Sacramento River Fall-run Chinook Spawner-Recruit Relationship

2003-2023

Brad Cavallo

Cramer Fish Sciences

Estimating spawner-recruit relationships for Sacramento River Fall Chinook based on natural-area escapement and the Sacramento Index adjusted by proportion natural-origin escapement estimates
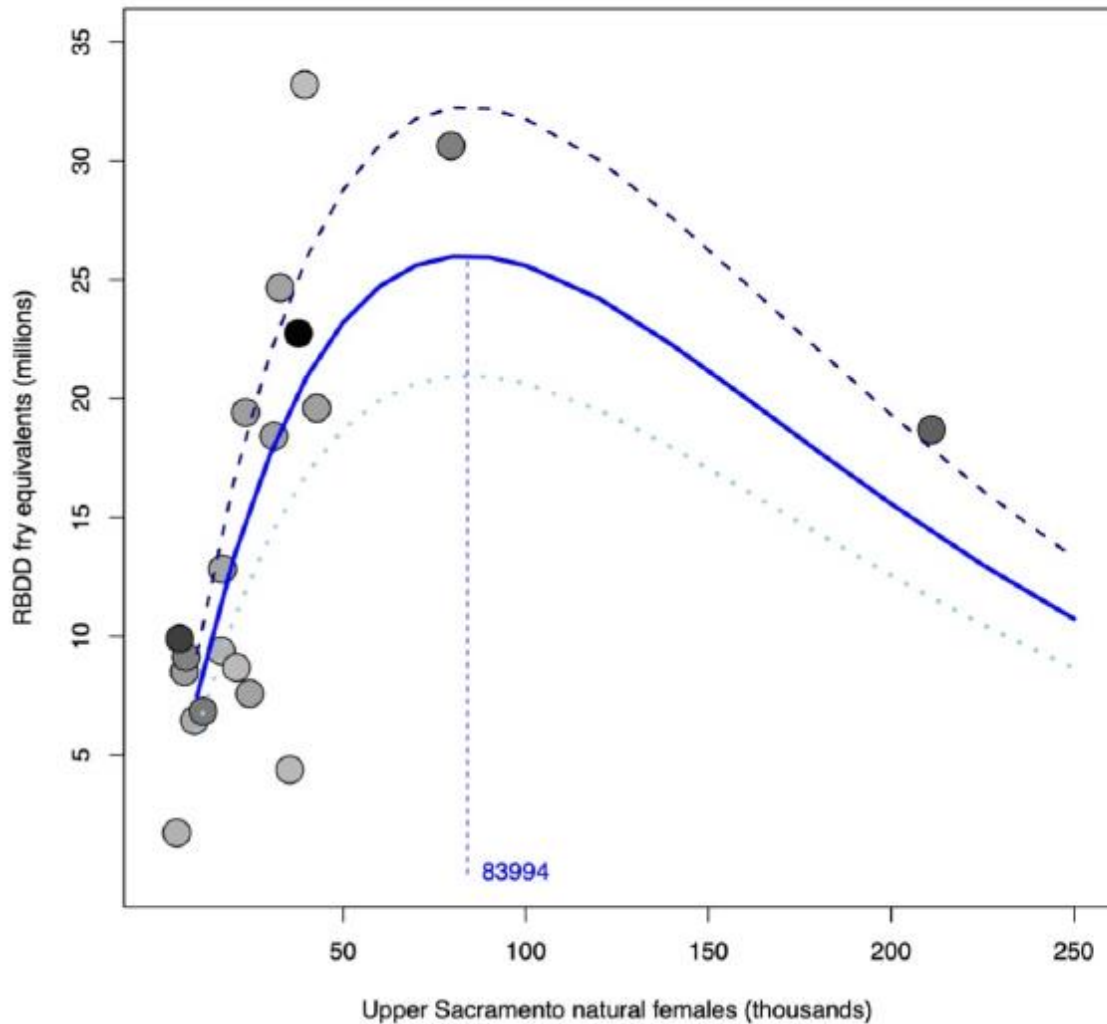
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NON PEER-REVIEWED DRAFT, FOR DISCUSSION PURPOSES ONLY

Developed for the Pacific Fishery Management Council's Salmon Technical Working Group which is evaluating possible changes to the Sacramento Index
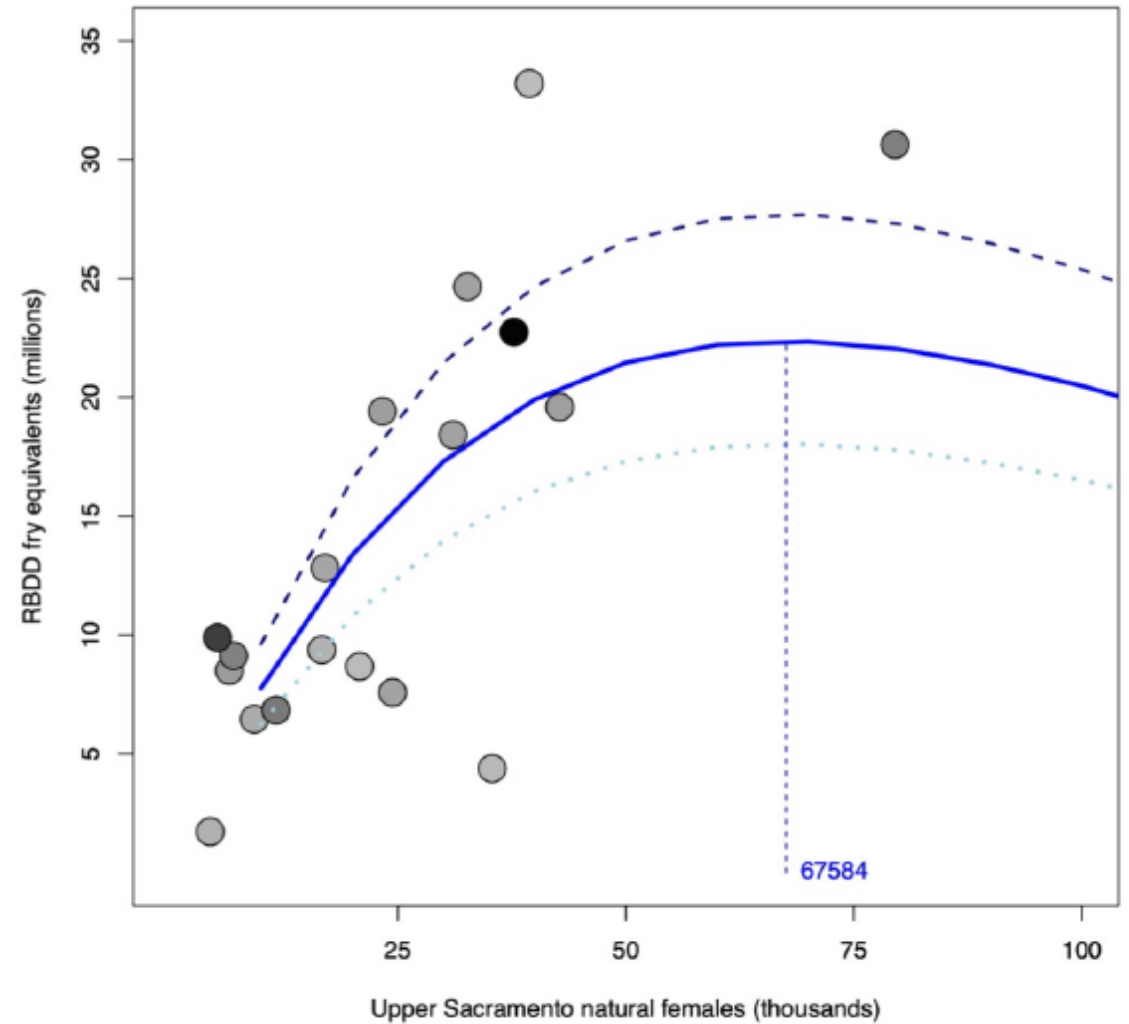
Upper Sacramento fall-run spawner-recruit relationships
(with flow as env. covariate)

Upper Sacramento fall-run spawner-recruit relationship

- 2002 excluded
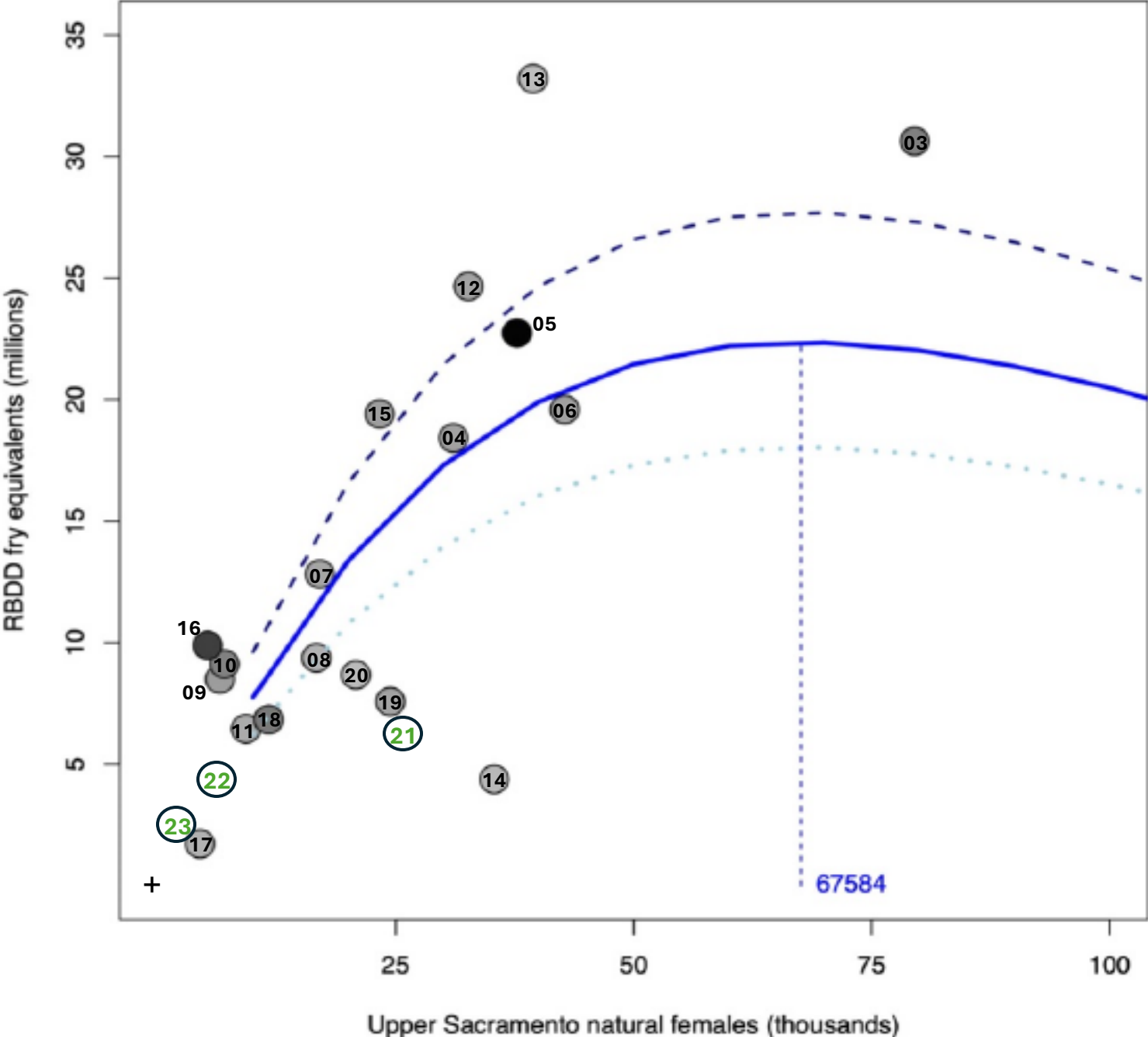- Brood Years labeled
- 2021-23 added

Caveats:
Recent fall-run juvenile production estimates may change
- Smolt to fry equivalents
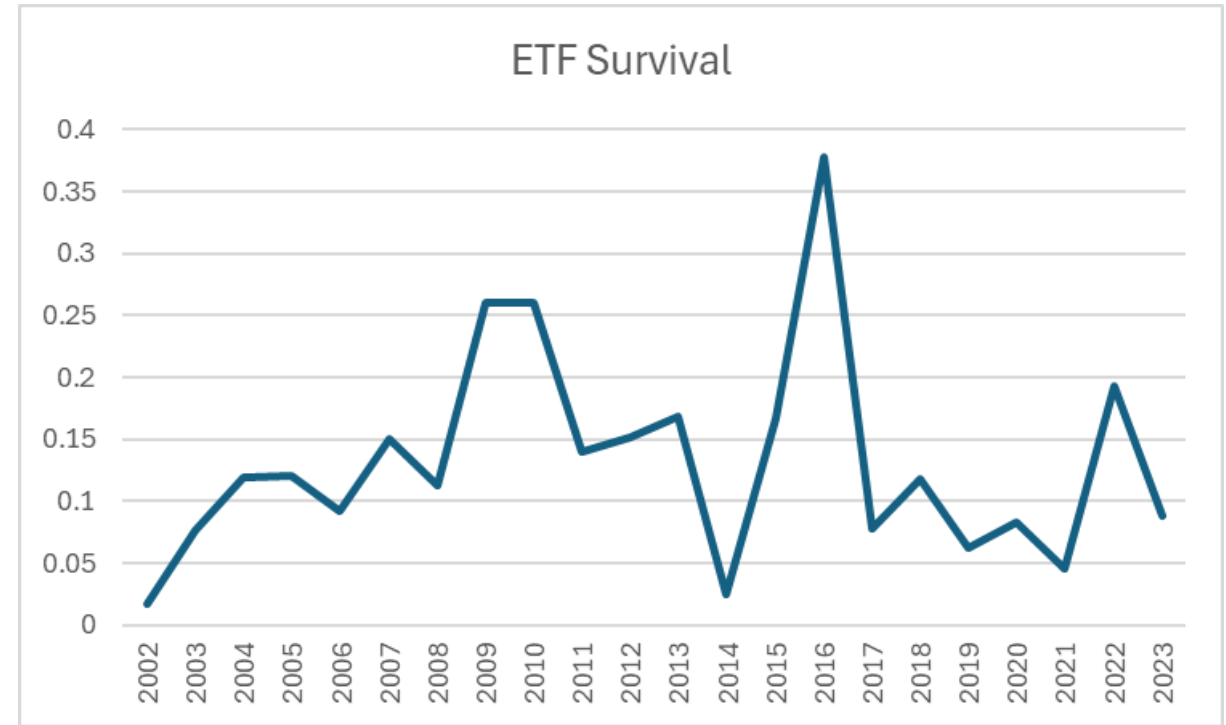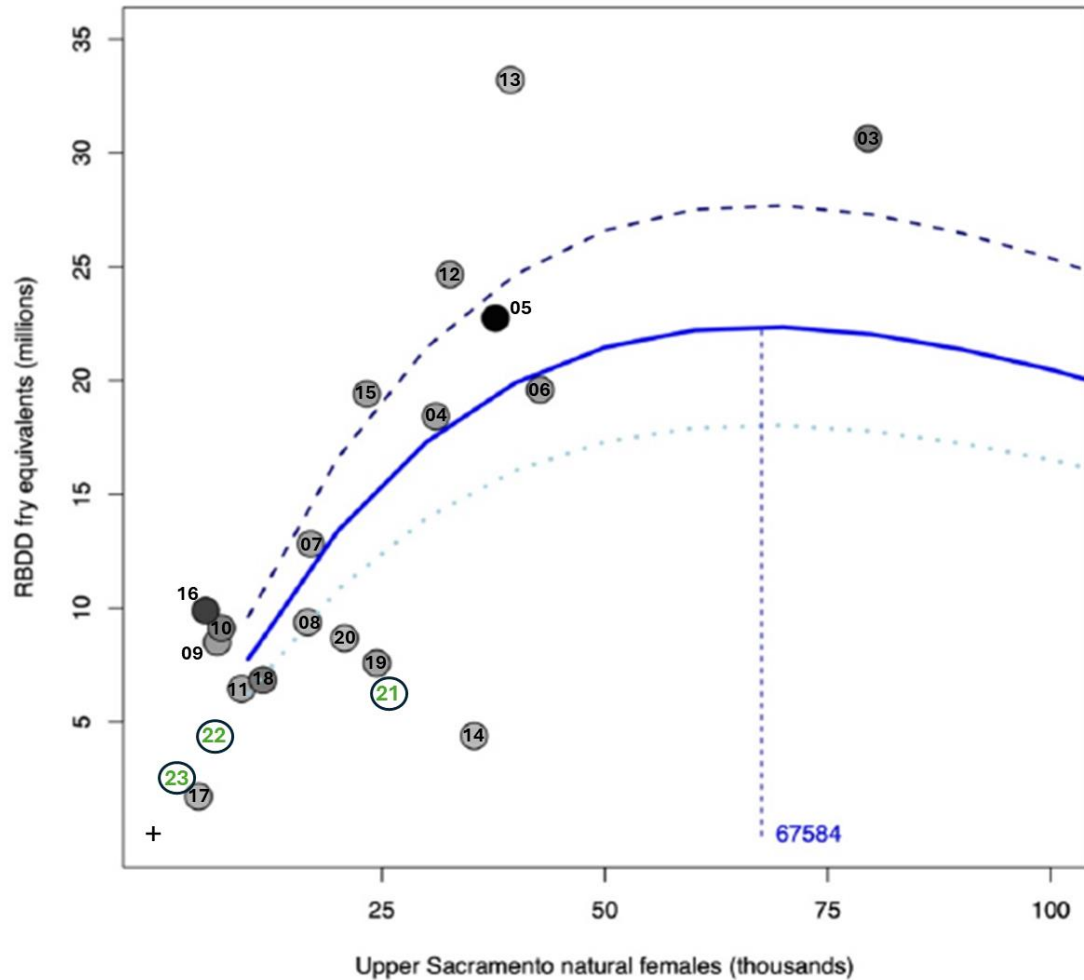- Run and origin corrections

Lack of observations with female spawning abundance <45,000 fish and at high flows

Flow covariate analysis preliminary
- Consider additional env. covariates

Stock-recruitment vs. Egg-to-fry Survival


(Assuming 5,000 eggs/female for all years)

Take aways

- Spawner-recruit analysis is useful
  - Integrates adult and juvenile abundance data
  - Allows visual interpretation, provides basis for covariate analyses
- RBDD monitoring represents juvenile fall-run production from the mainstem Sacramento River, Clear Creek, Battle Creek and several smaller tribs
  - Spawning-area specific contributions uncertain, likely vary from year to year
- How might we improve resolution of Sacramento River fall-run Chinook stock-recruitment data?

Stock-recruitment With and Without Flow Covariate

Upper Sacramento stock–recruit relationship 2003–2020 run years, ignore flow
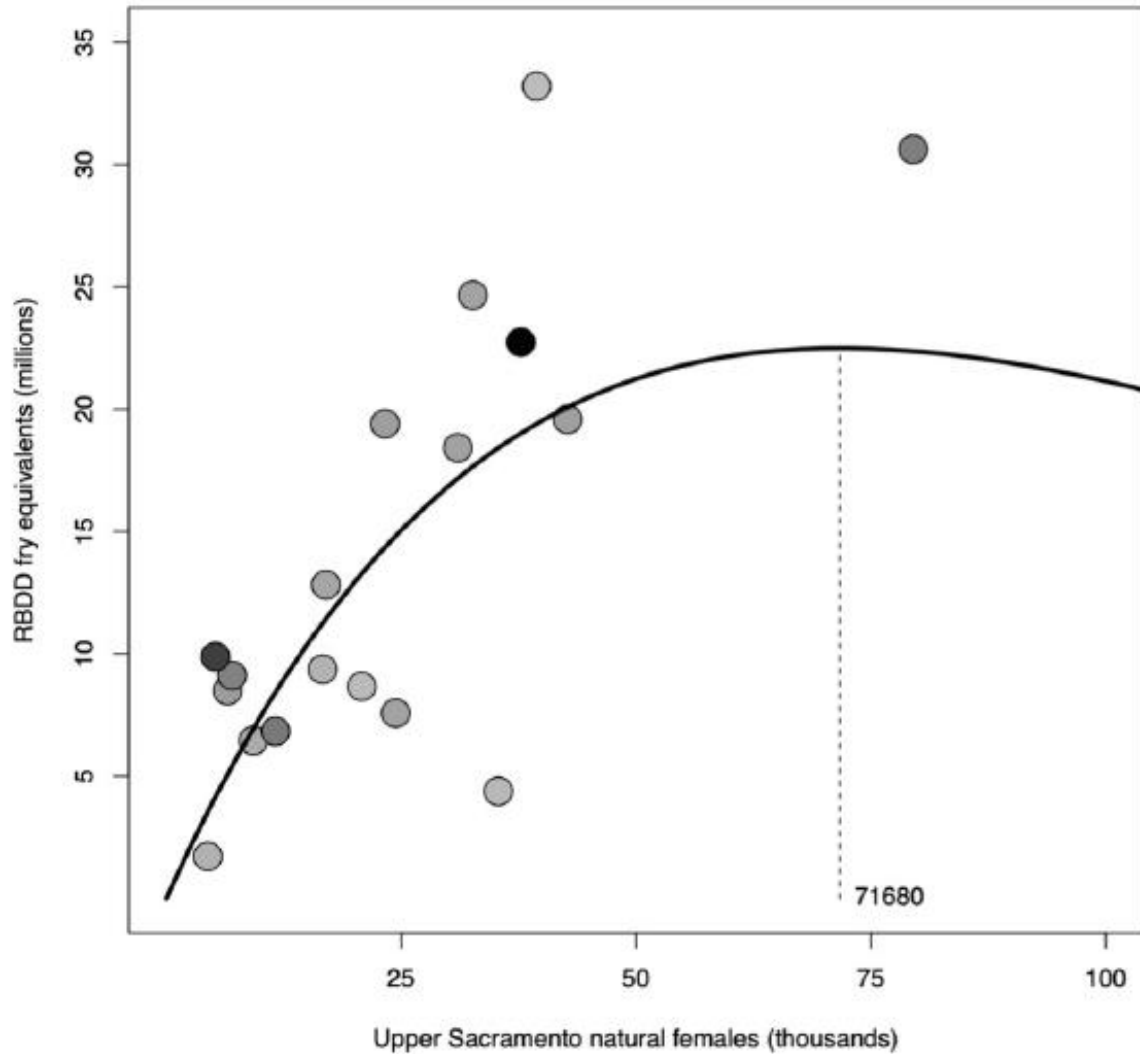
Upper Sacramento stock–recruit relationship 2003–2020 run years, include flow