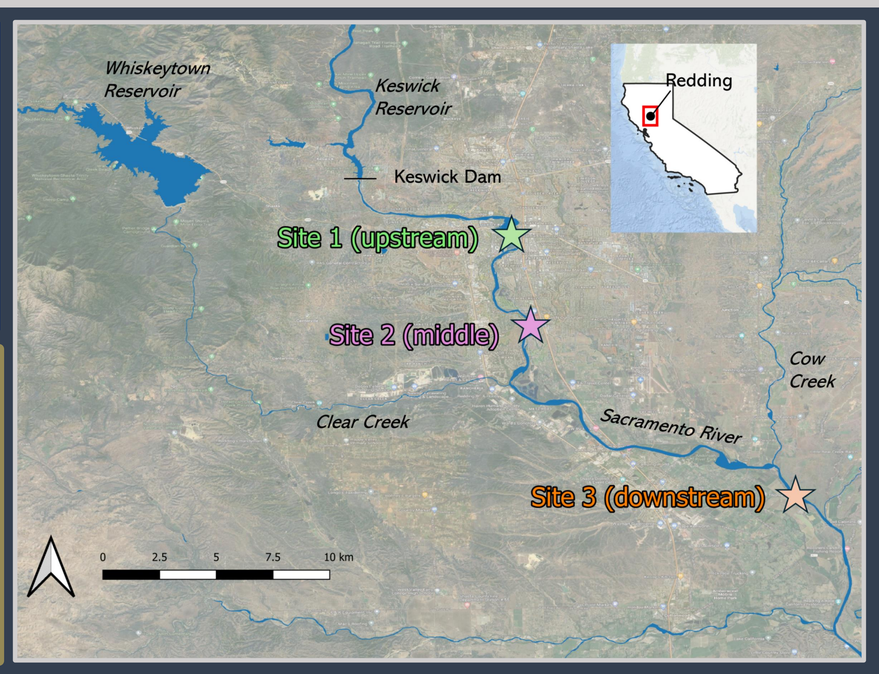
# Estimating survival of Chinook Salmon eggs and measuring hyporheic conditions during incubation in the Sacramento River

Jamie Byrne[1], Jasmine Williamshen[1], Avery Scherer[2], Brad Cavallo[1], Steve Zeug[1]
[1]Cramer Fish Sciences, Modeling, Analysis, and Synthesis Lab, Auburn, CA
[2]Cramer Fish Sciences, River Science and Restoration Lab, West Sacramento, CA

## Egg-to-hatch survival on the Sacramento River decreases downstream, despite tolerable environmental conditions.




## METHODS

Constructed artificial redds

Implanted fertilized fall-run eggs, temperature loggers, and conductometric standpipes

Collected bi-weekly measurements

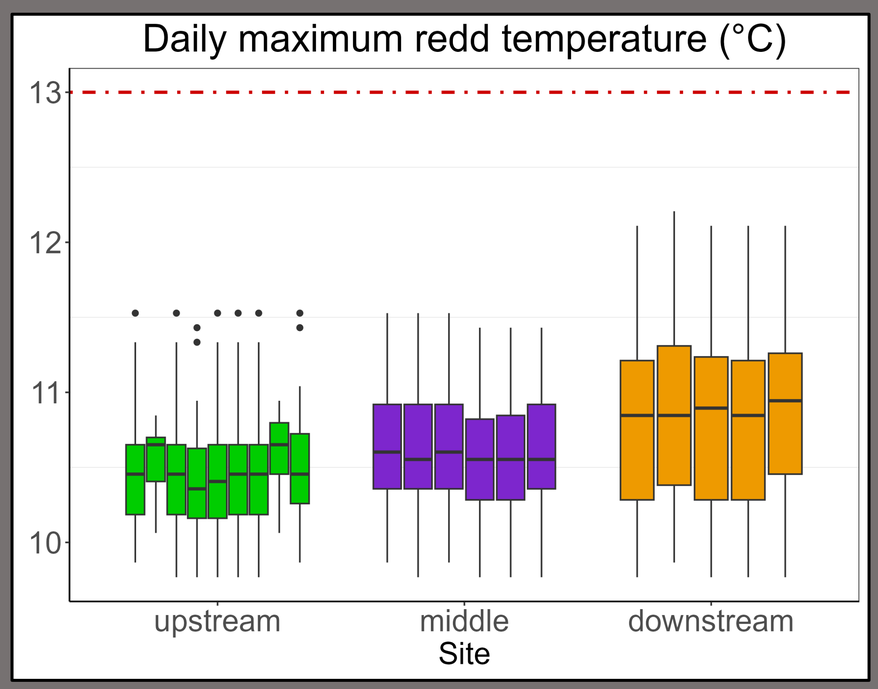
Recovered boxes post-hatch

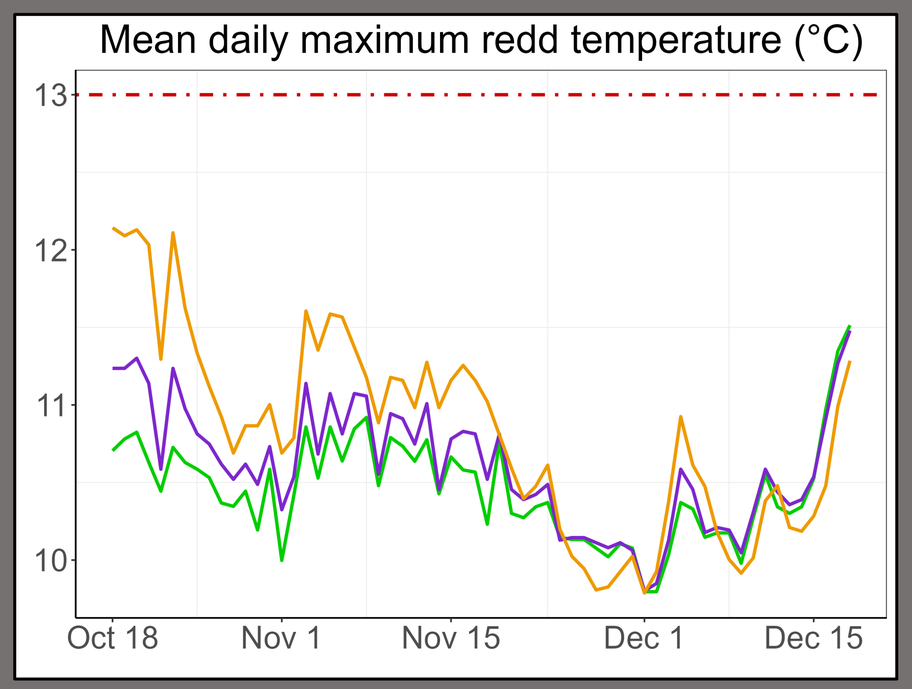
Counted hatched alevin

## BACKGROUND

- Concerns whether hypolimnetic water releases from Keswick Dam maintain suitable intergravel temperature, velocity, and oxygen levels for salmonid egg incubation
- Goal: estimate effects of intergravel water quality on in-situ survival of eggs-to-hatch in spawning habitat below Keswick Dam

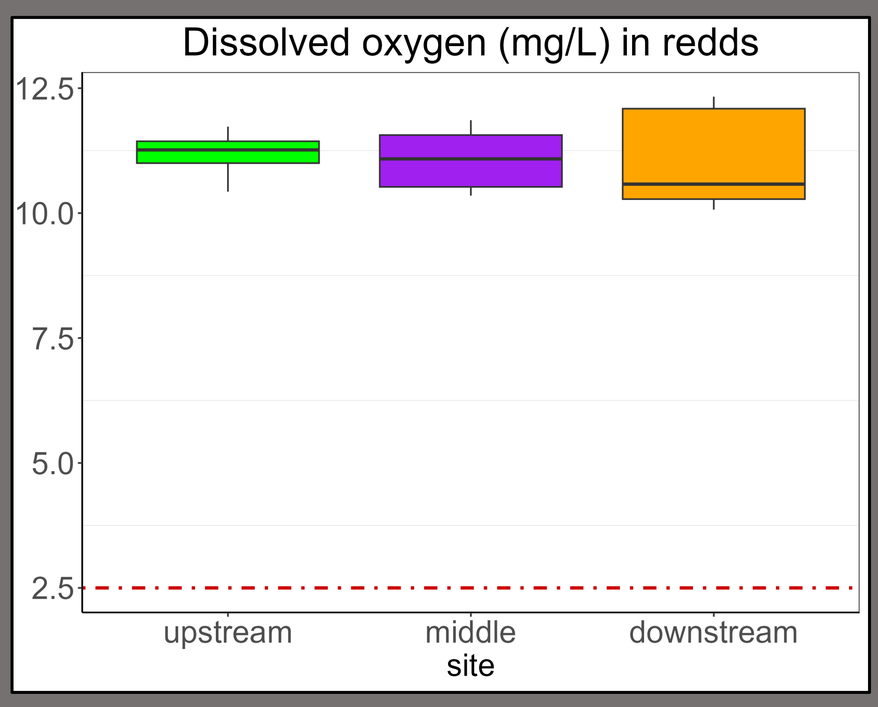
## RESULTS

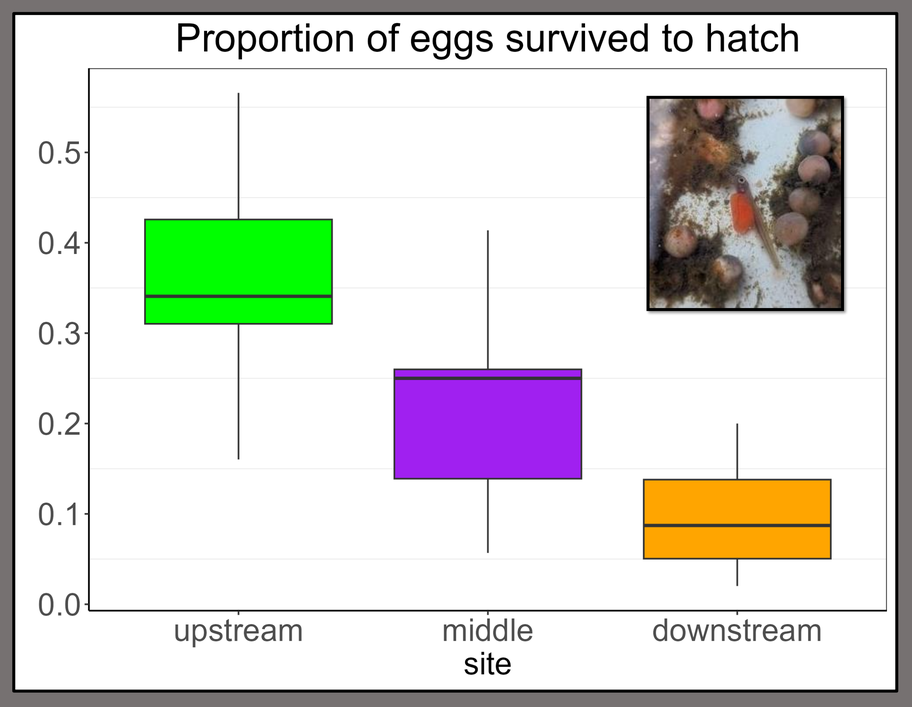



Redd temperatures did not exceed tolerance threshold and did not vary within sites.

Water temperatures in redds were greater at downstream sites through mid-November.




Redd dissolved oxygen did not exceed tolerance threshold (2.5 mg/L).

Survival of eggs-to-hatch was greatest at the upstream site and decreased moving downstream.

## NEXT STEPS

- Calibration curve for intergravel velocity
- Fall-run 2024 study including deep water redds
- Winter-run 2025 study

Scan for more presentations by Cramer Fish Sciences and to visit our website

### ACKNOWLEDGEMENTS

Sacramento River Settlement Contractors  Cramer Fish Sciences staff