

Comments on SWRCB Southern Delta Salinity Standards Modeling Requests (Tara Smith, Parviz Nader-Tehrani, Erik Reyes, Mark Holderman)

The suggested studies provide a good starting point to discuss model capabilities, time frames for studies, more specific definitions of operations, and potential ways of answering some of the questions given limitations of models, time, and/or operation definition.

Model capabilities in light of suggested studies

- CALSIM
 - Assuming that changes in Sacramento side reservoir releases and export operations can achieve the south Delta standards, CALSIM does not have the capability to operate to attempt to meet those standards. Further development would be necessary and would take a year (at a minimum) to develop.
 - Using the regression equation for Vernalis and Brandt Bridge developed for the CDO hearings, a buffered standard at Vernalis can be used as a surrogate standard for Brandt Bridge. Other stations do not yet have water quality relationships developed.
- DSM2
 - DSM2 does not currently account for in-Delta municipal discharges. If flow and water quality data is available, then it can be accounted for.
 - DSM2 is limited in how well it tends to model the effects of agricultural uses in the Delta. DSM2 tends to underestimate the effects of agriculture.

Input needed by modelers to make simulations (assuming models can perform studies)

- Provide municipal discharges and quality (for DSM2)
- Provide Friant Settlement Flows (possibly from USBR)
- Would need details on recirculation flows. Have flows been determined?
- Permanent Gate Operations. At this point it is assumed that the operations reflect the operations documented in the South Delta EIR.
- Define operation of low lift pumps as they work with Permanent Gates. (This may not be straight forward. It took a couple of years to settle on the permanent gate operation that is shown in the EIR. There were much iteration of operations and as result, many DSM2 simulations, as part of a discussion with the South Delta Water Agency and there continues to be modifications as a way to maximize the benefits of water quality and water levels. It is assumed that defining how the low lift pumps would work would also take a fair bit of time).

Proposed approach

- CALSIM operation to meet objectives

- Since CALSIM can not be currently operated to meet the South Delta Salinity Standards and it would take some time to develop that capability, there could potentially be a relationship developed between Vernalis and the other water quality stations using measured data to determine compliance. A regression was already determined for Brandt Bridge. DSM2 tends to underestimate the effect of agricultural drainage in the South Delta area. For this reason the preferred method to check compliance at South Delta locations (except Vernalis) would be to use some statistical regression equation based on historical measurements (Except for the case with permanent gates). The Delta Modeling Section has already developed such an equation for Brandt Bridge. Considering that the EC at Old River Tracy Road Bridge is consistently higher than the Union Island, the focus can be on the Tracy Road location. Due to more factors influencing the water quality at this location, the relationship is expected to be more complex than the relationship between Brandt Bridge and Vernalis. This analysis may take a few months to complete. Using these relationships, a buffer can be developed for Vernalis so that the compliance is met by the other stations. If this approach is taken, there shouldn't be the need for several of the DSM2 simulations suggested. Studies 1, 5 and 9 may still need DSM2 analysis.
- Increased Sacramento flows and changes in exports to meet objectives (Study 1)

This cannot be demonstrated using CALSIM and the proposed regression equations described above. Information on the ability of exports and Sacramento flows to meet objectives can be found in the appendices of DWR's submittal to the SWRCB. The appendices contain documents from both the workshop and the prior CDO Hearing. All of the information contained in the figures was not fully described in the text in regards to the Sacramento influence on the locations and that information could be better described. Some examples of this are:

- DWR Exhibit 20 (CDO Hearing) – The 1991- 2005 historical fingerprints at the three locations. This illustrates that in times when the barriers are not in place, the Sacramento flow does not really affect the objective locations. The graphs represent a wide range of hydrologies.
- DWR Salinity Workshop Submittal – Appendix C- In addition to what was presented or shown regarding water quality. There are some figures showing net flows into the south Delta. Amounts of flow entering the south Delta area help to illustrate how much flow is moved by the barriers upstream over different hydrologies.
- DWR South Delta Temporary Barriers Monitoring Reports (http://sdip.water.ca.gov/web_pg/tempbar/monitoringreports.cfm). These reports contain sections on hydrologic modeling of historical conditions and could add to the understanding.

Of course, additional simulations for a different year or years could be done to more directly and fully demonstrate the Sacramento River Flows limited influence on the South Delta Area.

Miscellaneous Points Related to Modeling for The Objectives

- The State Water Contractors are working on a proposal that looks at a pre-project condition hydrology as compared to current levels of use. From Paul Hutton's proposal:

The primary purpose of the proposed study is to show that, absent the CVP and SWP, seawater impacts would have been severe in the south Delta during other drought periods. A secondary purpose of the proposed study is to show the incremental impact of CVP and SWP operations on south Delta salinity and circulation patterns.

- The South Delta Water Agency has requested that DWR look at a redesign of the temporary barriers with the idea that better circulation could be provided. Initial modeling done showed some improvement in circulation, which could result in local improvements in water quality at the Old River near Tracy compliance station, when barrier weir heights were changed. However, these improvements come at the cost of reduced water levels upstream of the barriers which might not be acceptable under low supply/high demand irrigation conditions. DWR is considering experimenting with culvert operations to obtain similar circulation improvements and real-time water quality and water level monitoring but only with the cooperation of SDWA.
- There has been continued investigation of the re-operation of the permanent gates to improve circulation. This has recently been investigated by CH2MHill under the request of MWD and in coordination with DWR.