Migration and Survival of Wild Juvenile Chinook Salmon in the Delta

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Introduction

- The Delta serves as migration corridor and rearing habitat for juvenile salmonids.
- Our understanding of their migration and survival in the Delta is largely limited to studies on tagged hatchery juveniles.
- What about the migration and survival of wild juveniles migrating and rearing in the complex aquatic system of the Delta?

Data

- **Juvenile Winter-run and Spring-run Sized Data (US FWS)**
  - Broodyear 1994-2011
  - Sacramento trawl at Sherwood Harbor
  - Chipps Island trawl

- **Flow Data (USGS)**
  - Sacramento River flow
  - Delta outflow

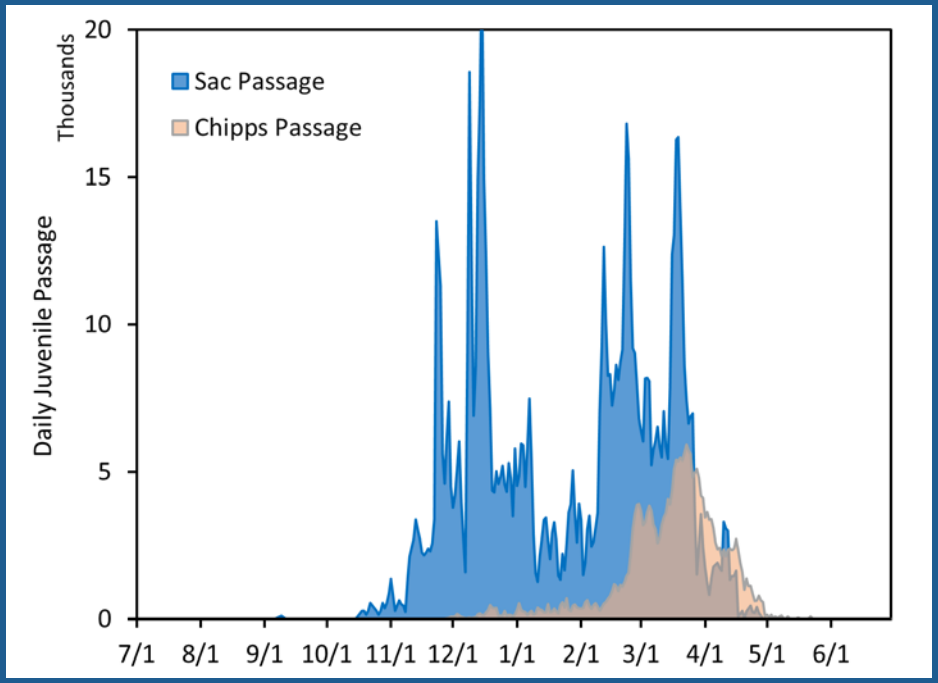
Migration Pattern and Timing

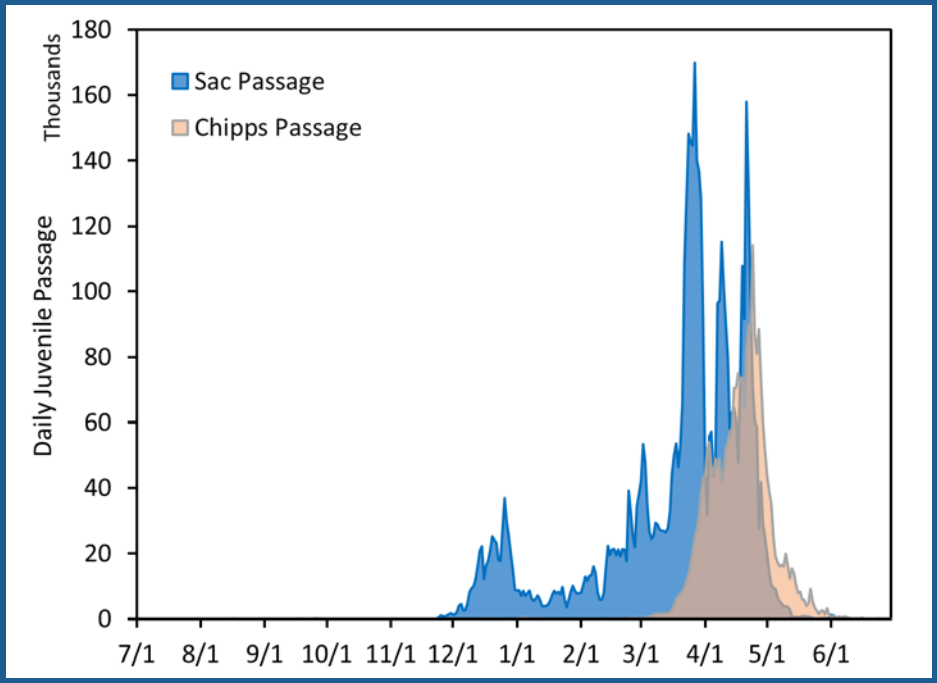
Winter-run

- November through April
- Peaks: December and March

Spring-run

- December through May
- Peak: Mid-March through April





Migration Duration

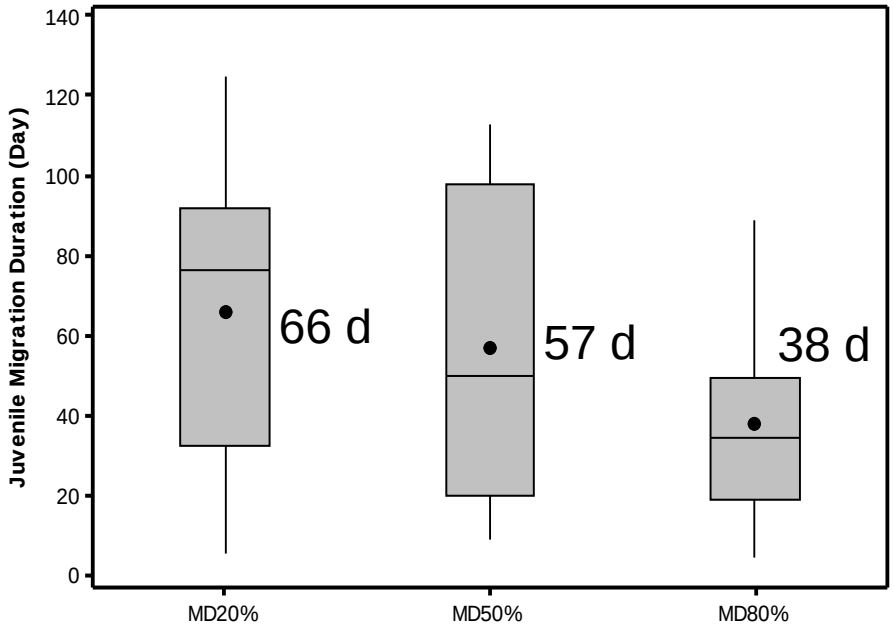
54 RMs: Sherwood Haber to Chipps Island

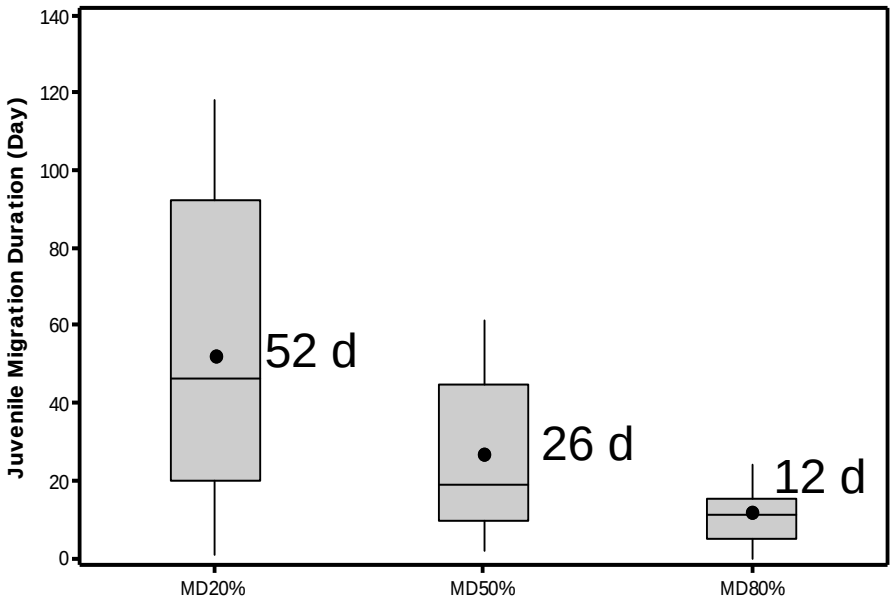
Winter-run

- Longer residence in Delta
- Mean MD50%: 57 days

Spring-run

- Shorter residence in Delta
- Mean MD50%: 26 days



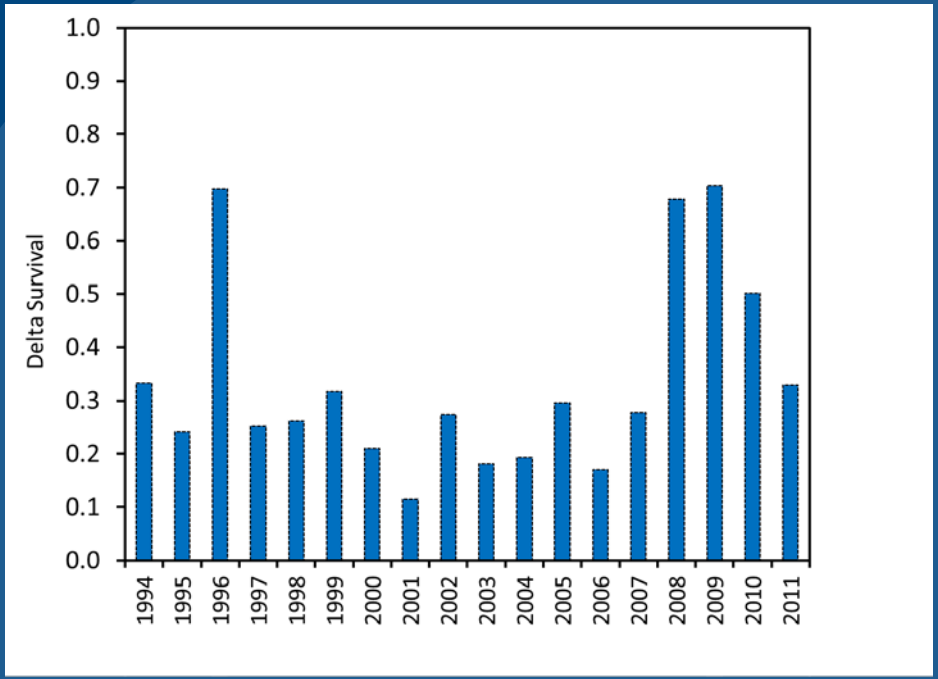


Rosario et al. (2013): 87 days for 90 RMs from Knights Landing to Chipps Island

Wild Juvenile Delta Survival

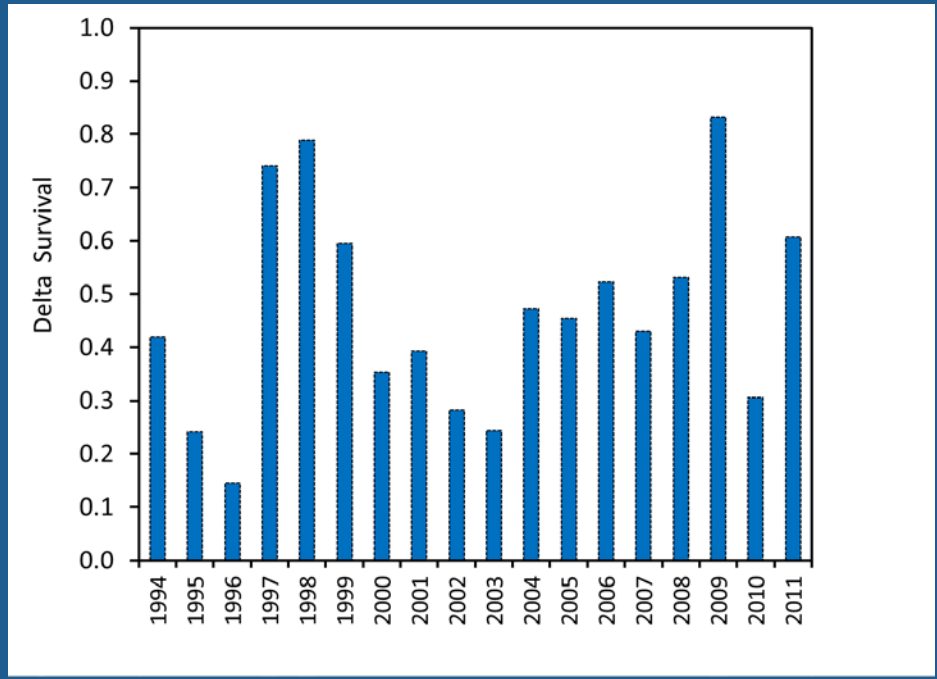
Winter-run

- **Survival: 0.33 ± 0.09 (95%CI)**



Spring-run

- **Survival: 0.46 ± 0.09 (95%CI)**



Hatchery Juvenile Delta Survival from Acoustic Tag Studies:

- Winter-run (released in Upper SR): 0.34 (Ammann)
- Late Fall-run (released in Upper SR): 0.58 (Michel)
- Late Fall-run (released in Delta): 0.33 (Perry)

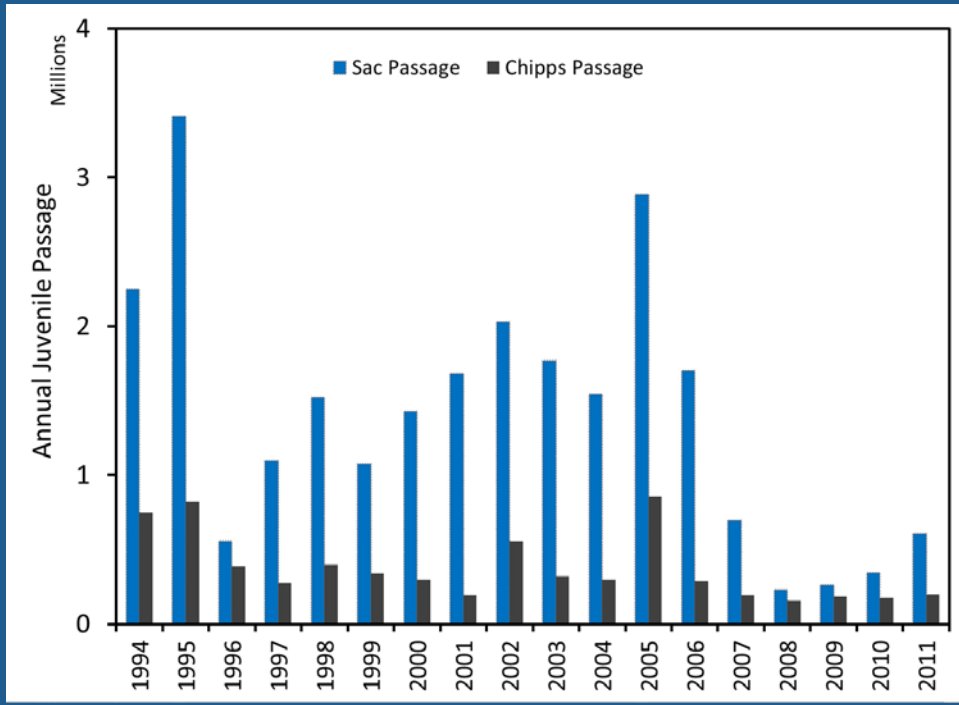
Annual Juvenile Passage

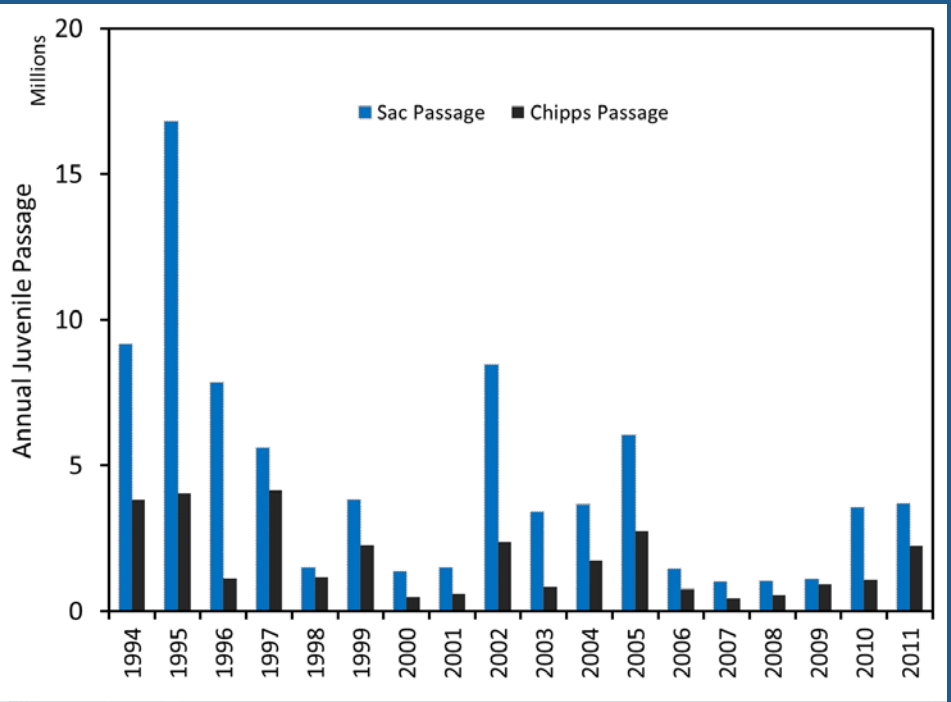
Winter-run

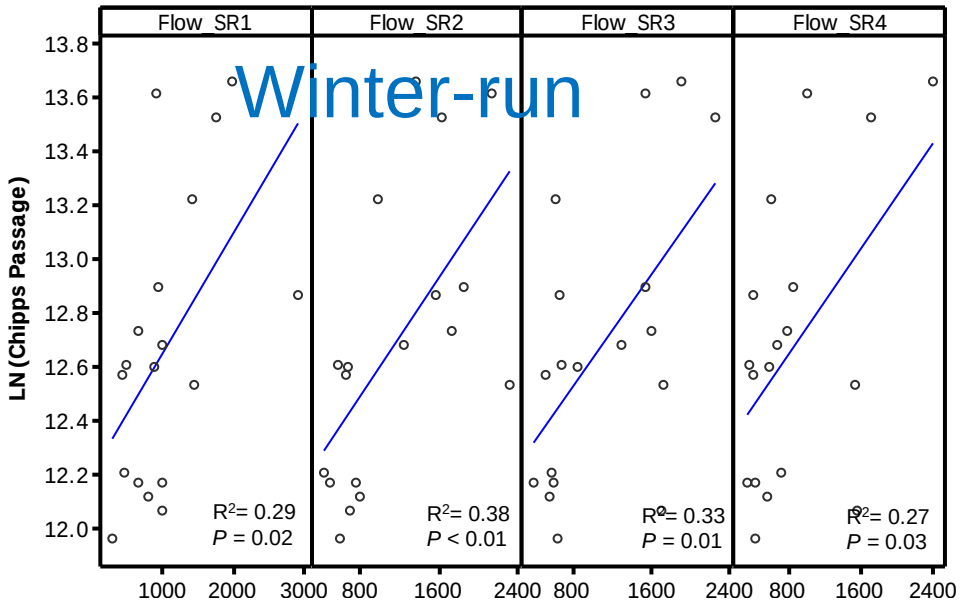
- Sac Trawl: 1.39 ± 0.41 million
- Chipps Trawl: 0.37 ± 0.10 million

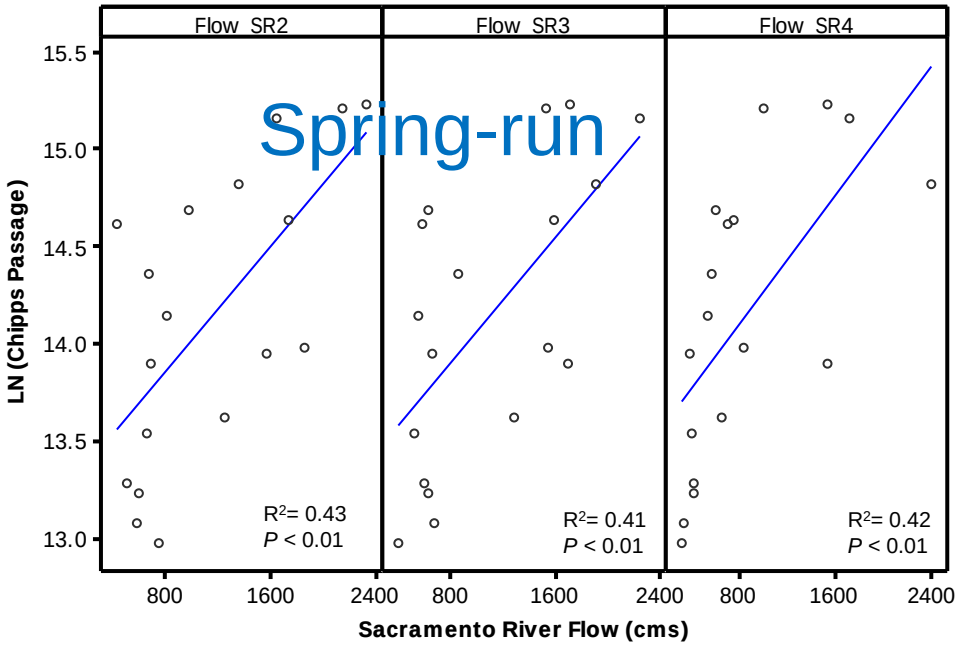
Spring-run

- Sac Trawl: 4.50 ± 1.88 million
- Chipps Trawl: 1.75 ± 0.58 million





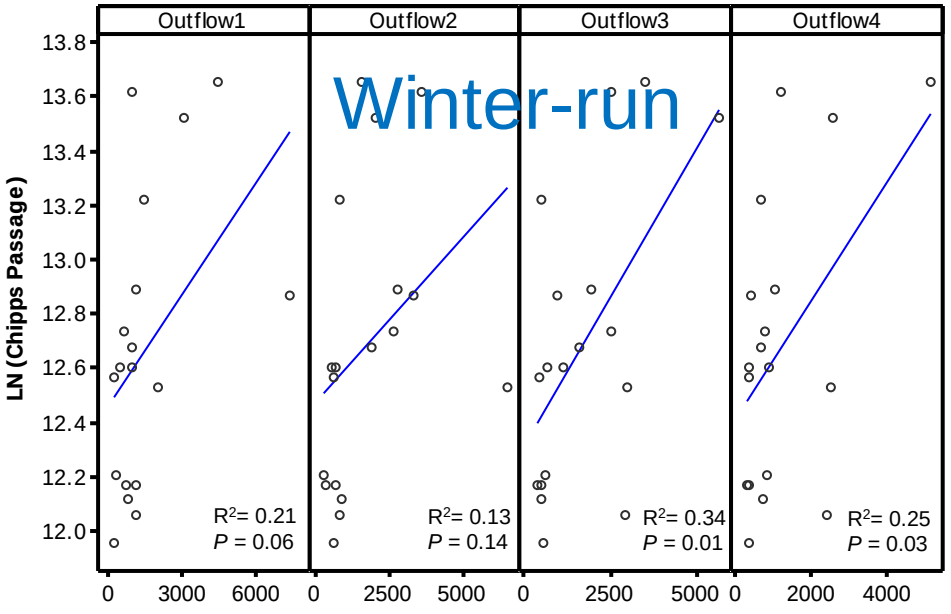


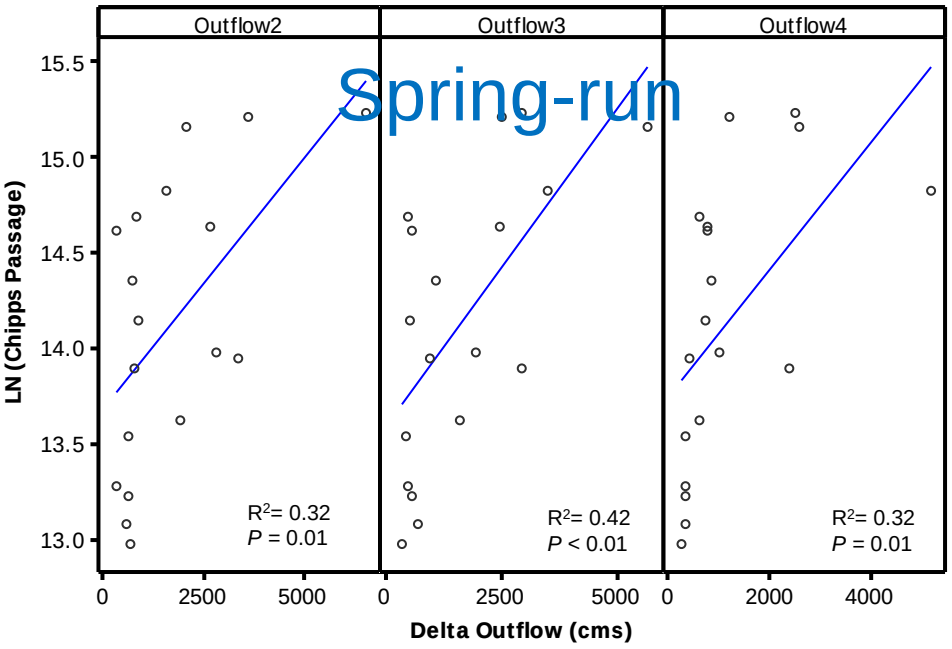


Annual Passage vs. Inflow

Annual juvenile passage at Chipps Island increases with increasing Sacramento River flow at Sacramento.

Annual Passage vs. Delta Outflow





Annual juvenile passage at Chipps Island increases with Delta outflow

Acknowledgement

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