

RECLAMATION

Managing Water in the West

Sharing Risks: Applicability of the Surrogate Species Approach for San Joaquin River Salmonid Species

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U.S. Department of the Interior
Bureau of Reclamation

Interagency cooperative study

- US Fish and Wildlife Service-Stockton
- California Dept. Water Resources Bay-Delta Office
- USGS- Sacramento Water Resources Division
- USGS- Columbia River Research Laboratory
- California Department of Fish and Game



- University of Washington
- San Joaquin River Group Authority
- Consultant Team (FishBio, Hanson Environmental)

RECLAMATION

San Joaquin River salmonid telemetry studies

	Central Valley Steelhead	Fall Run Chinook
2011	May 17-21 May 22-26 June 15-18	May 17-21 May 22-26 June 15-19
2012	May 2-4 May 18- May 23	May 2-May 7 May 17-22

San Joaquin River salmonid telemetry studies

Observations from other presentations

- **Survival**
- **Route Entrainment**
- **Travel rates**

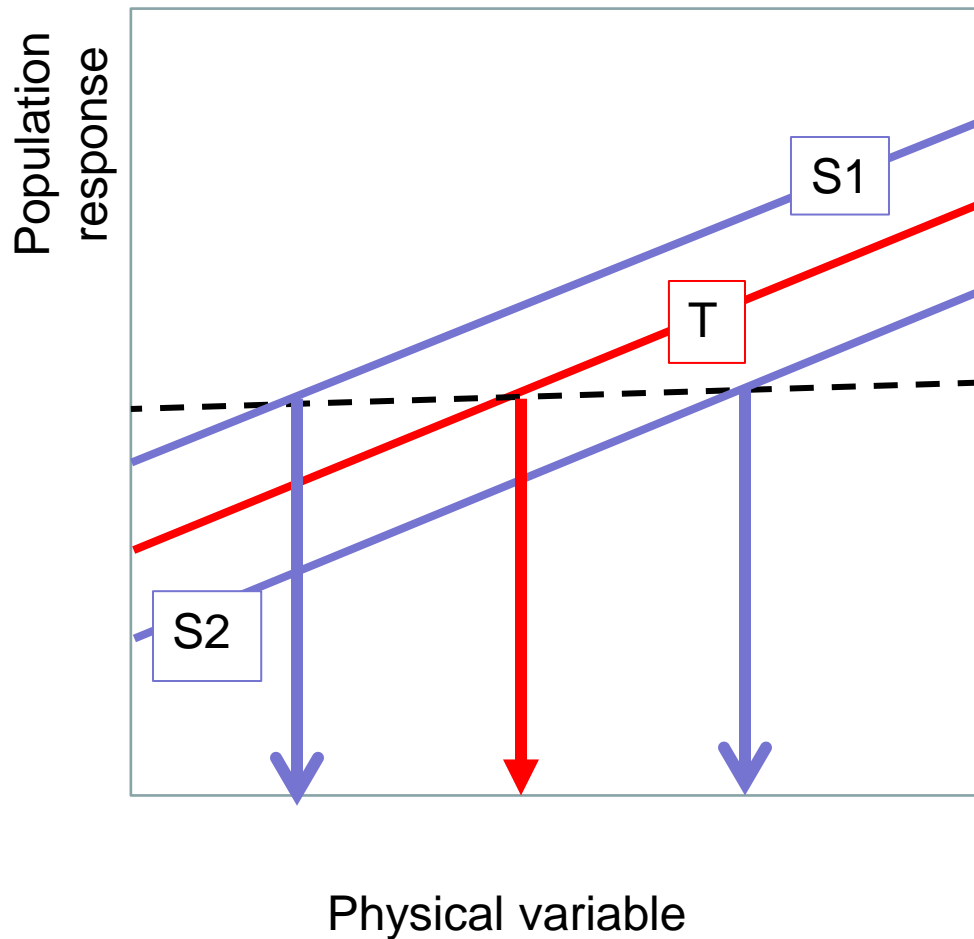
Steelhead

- Upstream movements

Fall Run Chinook

- Inability to measure interior Delta survival from SJR

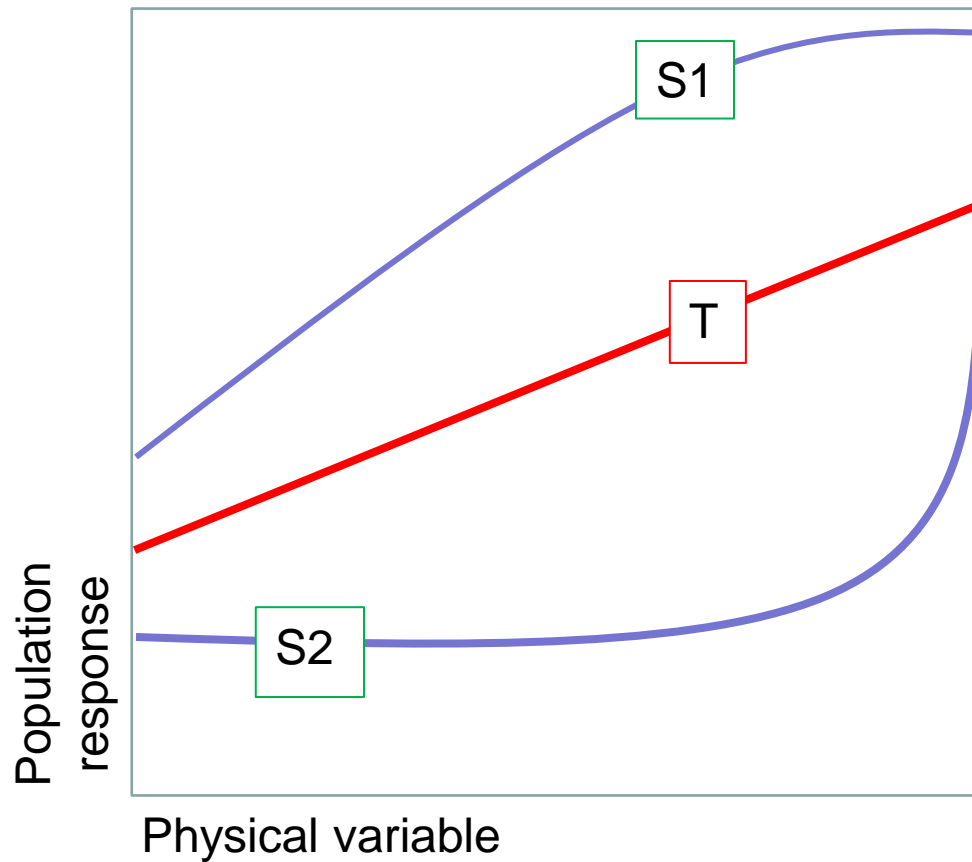
Conceptual Model of Surrogacy (adapted from Caro et al 2005)



Desired response occurs when variable's value is exceeded

How about surrogate species responses?

Conceptual Model of Surrogacy (adapted from Caro et al 2005)

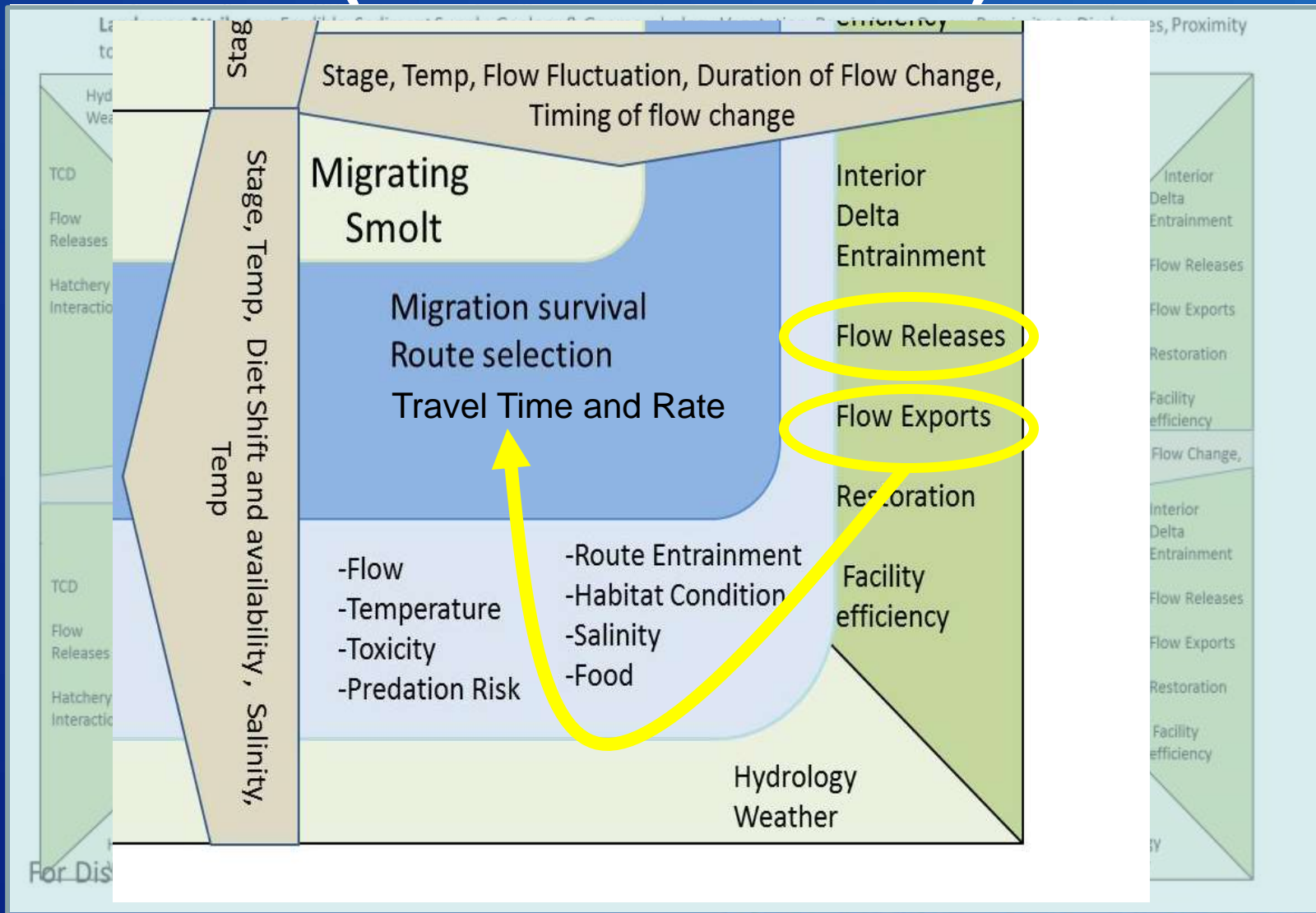


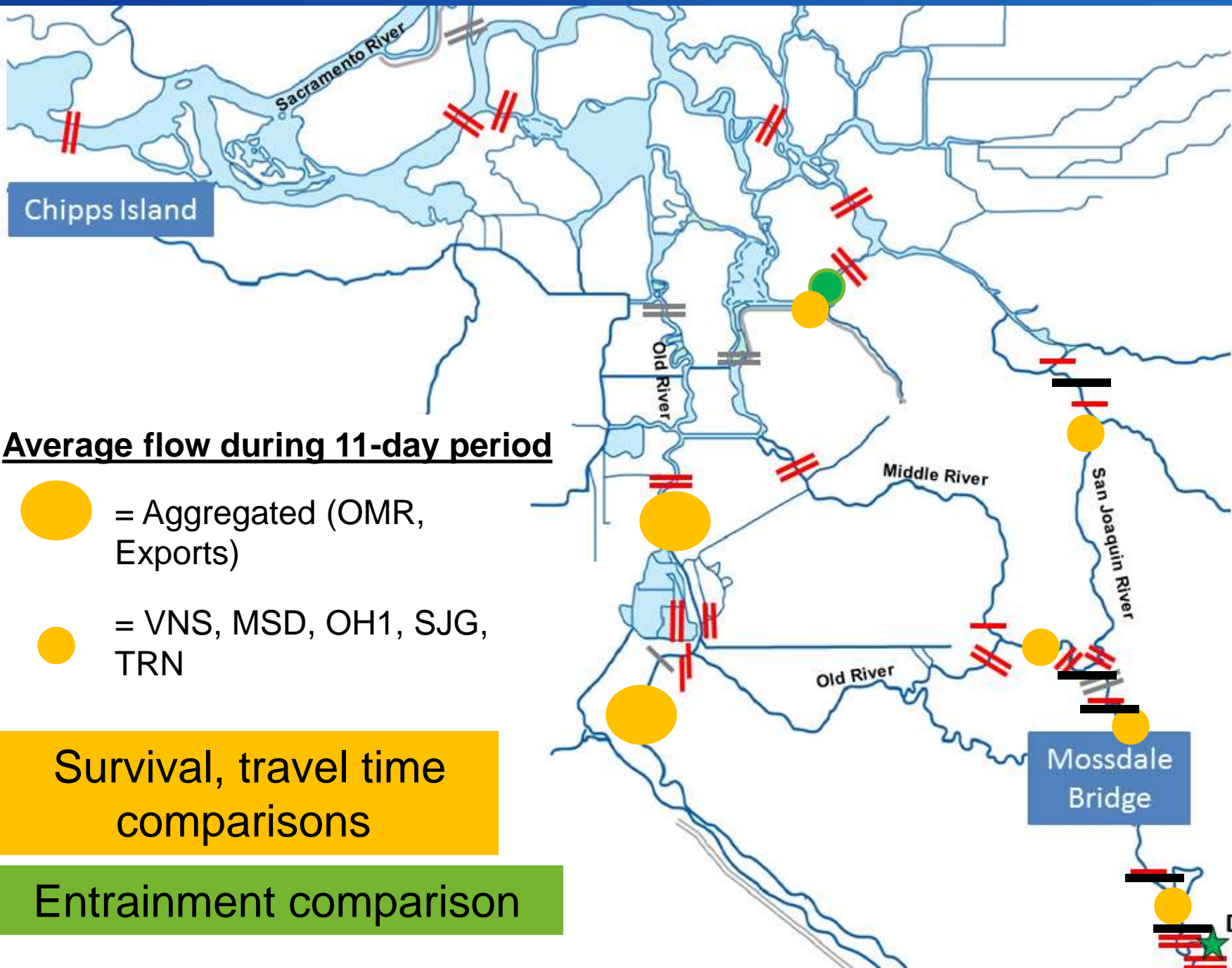
6-Year Study and CVPIA Telemetry

Comparison often limited by experimental design, so focused on:

Study Design	Controls for
Same tagging protocol, personnel, effort	Tagging effects
Same holding and release protocols	Release effects
Same release period	Environmental effects
Same survival model	Standardized measurements

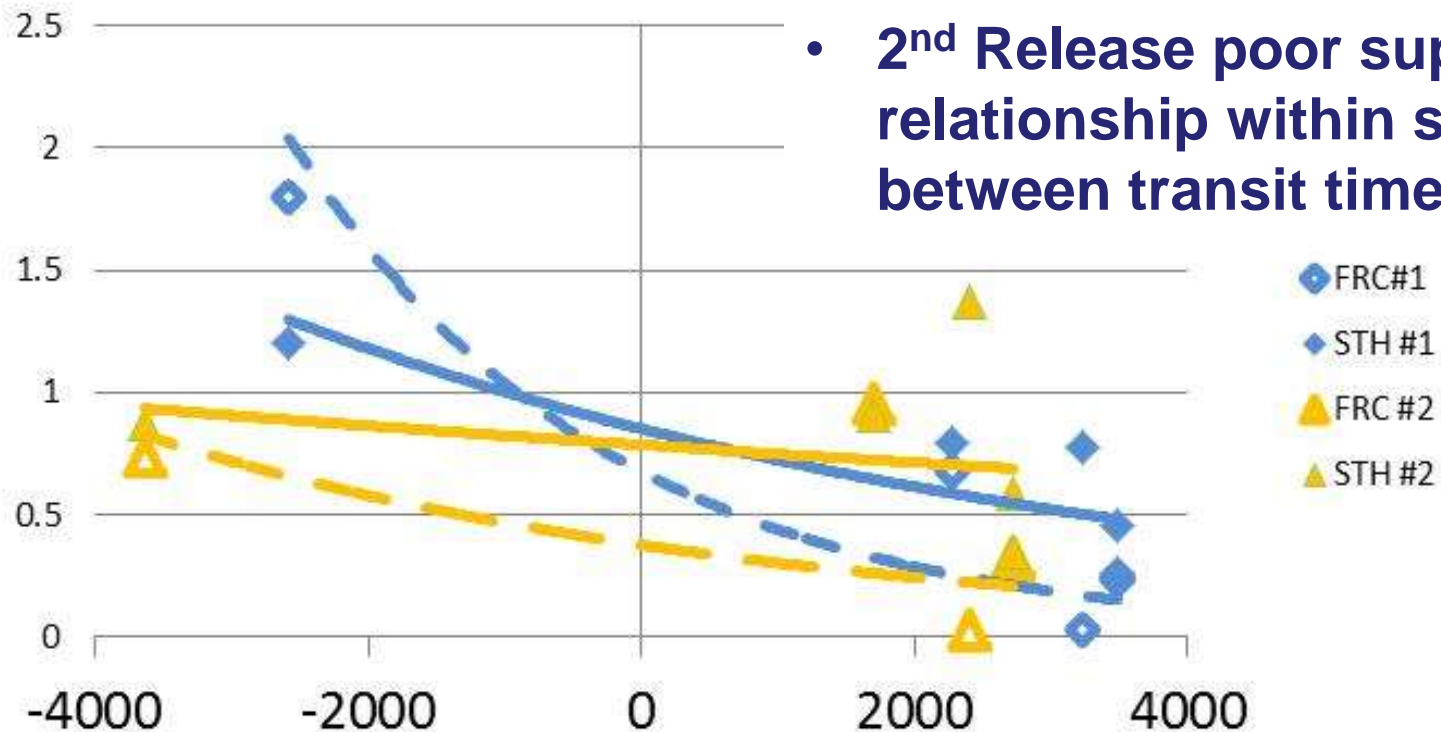
Conceptual Model of Salmonid (See Poster #165)



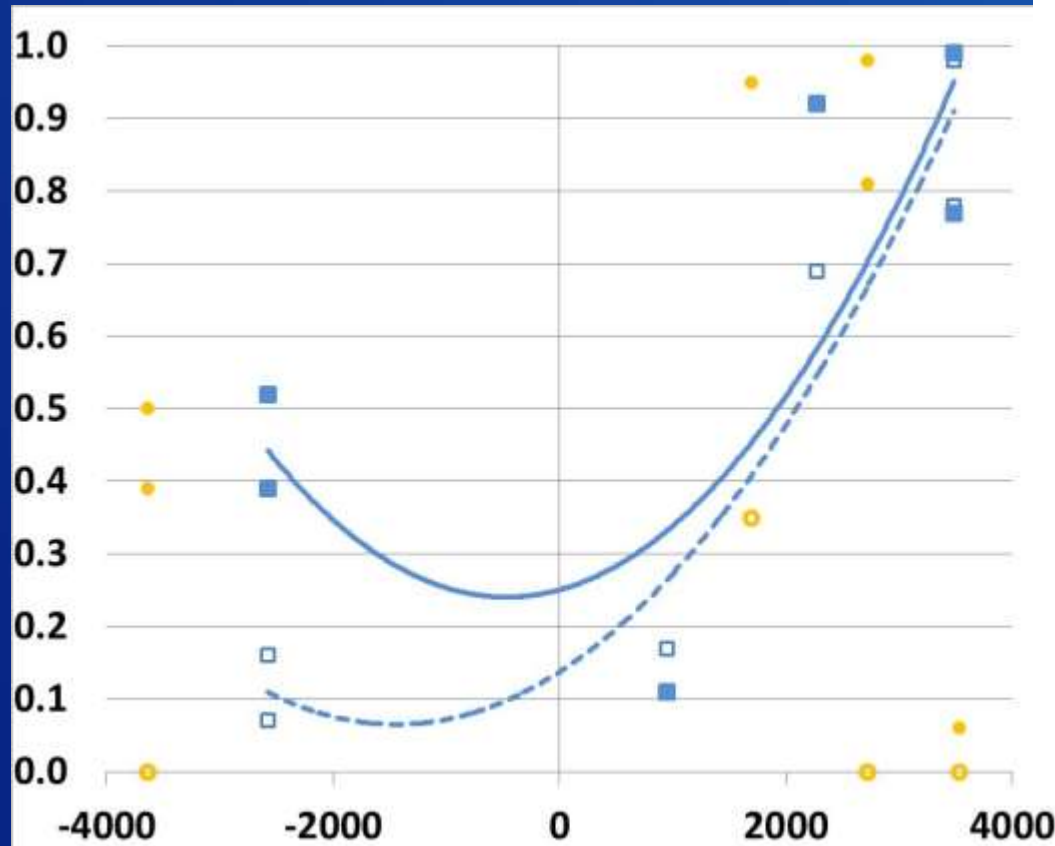


San Joaquin River transit times vs. flow

- **1st Release:** Intersecting pattern of travel times, so using FRC to predict response of STH is a bad assumption.
- **2nd Release** poor support for relationship within species between transit time and flow.

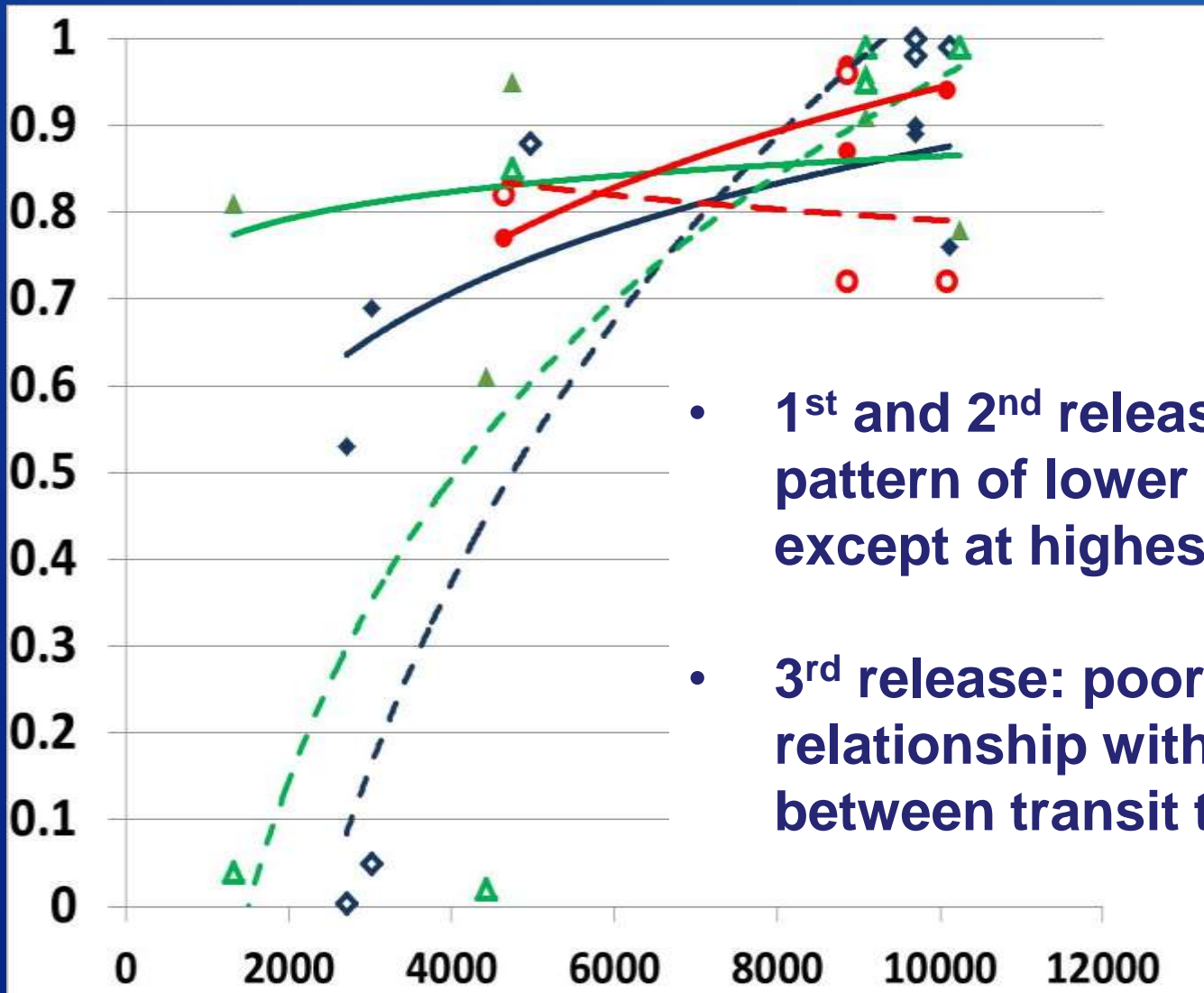


San Joaquin River survival vs. flow



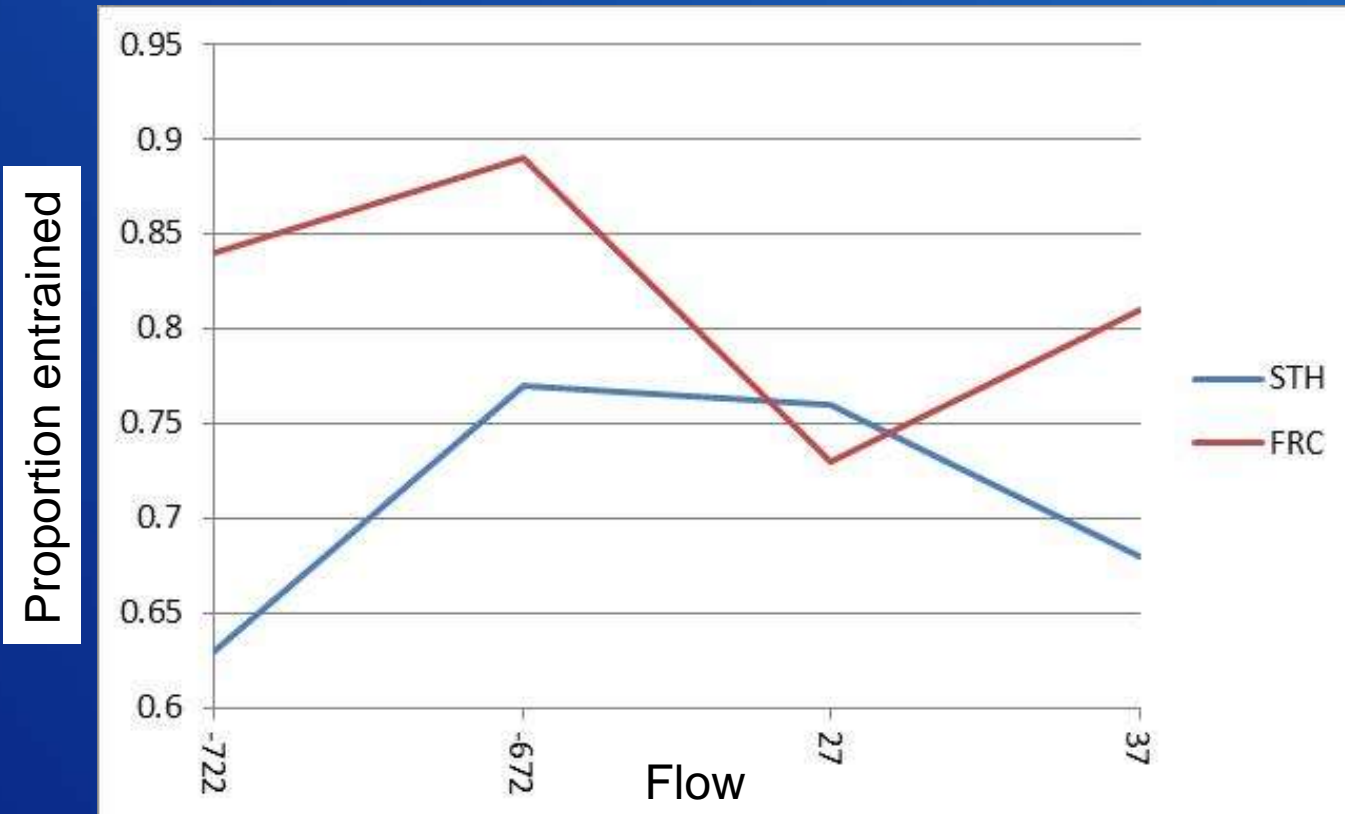
- **1st release:** Similar pattern of lower FRC survival, so setting FRC target protects STH, except at very high outflows and late in spring.
- **2nd release:** poor support for relationship within species between transit time and flow.

San Joaquin River survival vs. flow



- **1st and 2nd releases: Similar pattern of lower FRC survival, except at highest outflows**
- **3rd release: poor support for relationship within species between transit time and flow.**

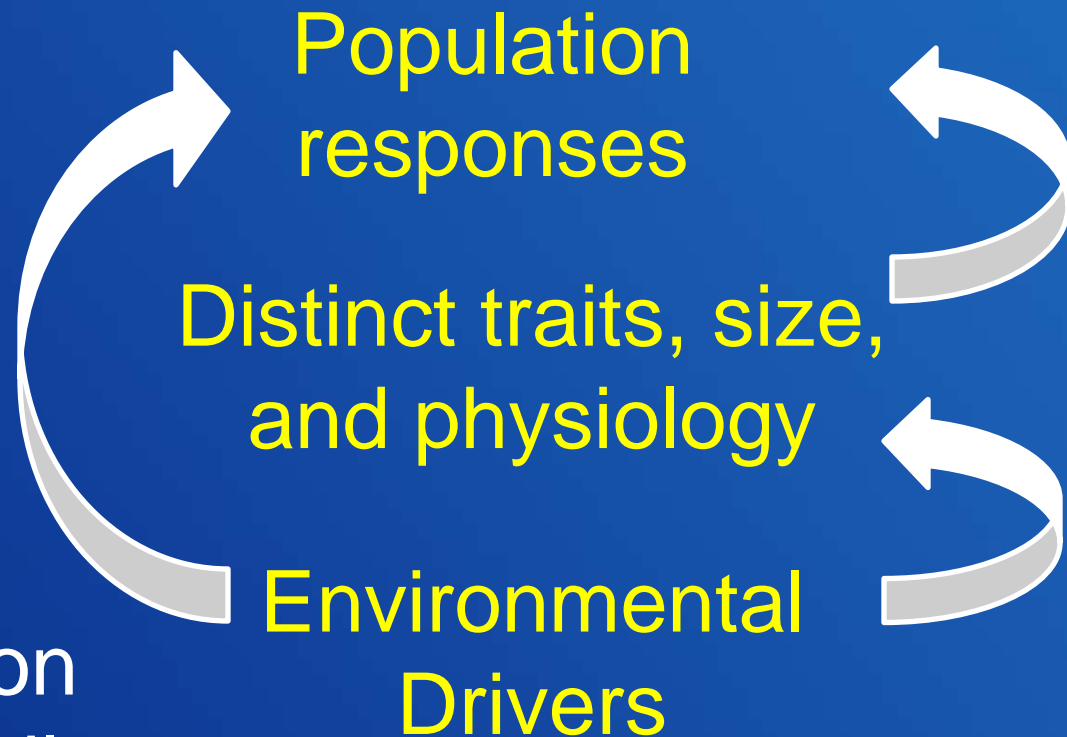
Can substitute species determine route entrainment?



Similar patterns, but more steelhead enter Turner Cut, so substitute species would underestimate Interior Delta entrainment

Who should be the surrogate species?

- Measuring effects with substitute species is complicated.



- South Delta is a difficult place to undertake evaluation due to lack of juvenile survival

Who should be the surrogate species?

- It depends on what response (conservation or disturbance) is being measured.
- Greater field experiments in distinct habitats are needed with Steelhead and Fall run Chinook to determine mechanism of mortality.
- Once mechanisms are understood, substitute species may be appropriate.