



# You Only Leave Once: Use of the Yolo Bypass by Out-Migrating Juvenile Chinook Salmon

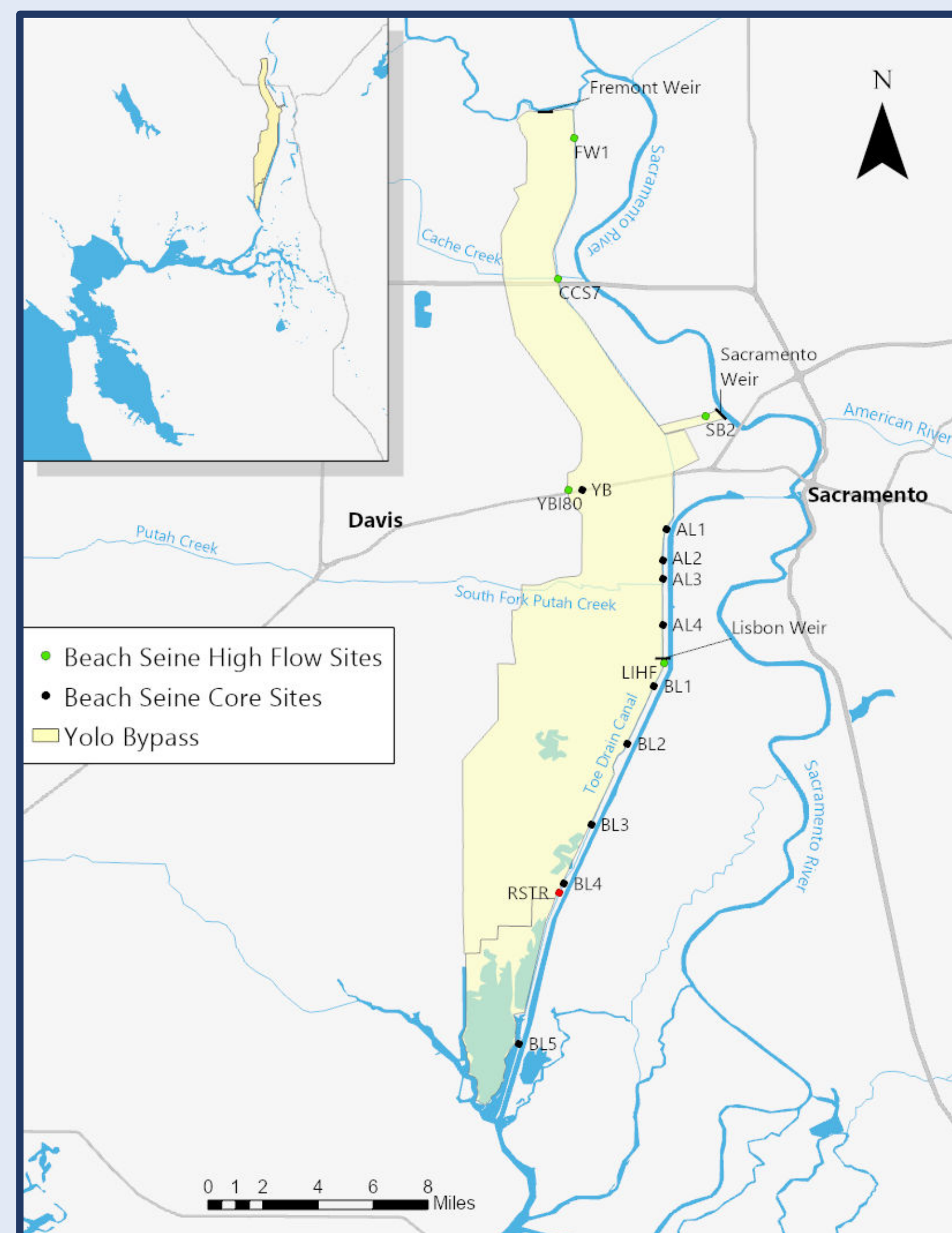
Amanda Casby, Nicole Kwan, Brian Schreier  
California Department of Water Resources



Photo: Carson Jeffres

## Introduction

- Since 1998, the Yolo Bypass Fish Monitoring Program (YBFMP) has monitored fish presence in the Yolo Bypass.
- The Yolo Bypass is the largest remnant floodplain of the Sacramento River and provides productive rearing habitat for juvenile Chinook salmon, mainly in years of floodplain inundation.
- To better understand the use of the Yolo Bypass by threatened and endangered runs of Chinook salmon, YBFMP began genetically identifying the run type of each salmon sampled in 2015.



Map of YBFMP sampling sites.

## Methods

### Fish Collection

#### Rotary Screw Trap

- Samples fish leaving the Toe Drain from January – June.

#### Beach Seine

- Biweekly beach seines occur at 8 core sites along the Toe Drain.
- During inundation, seines are done weekly at 11 sites.

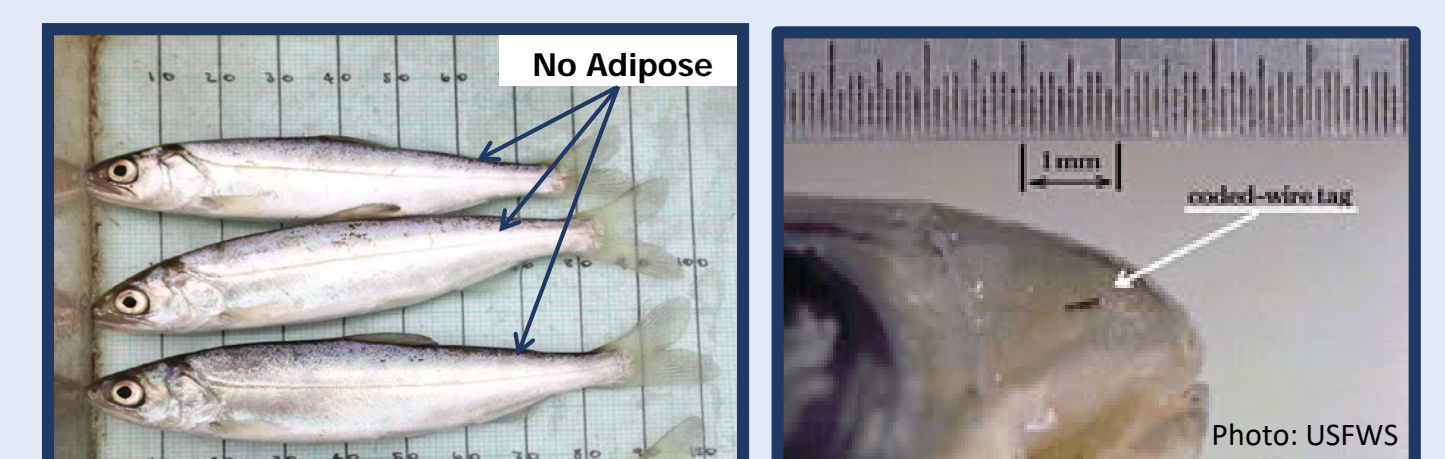
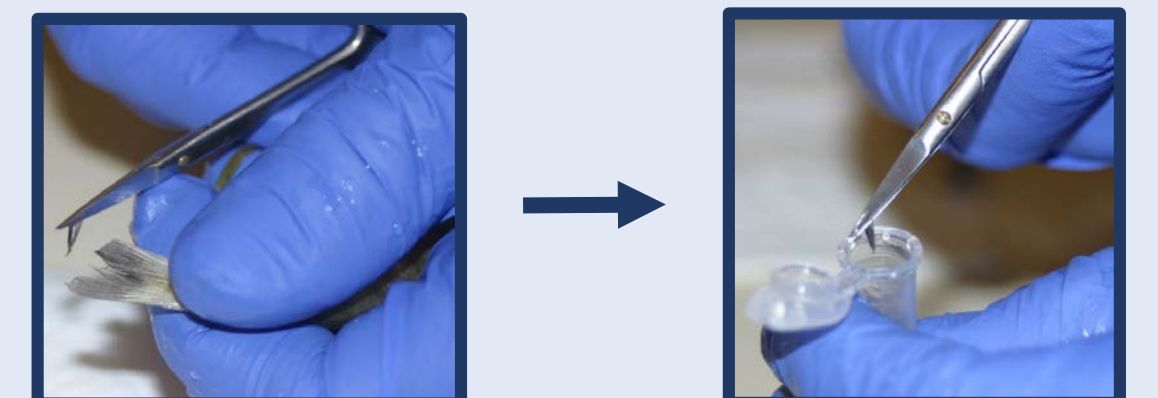
### Run Type Verification

#### Fin Clips

- Caudal fin clips are taken for all adipose-present juvenile to genetically confirm run type.

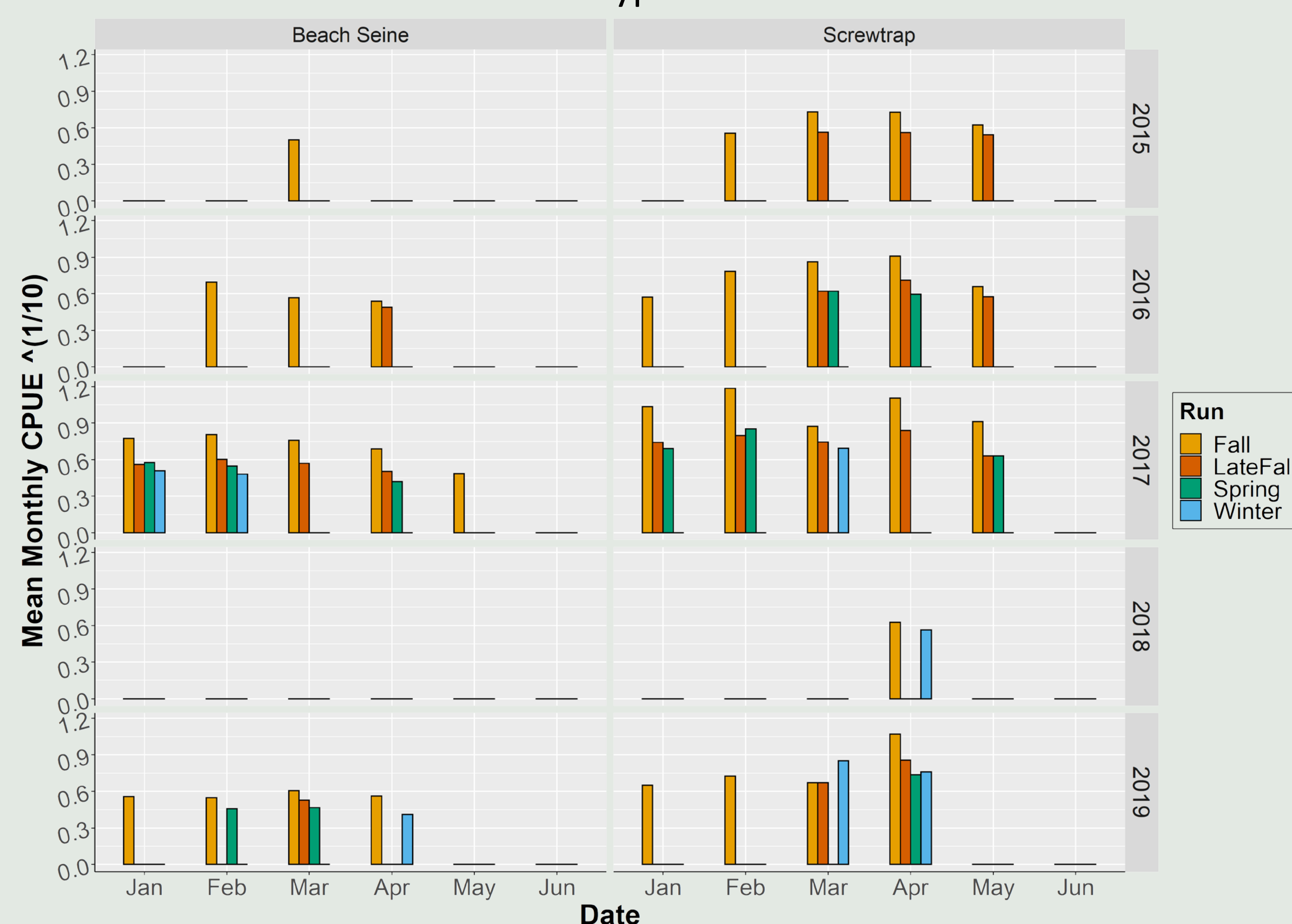
#### Coded Wire Tags

- Adipose-absent fish are preserved for coded wire tag extraction to confirm what hatchery the fish is from and its run type.

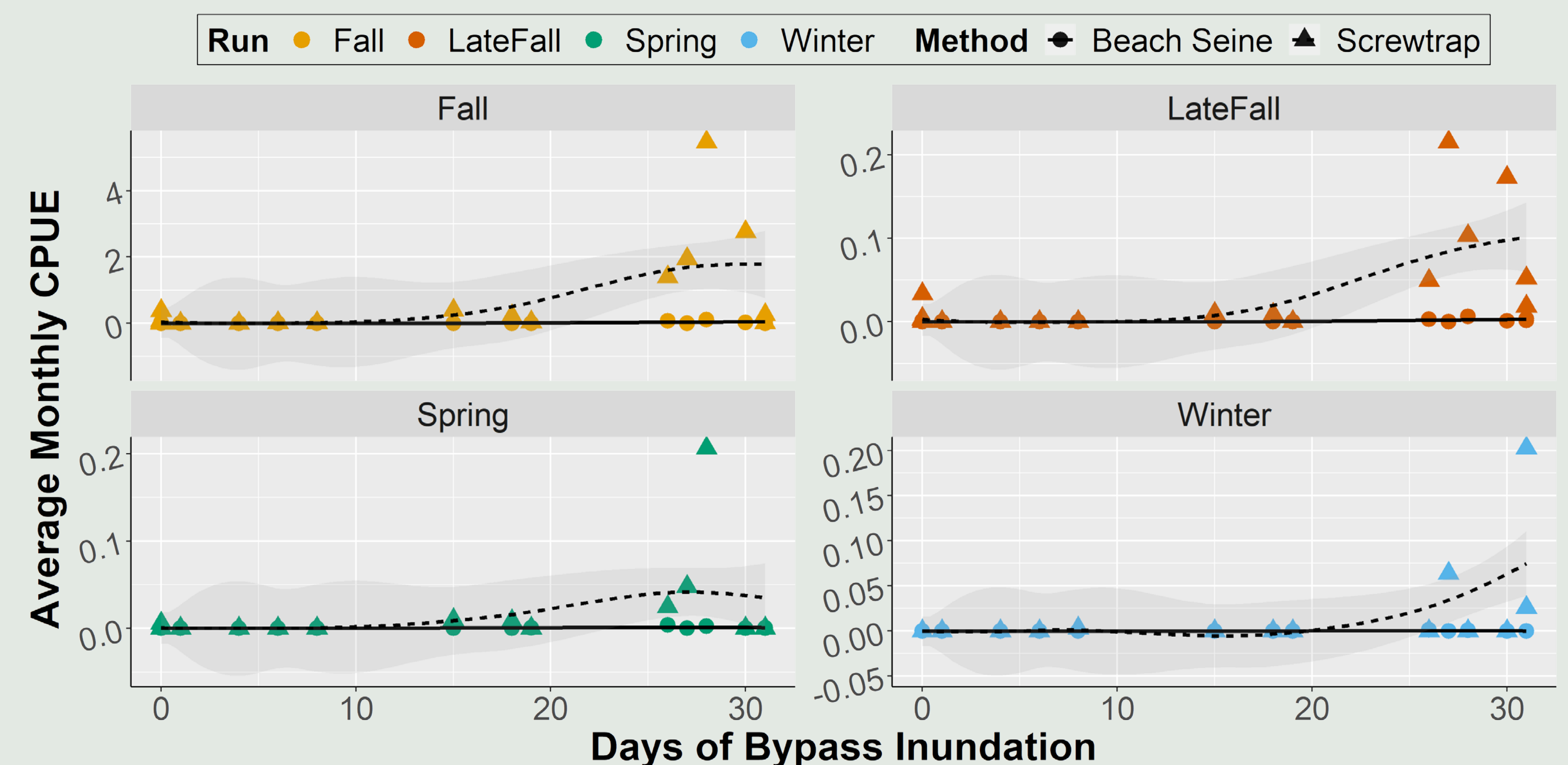


## Results

### 1. General catch per unit effort (CPUE) trends of juvenile Chinook Salmon in the Yolo Bypass

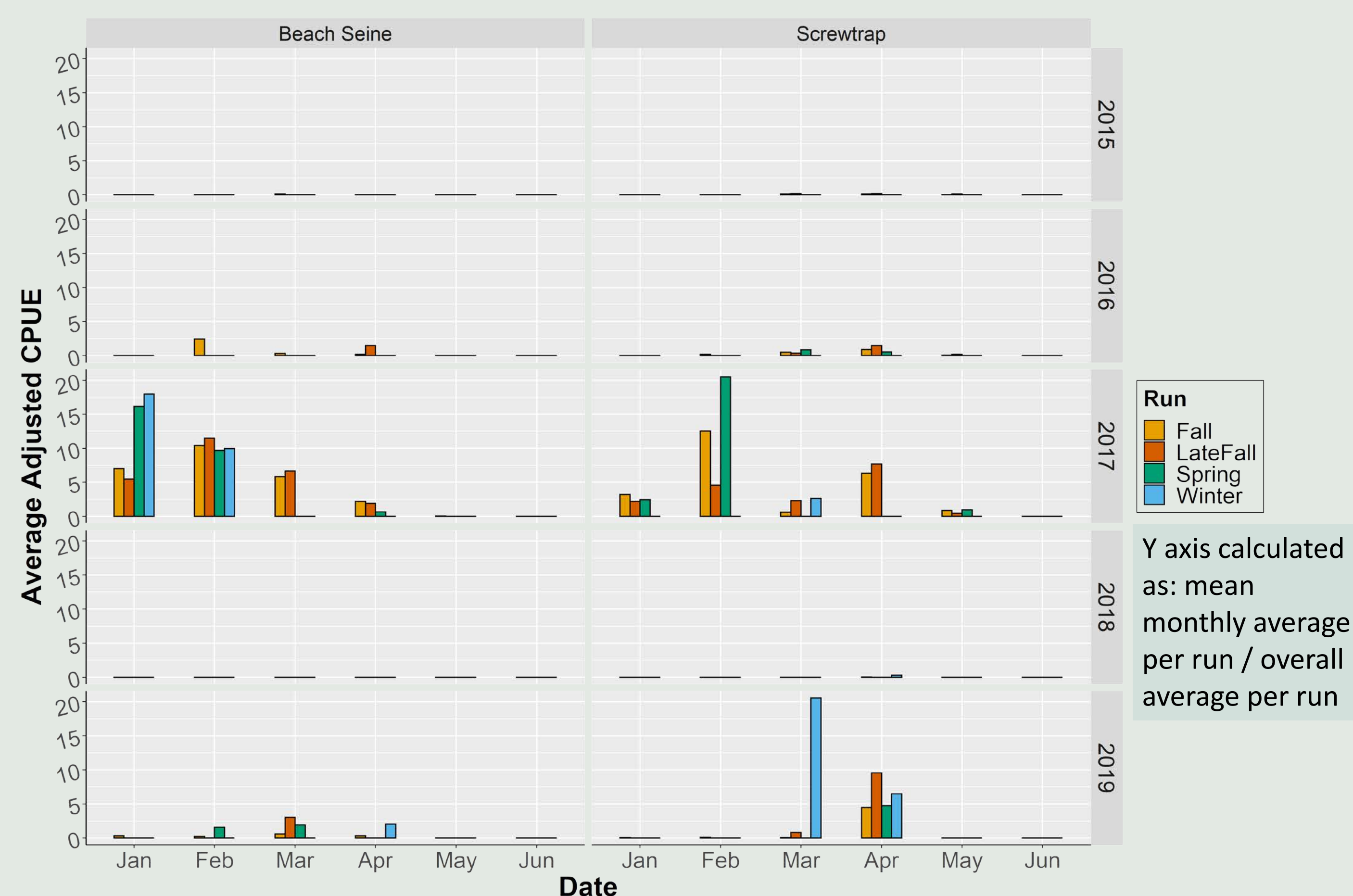


### 3. Relationship between catch per unit effort and days of bypass inundation. Trend lines reflect smoothed conditional means and 95% confidence intervals.

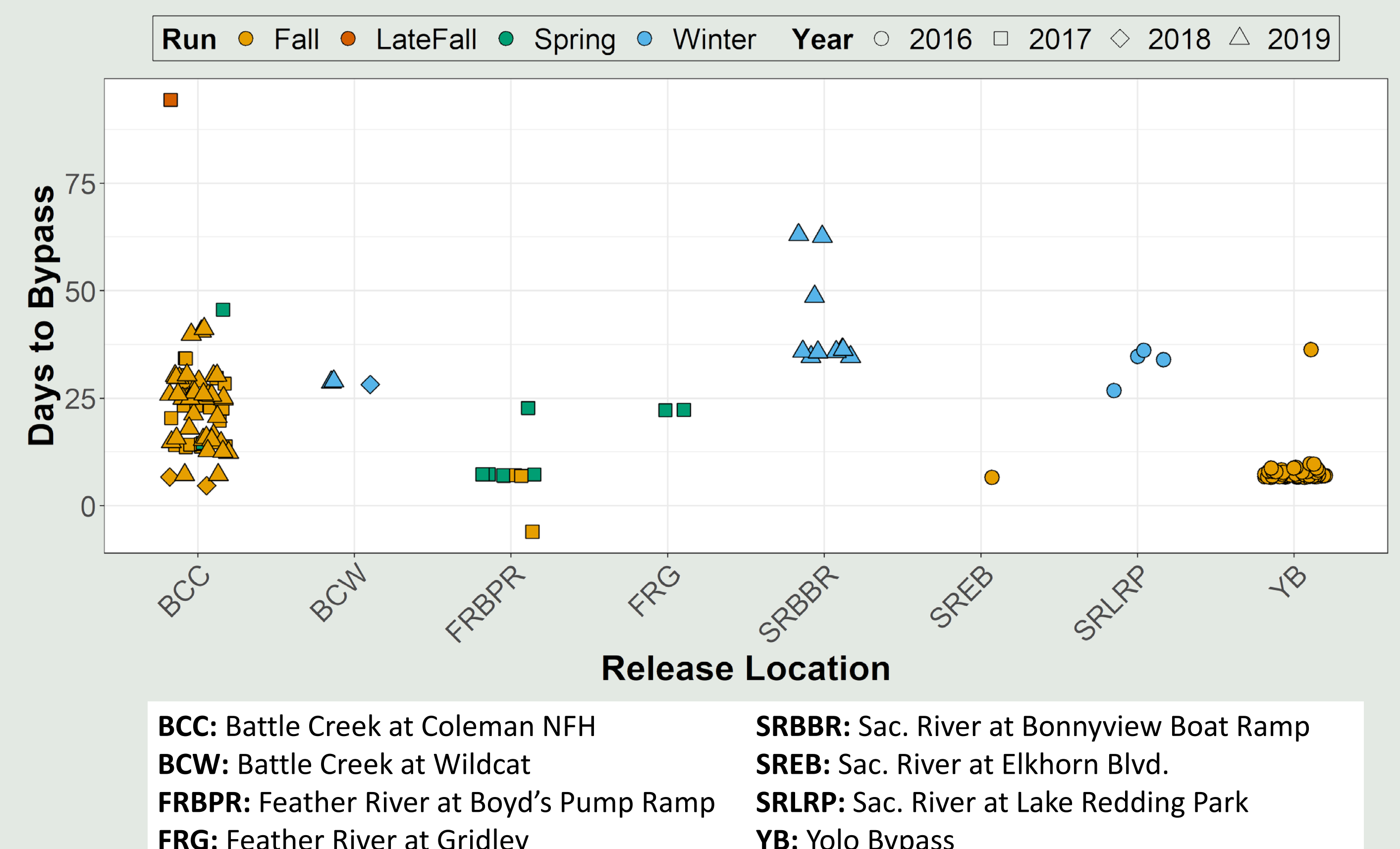


These plots suggest a positive relationship between days inundated and salmon catch. We plan to analyze this more rigorously using a zero inflated negative binomial generalized linear model.

### 2. Average adjusted CPUE for juvenile Chinook Salmon in the Yolo Bypass



### 4. Days between hatchery release and capture in the Yolo Bypass for coded wire tagged juvenile Chinook Salmon.



**BCC:** Battle Creek at Coleman NFH  
**BCW:** Battle Creek at Wildcat  
**FRBPR:** Feather River at Boyd's Pump Ramp  
**FRG:** Feather River at Gridley  
**SRBRR:** Sac. River at Bonnyview Boat Ramp  
**SREB:** Sac. River at Elkhorn Blvd.  
**SRLRP:** Sac. River at Lake Redding Park  
**YB:** Yolo Bypass

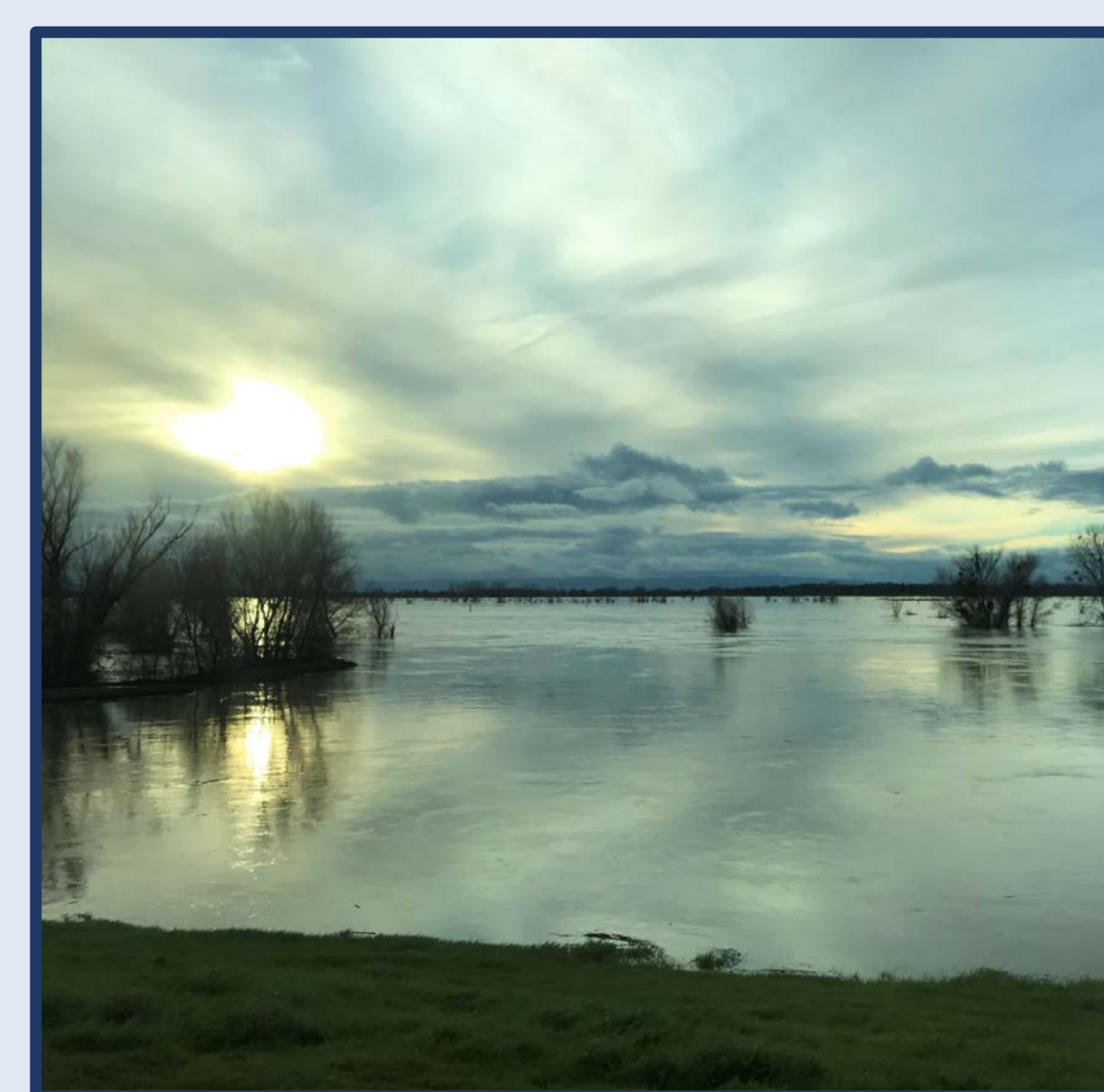
## Conclusions

- There is higher catch of juvenile Chinook Salmon in wetter years than in dry years.
  - This includes a greater presence of threatened species such as spring and winter run Chinook Salmon.
- Generally, there is a positive relationship between monthly Chinook Salmon CPUE and days inundated per month.
- Most hatchery fish released upstream get to the Yolo Bypass in less than 70 days, however, winter run seem to take longer to arrive or reside longer before migrating out.
- Genetic identification and CWT processing helps the YBFMP gain valuable information on bypass use by different runs of Chinook Salmon.

Contact: [Amanda.casby@water.ca.gov](mailto:Amanda.casby@water.ca.gov); [Nicole.kwan@water.ca.gov](mailto:Nicole.kwan@water.ca.gov)

## Acknowledgements

Thank you to DWR Aquatic Ecology Section staff and volunteers for their efforts sampling salmon in the bypass and processing CWT tags. A special thank you to Rosemary Hartman and Catarina Pien for their data analysis and modeling assistance. A big thanks to the Genomic Variation Laboratory at UC Davis for running all of the genetic identification tests. This work was completed under California Department of Fish and Wildlife scientific collection permits SC-10330, SC-10842, and S-182970002-19100-001, the National Marine Fisheries Service permit 1440-2R, and the Interagency Ecological Program's California Endangered Species Act Memorandum of Understanding.



Flooded Yolo Bypass.