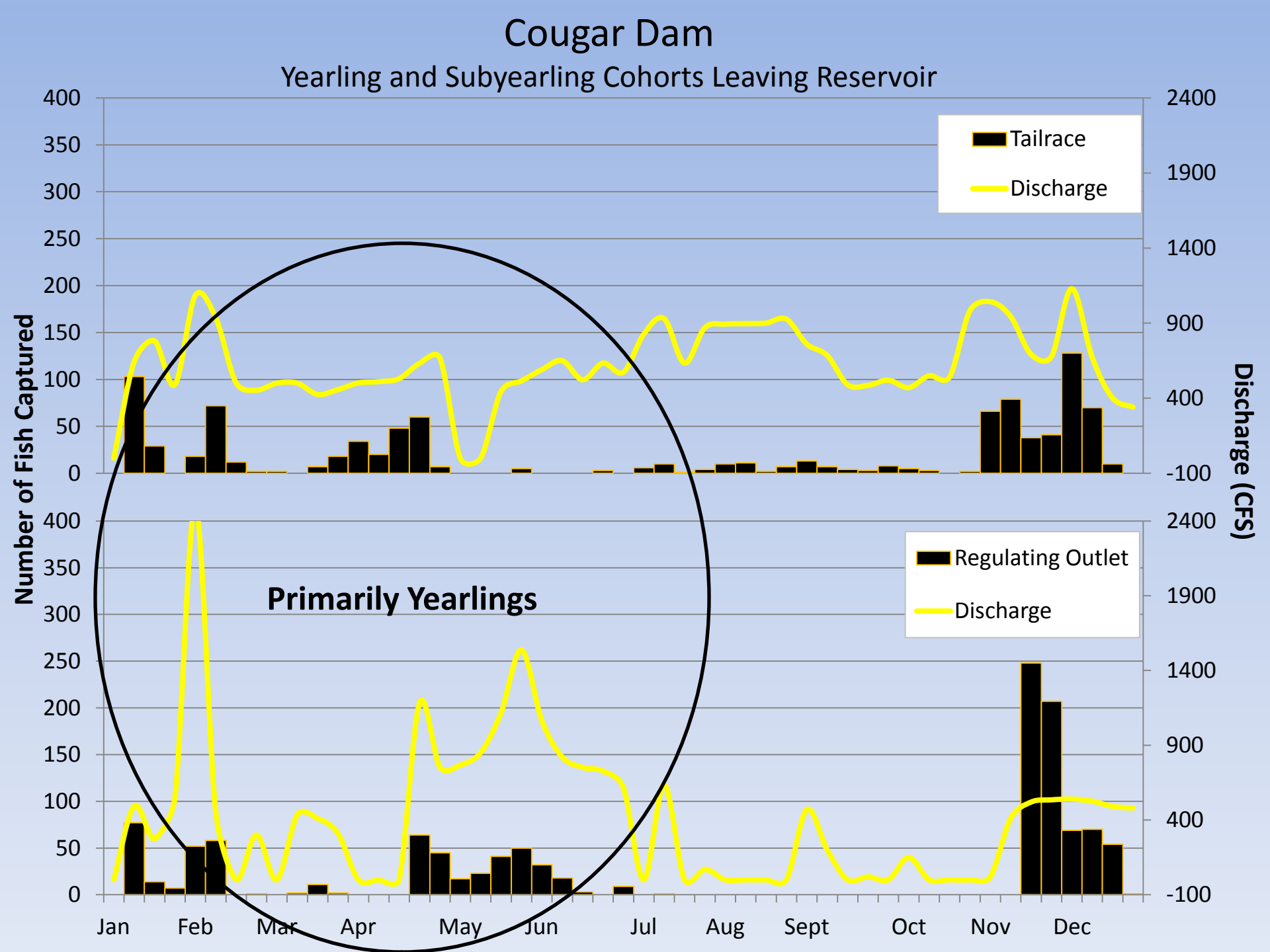
Reservoir Entry – Timing and Abundance



South Fork McKenzie River

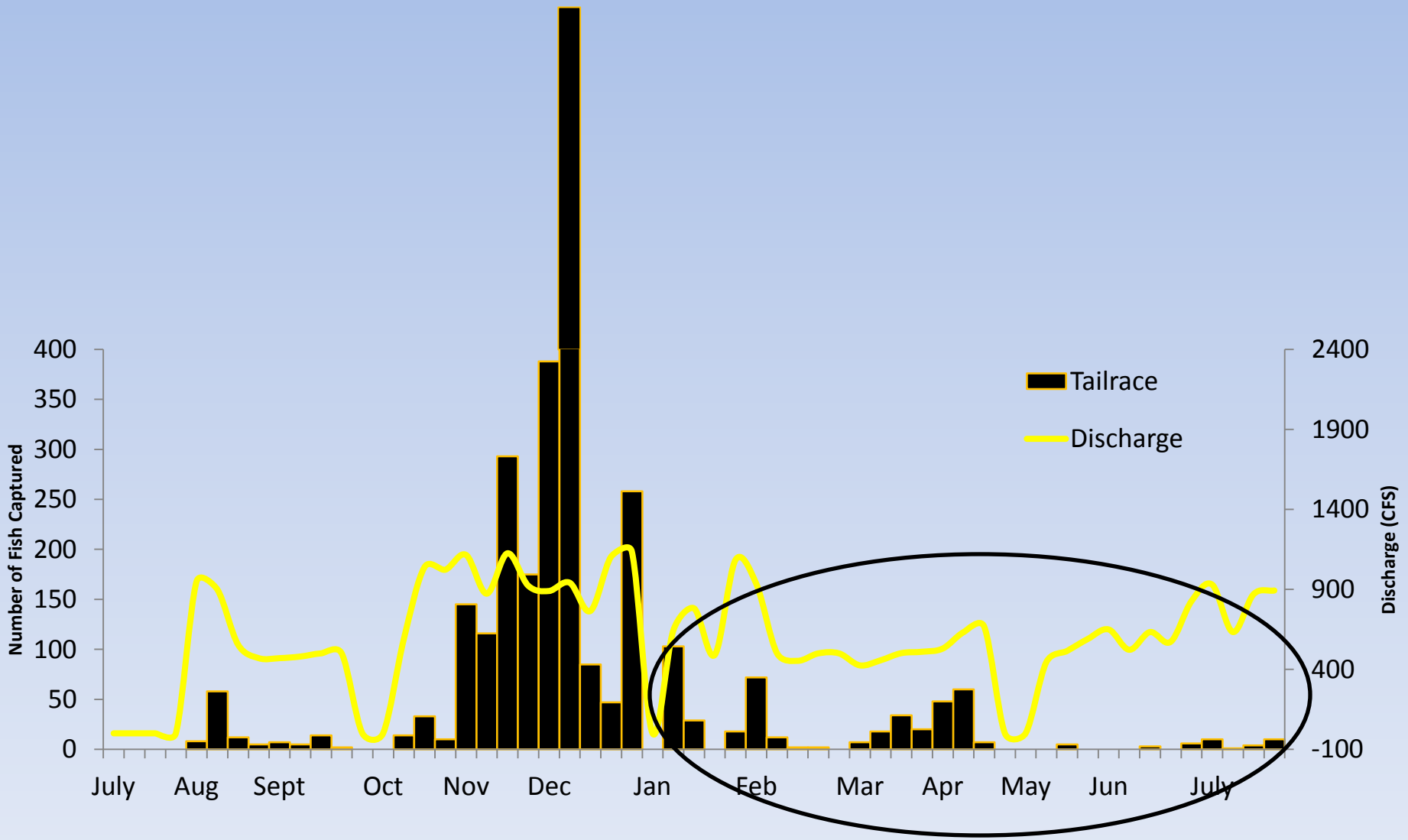
Reservoir Entry - Size




Cougar Dam
Yearling and Subyearling Cohorts Leaving Reservoir
Number of Fish Captured
Discharge (CFS)
Tailrace
Discharge
Regulating Outlet
Discharge
Primarily Yearlings
400
350
300
250
200
150
100
50
0
2400
1900
1400
900
400
-100
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec

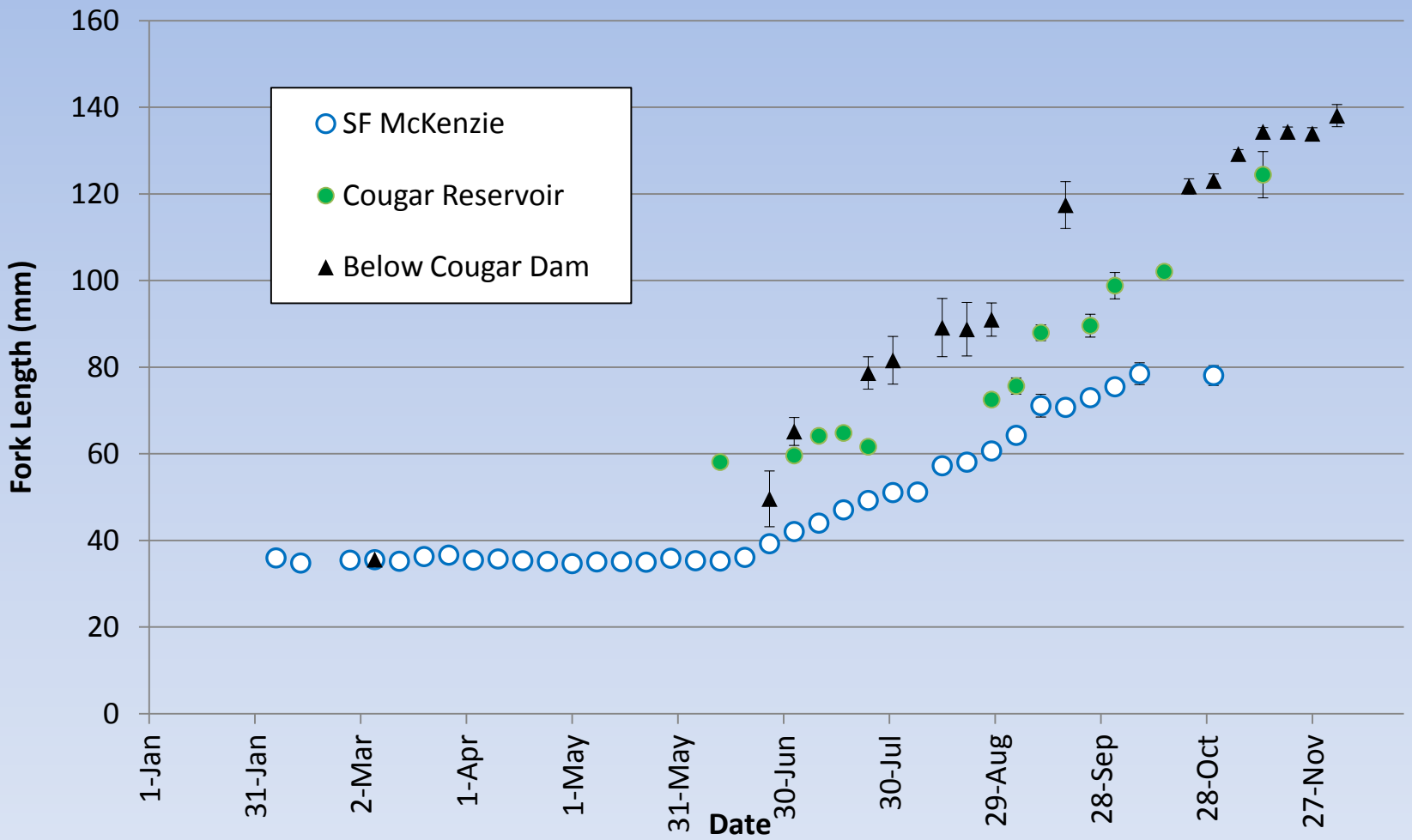
Cougar Dam

July 2010 – July 2011

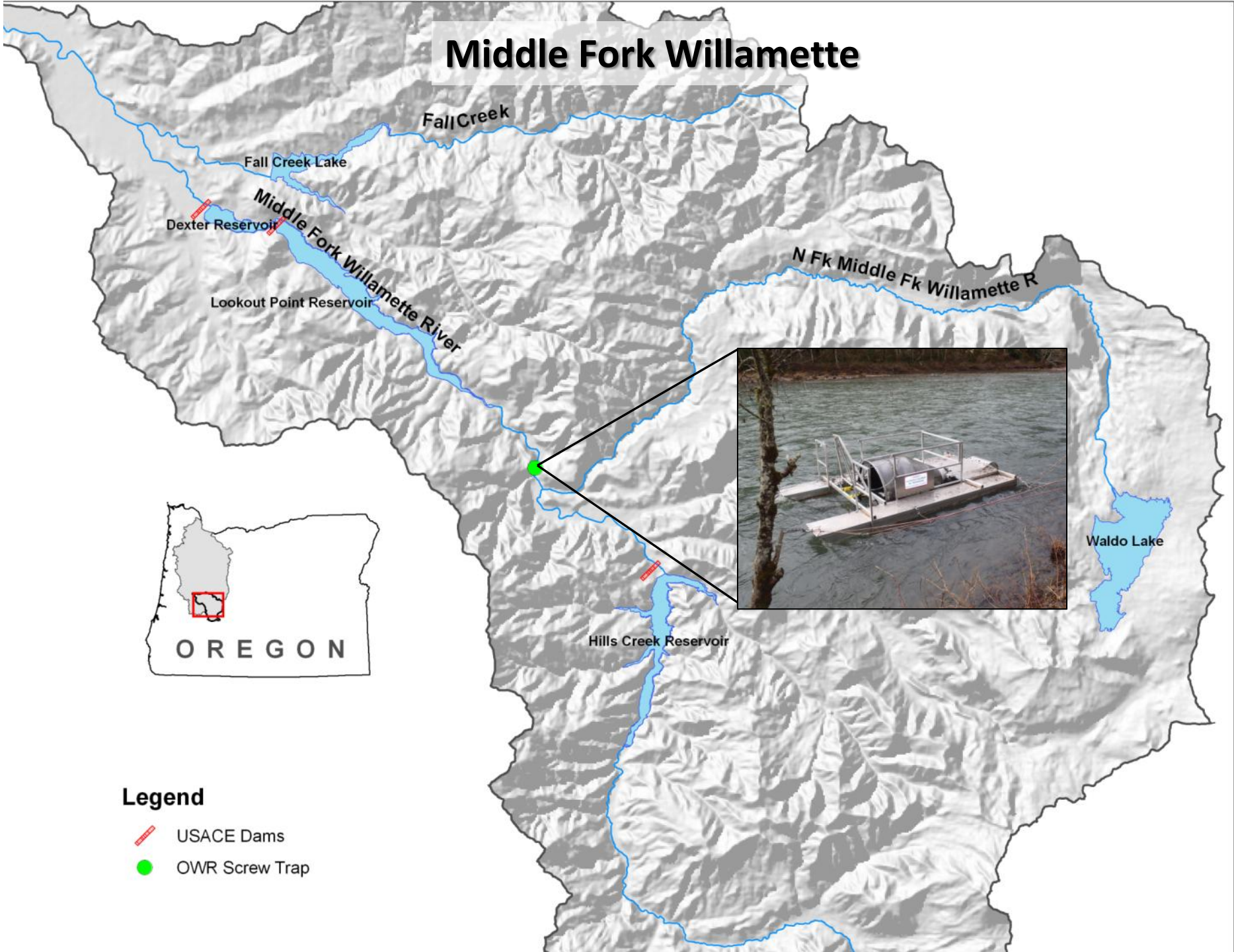


South Fork McKenzie

Subyearling Cohort – Stream vs. Reservoir

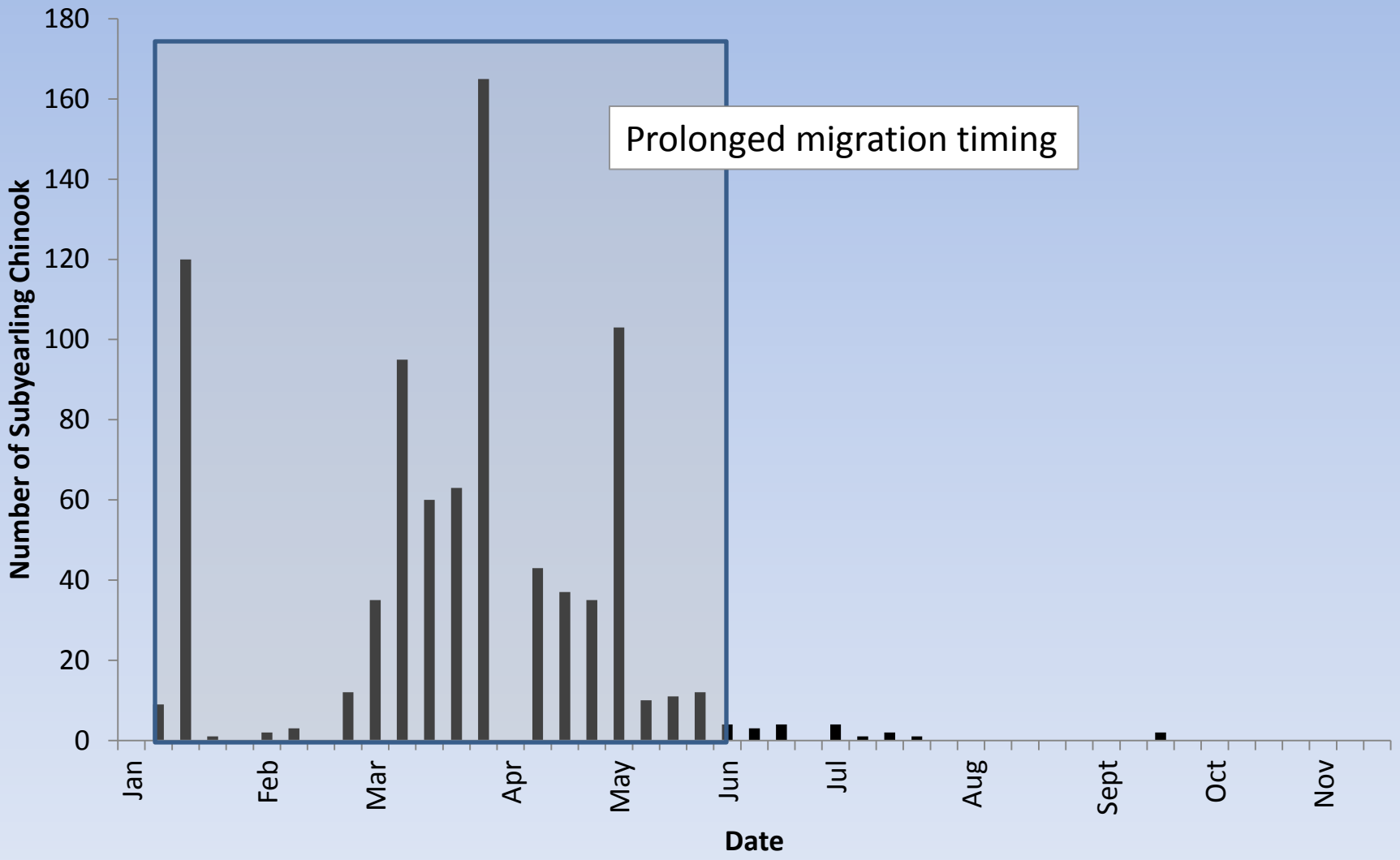


Middle Fork Willamette



Middle Fork Willamette River

Reservoir Entry – Timing and Abundance



Middle Fork Willamette River

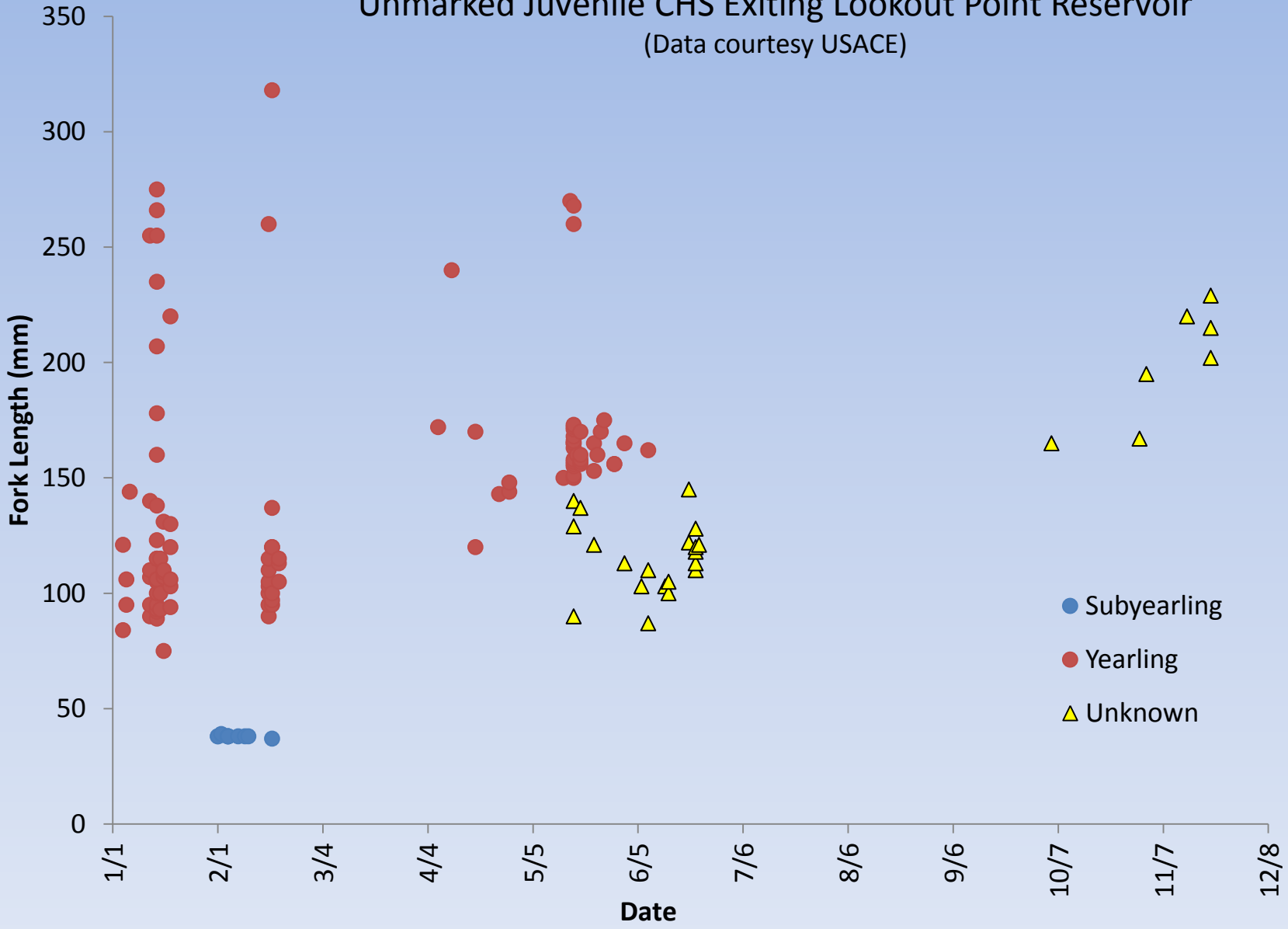
Lookout Point Reservoir Entry

58 Km from end of spawning distribution to screw trap

Middle Fork Willamette River

Unmarked Juvenile CHS Exiting Lookout Point Reservoir

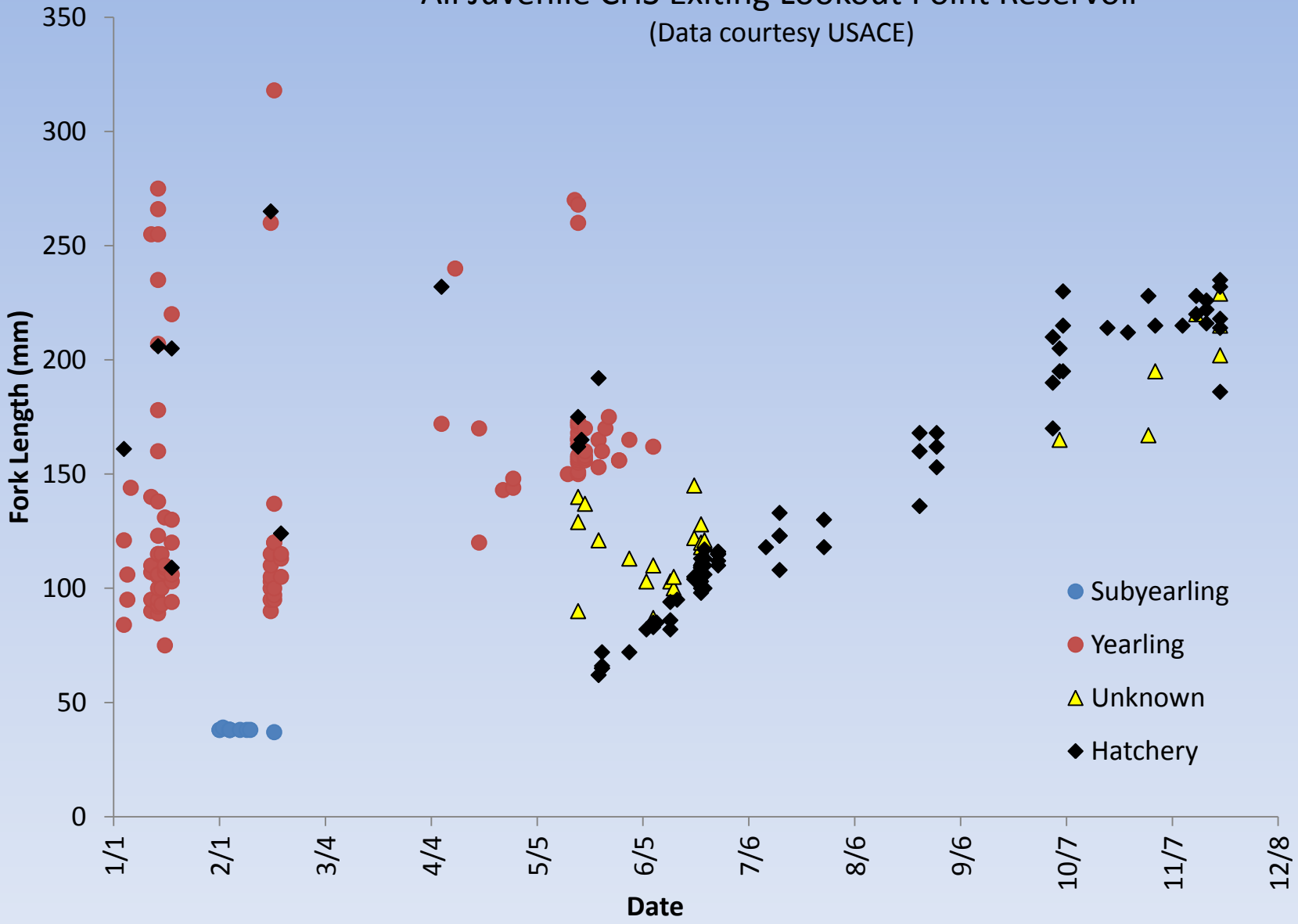
(Data courtesy USACE)



Middle Fork Willamette River

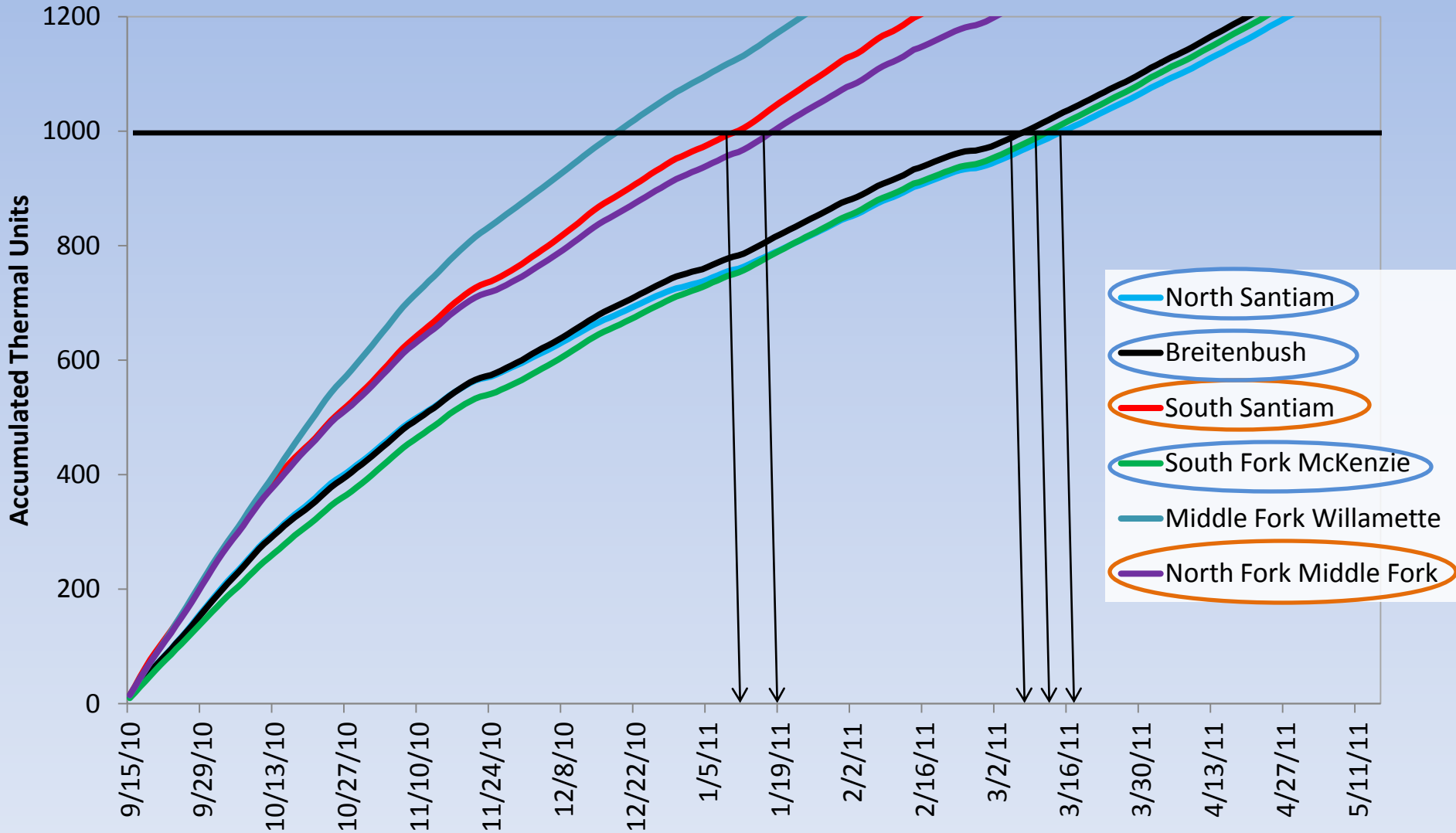
All Juvenile CHS Exiting Lookout Point Reservoir

(Data courtesy USACE)

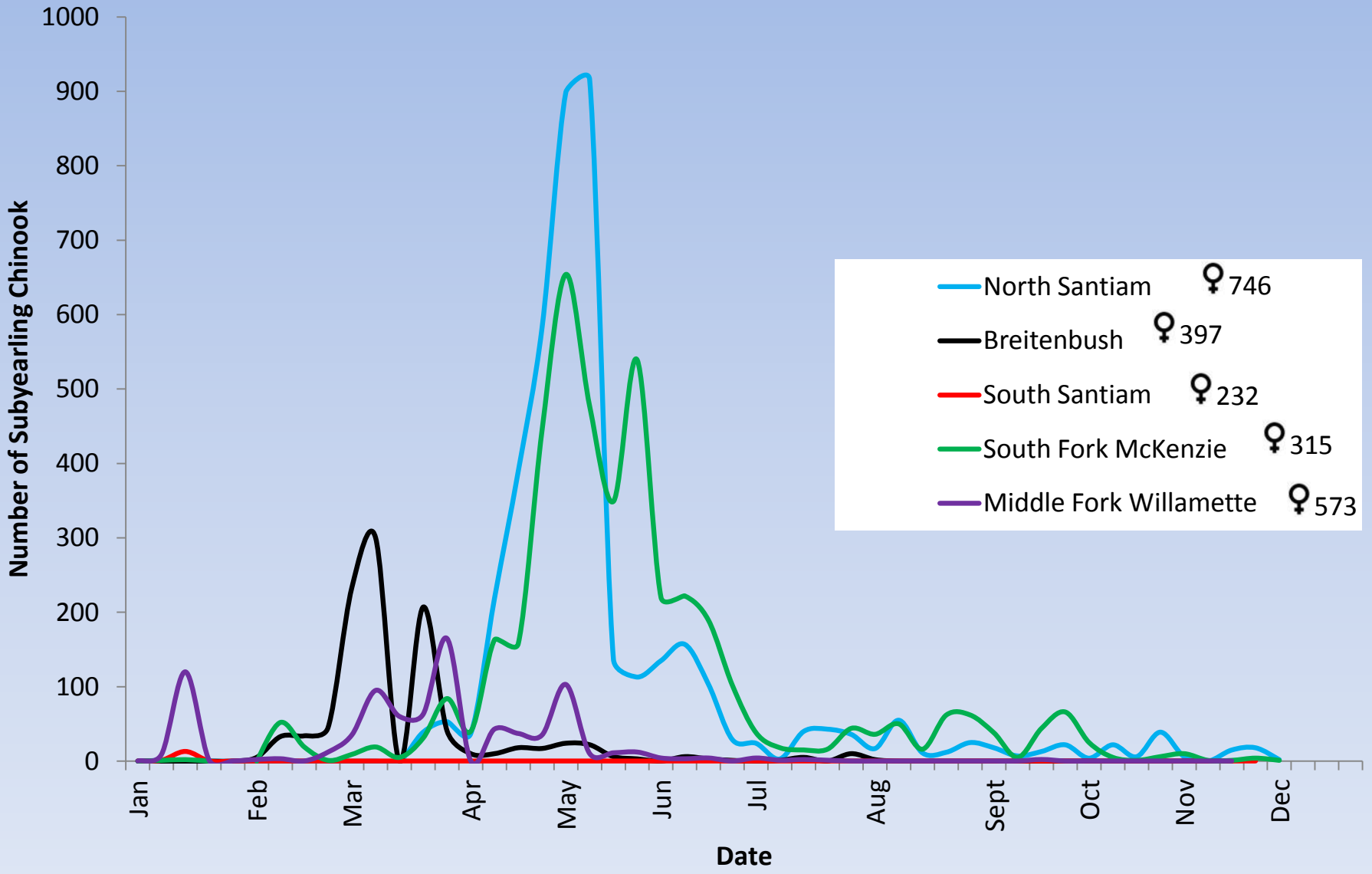


Comparative Predicted Emergence Timing

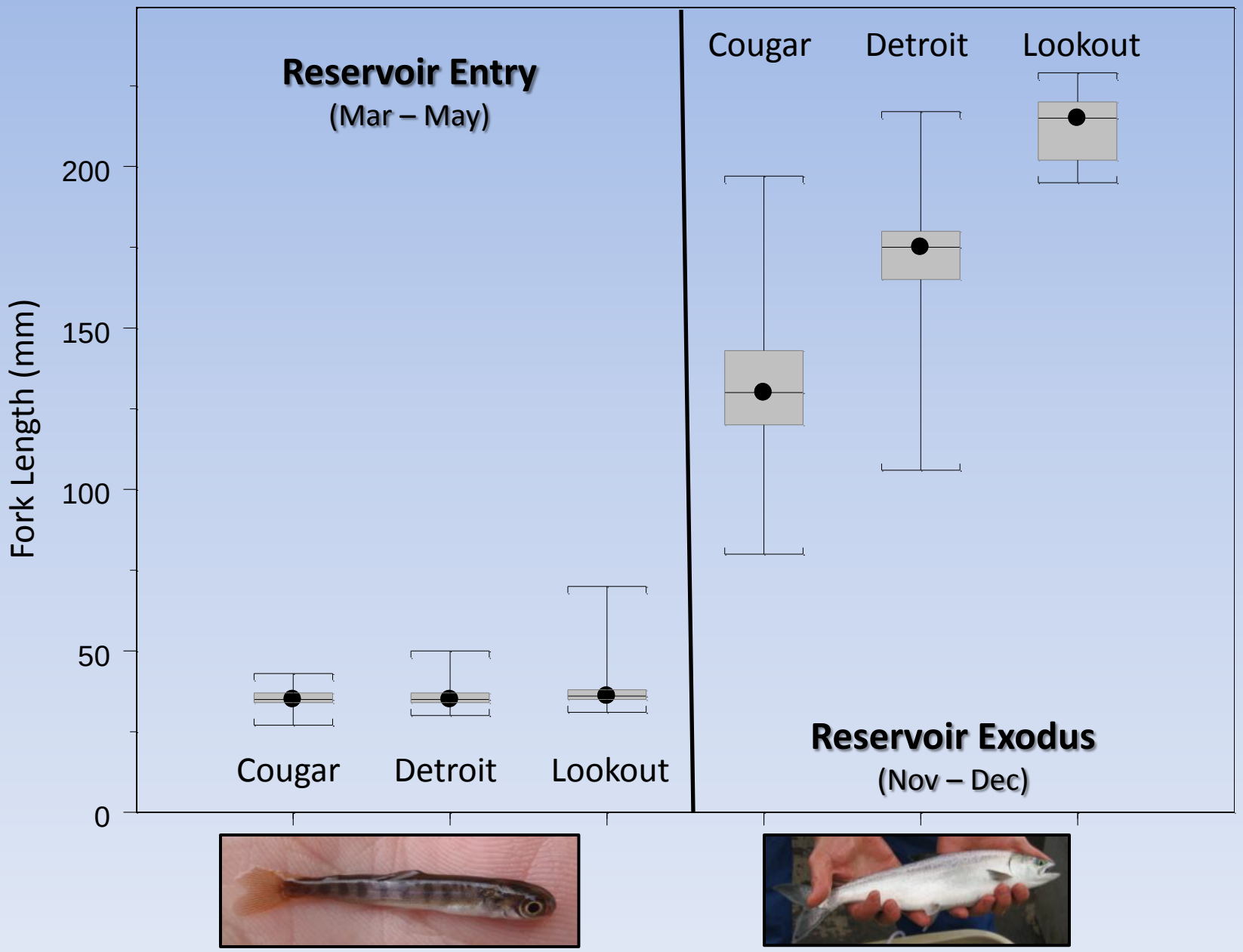
[using accumulated thermal units (ATU)]



Run Timing and Relative Catch



Reservoir Growth Comparison



Conclusions:

Reservoir Migration Timing –

- A majority of juvenile CHS **enter** as fry in early spring (Jan-Jun) –
  - emergence timing (ACU)
  - distance from spawning of adults to head of reservoir
  - discharge
- Very few fry continue migration through reservoir
- A majority **exit** as subyearlings in the winter (Nov-Dec)

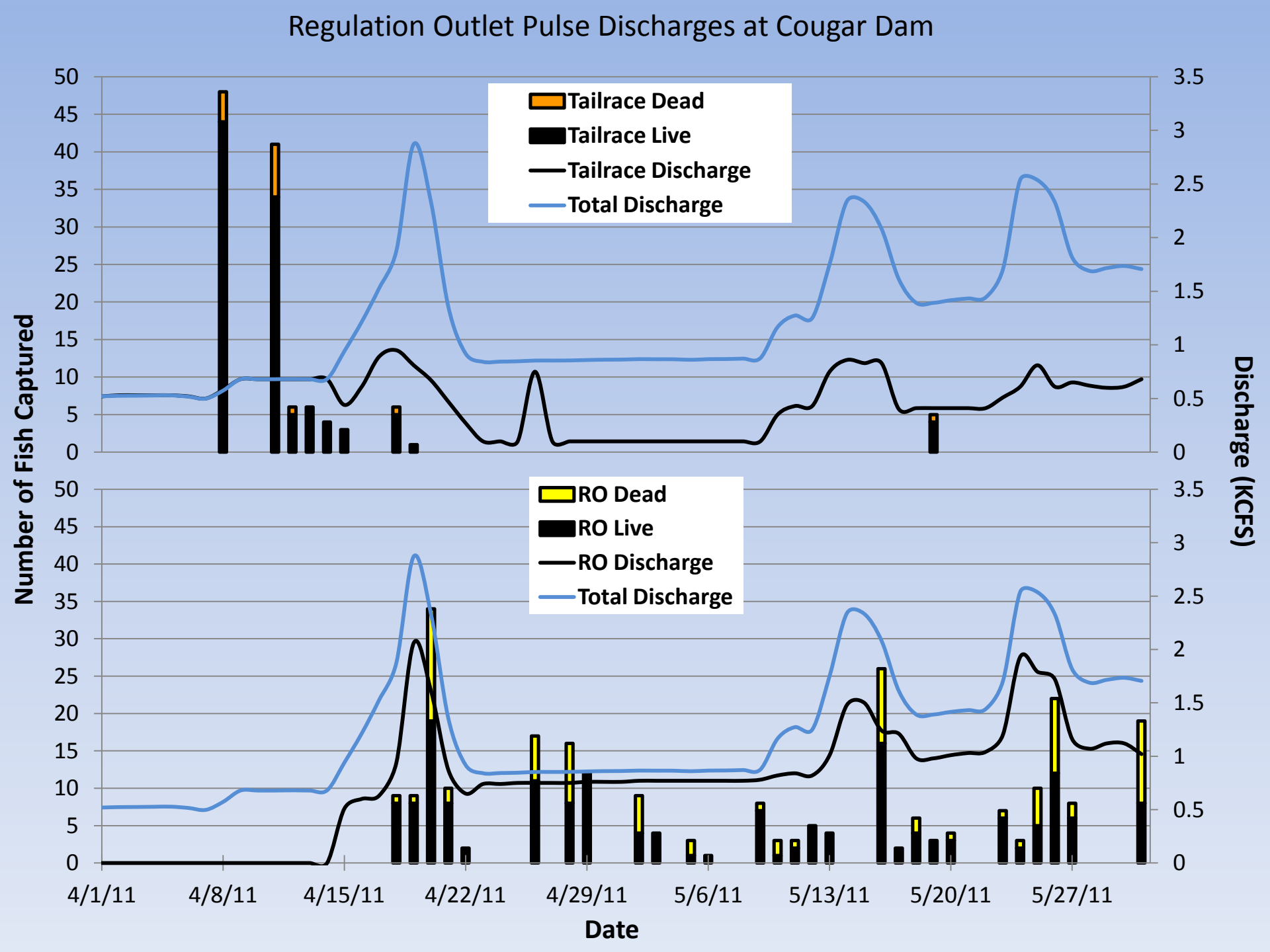
Size –

- A majority of juvenile CHS enter reservoirs ~35 mm
  - Highly susceptible to predation

Growth Comparison –

- Reservoir rearing fish grow faster than stream rearing fish
  - May increase survival to adult return
- Large fish have higher mortality associated with dam passage

Questions ? ? ?


Regulation Outlet Pulse Discharges at Cougar Dam
Tailrace Dead
Tailrace Live
Tailrace Discharge
Total Discharge
RO Dead
RO Live
RO Discharge
Total Discharge
Number of Fish Captured
Discharge (KCFS)
Date
4/1/11
4/8/11
4/15/11
4/22/11
4/29/11
5/6/11
5/13/11
5/20/11
5/27/11

Spillway Discharge at Detroit Dam