

# SAN JOAQUIN RIVER DISSOLVED OXYGEN TMDL STUDIES

## PEER REVIEW PRELIMINARY CONCLUSIONS

**JUNE 12, 2002**

### OVERALL

Our collective understanding of the sources and causes of DO depletion in the DWSC has grown substantially in the past year. Critically important new measurements have been made and diverse analytic approaches have been applied to transform data into knowledge. Much of this effort has followed guidance from previous peer reviews.

### RECOMMENDATIONS TO CALFED

The PIs need the opportunity to exploit historic and new data to:

- Refine conceptual models of sources and causes of the DO problem
- Identify high priority data gaps
- Design a road map for filling those data gaps

This can best be accomplished by extending contracts and funding expressly for this purpose. In addition, CALFED should fund a facilitator to assist them to fully exploit the data.

Our preliminary identification of data needs includes:

- Continuous measures of flow, DO, and representative measures of phytoplankton, zooplankton, nutrients and other oxygen-affecting substances. These should be collected within the DWSC, upstream of the DWSC at Mossdale, and far upstream from one or more significant tributaries. These are critical for new modeling work as well as for quantifying the driving forces into the SJR and on to the DWSC.
- Species variation of the algal load along the SJR. Does it vary with time/temp/flow? Does it vary with location in the SJR? What does this mean?
- Critical levels of DO in water (and location) for various organisms of interest, both aquatic and benthic.
- What is the importance of thermal stratification in the DWSC?
- Flow augmentation resulting from permanent tidal barriers in the Delta. These would factor into a major hydrodynamic change in the SJR/DWSC system. Need a better hydrologic budget for better modeling of the upper SJR system.
- Need data on sub-watersheds within the upper watershed to be able to support control actions
- Data to resolve disagreement on the causes of DO depletion in the DWSC (upstream algae versus local ammonia inputs)

- What is the role of grazing on algae levels in the SJR?
- Characterization of the dynamics between Mossdale and Channel Point

General additional monitoring recommendations (must be performed with input from Hydroqual):

- Extend upstream
- Install more probes to adequately define temporal and spatial variation in DO, conductivity, temperature, turbidity, and pH
- Continue “synoptic surveys” (Hayes cruises, etc.)

Ammonia concentrations in the DWSC are high. This deserves serious attention. Analysis of SRWCF effluent data needs to be performed to verify the occurrence and completion of nitrification.

Develop information on various aeration schemes/technologies, including performance of science-based demonstrations at pilot (possibly lab) scale. Cost/benefit data are also needed. (Important note: The DWSC/SJR system is already heavily modified. Further artificial modification must be performed with considerable caution.)

There is a legitimate difference of opinion on the role of ammonia in the DWSC DO depletion. CALFED should support use of the 1-D model or other suitable model to obtain a version of the oxygen mass balance for the DWSC that accounts for all of the different information (primary productivity, respiration, sedimentation rates and SOD) and resolves the ammonia controversy or better exposes basis for differing opinions. Use of the 1-D model can accomplish this in a relatively short period of time.

The application of the statistical model to long term data is promising and should be pursued. However, there are potential errors in the statistical model that must be resolved to make it a valuable tool for analysis. Dr. Jassby has given specific recommendations on this. CALFED should pursue a Directed Action for this work.

Process studies of 1-D model rates should be conducted. These should include but are not limited to:

- Plant productivity
- Plant respiration
- Nitrification rate
- Grazing rates