

---

**From:** Brad Cavallo <bcavallo@fishsciences.net>  
**Sent:** Tuesday, June 5, 2018 11:05 AM  
**To:** Halston, Armin; Jacobs, Brooke@Wildlife; Kevin Clark; Garwin Yip - NOAA Federal; J. Stuart - NOAA Federal; John Wikert; Allison, Anna@Wildlife; Buttermore, Elissa; Jennifer Nevills; Deanna Sereno; Allison Febbo; Corey C Phillis; Sheila Greene; chanson@hansonenv.com  
**Cc:** Nelson, Benjamin; Harrison, Katrina; Luke Davis; Cordova, Daniel  
**Subject:** Re: Second San Joaquin River I:E Technical Team Meeting  
**Attachments:** Delta\_hydro\_figures.pdf

Hi folks.

At our I:E Technical Team meeting yesterday there was a lot of discussion and interest in how increased San Joaquin River inflows might beneficially affect Delta hydrodynamics (particularly how the transition from river to tidal conditions can be pushed further downstream).

The attached figures depict how much and where SJR inflows (and exports) affect the South and Central Delta. I'd also encourage you to check out the Shiny app we developed (<https://fishsciences.shinyapps.io/delta-hydrodynamics>) and explore the data yourself (click the "about" tab for background information about data sources in how the app works).

Some observations to help orient you to each of the five figures in the attached PDF.

- 1) The first figure shows the attenuation of velocity changes associated with increased SJR inflows. Green channels indicate small velocity changes, red channels indicate larger velocity changes. At upstream locations (e.g. Channel "5"), velocity changes are dramatic with SJR inflows going from 1,000 cfs to 4,500 cfs. In contrast, velocity changes resulting from increased SJR inflows are quite subtle at downstream locations (e.g. Channel "31")
- 2) The second figure shows how SJR inflows strongly effect the location of the tidal transition zone. Red channels indicate where tidal reversals are strongly affected by SJR inflows. At Channel "12" tidal reversals are common at 1,000 cfs but rare at 4,500 cfs. SJR inflows affect the frequency of tidal reversals at Channel "31" but the effect is much weaker.
- 3) The third figure depicts how average velocities are influenced by SJR inflows. Again, red channels are where large changes in average velocity result from increased SJR inflows. The inset graphs show that effect of exports on these average velocities in the SJR corridor (pretty minimal).
- 4) The fourth figure shows export effects on tidal reversals, and is intended to be contrasted with the fifth figure which shows the affect of SJR inflows on tidal reversals. Take home message here is that increased SJR inflows have a very large footprint of hydrodynamic effects, while increased exports impact a relatively small geographic area. Why? Because export facilities are in the tidal Delta, where tides dominate hydrodynamic conditions experienced by fish. We can change things for fish by modifying SJR inflows, but exports primarily impact channels close to the export facilities.

Happy to discuss or answer any questions that may come up.

-Brad

Bradley J. Cavallo  
Vice-President, Principal Scientist  
Cramer Fish Sciences  
13300 New Airport Road, Suite 102  
Auburn CA 95602

office 530.240.6448  
mobile 530.613.8459  
[www.fishsciences.net](http://www.fishsciences.net)  
[www.genidaqs.com](http://www.genidaqs.com)

---

**From:** Halston, Armin <[ahalston@usbr.gov](mailto:ahalston@usbr.gov)>  
**Sent:** Monday, June 4, 2018 10:05:03 AM  
**To:** Jacobs, Brooke@Wildlife; Kevin Clark; Garwin Yip - NOAA Federal; J. Stuart - NOAA Federal; John Wikert; Allison, Anna@Wildlife; Buttermore, Elissa; Jennifer Nevills; Deanna Sereno; Allison Febbo; Corey C Phillis; Sheila Greene; Brad Cavallo; chanson@hansonenv.com  
**Cc:** Nelson, Benjamin; Harrison, Katrina; Luke Davis; Cordova, Daniel  
**Subject:** Re: Second San Joaquin River I:E Technical Team Meeting

Hi All,

We will be having the second I:E Technical Team Meeting Today at noon.

Please see the attached agenda, and Idea Briefs,

For the group discussion we will be speaking to the attached ideas and the following statements:

- 1) OMR is a function of SJR inflows and export rates.
- 2) OMR regulations are intended to provide protection to juvenile salmonids (and smelt) in the tidal Delta (i.e. from export facilities north, downstream of Stockton on the SJR)
- 3) I:E is intended to preserve the benefit to fish of available San Joaquin River flows by constraining exports above and beyond OMR standards
- 4) However, we now know exports have no effect upstream of the Head of Old River (HOR), and minimal effects on the mainstem SJR downstream of HOR.
- 5) Because SWP/CVP doesn't control SJR inflow and because exports primarily influence the tidal Delta, I:E is redundant to OMR.
- 6) If OMR regulations provide sufficient protection to salmonids in the tidal Delta, then additional restrictions from I:E shouldn't be needed.
- 7) To increase SJR flows (not to further restrict exports), then the best way to do that is encourage/incentivize SJR basin water conveyance

Thank You,

Armin

On Thu, May 17, 2018 at 10:37 AM, Halston, Armin <[ahalston@usbr.gov](mailto:ahalston@usbr.gov)> wrote:

Hello,

This email is in regard to the Second San Joaquin River I:E Technical Team Meeting, which you have been invited to participate in. The first meeting and Track 1 workshops helped Reclamation further develop potential Track 1 ideas for future operation of the CVP/SWP in regard to the San Joaquin River. The first meeting seemed to have resulted in team consensus on many aspects of the current I:E Ratio requirement. Reclamation will like to continue this effort and share the evolved idea to gain insight into advantages,

disadvantages and uncertainty of it. Please click on the doodle poll link below and identify your available meeting dates and times.

Thank You

Armin Halston

<https://doodle.com/poll/egizbs5cgpr9ydse>

--

Armin A. Halston  
Natural Resource Specialist  
Bay Delta Office | Bureau of Reclamation, Mid-Pacific Region  
801 I Street, Suite 140, Sacramento, CA 95814  
Office: (916) 414-2404

--

Armin A. Halston  
Natural Resource Specialist  
Bay Delta Office | Bureau of Reclamation, Mid-Pacific Region  
801 I Street, Suite 140, Sacramento, CA 95814  
Office: (916) 414-2404