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*Review of “Synthesis of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel Near Stockton, CA” by G. Fred Lee and Anne Jones-Lee.*

**General comments:**

The authors have written a report with the purpose of unifying and explaining 12 studies that were conducted between 1999 and 2001 that examined various aspects of the DO problem in the DWSC. The authors have a daunting task, complicated by the fact that several of the reports consist largely of raw data.

The report includes many data sets and models. The reference to these myriad data and models needs to be more clearly stated throughout the report. It needs to be clarified what conclusions are based on reports by the principal investigators and what conclusions are from additional analysis conducted by the authors of the synthesis report. The authors should use phrases such as “based on data collected by ....., according to box models conducted by....., using a water quality model developed by....” liberally throughout the synthesis report. An example of a well cited paragraph can be found on page 47, second paragraph. There are a number of statements made in the synthesis report that do not reference other reports or papers and it is not clear if there is conclusive data to support the statement or if it is the authors supposition.

It is stated at several points in the report that algal production in the DWSC does not contribute to the DO deficit because the algae produce oxygen as they grow. The implication appears to be that algal production in the channel is not contributing to the problem. The same logic could be applied to algae imported from up-stream. Algae produce oxygen even if they are not actively growing (maintenance metabolism), so when up-stream algae enter the channel, they also make oxygen, so long as they are in the photic zone. It appears that regardless of where the algae originate, they add oxygen demand when they sink in the DWSC.

On page ‘i’, third paragraph, and page 27, second paragraph, it is stated that the primary purpose of the technical studies was to determine the assimilative capacity of the DWSC. However, there is very little reference to assimilative capacity in the rest of the report. It is not apparent which, if any, of the twelve studies made any significant effort to determine assimilative capacity. Most of the studies focused on determining the factors

causing DO deficits in the DWSC. This is not the same as determining how much load the river can take before there is a DO deficit (assimilative capacity). Two studies examined engineered remediation approaches. Some studies were simply monitoring studies, lacking in any significant data interpretation. Determining assimilative capacity should not be listed as a primary objective for this project.

In the Executive Summary, there is no reference as to what studies lead to what conclusions. There is a need to support the arguments and conclusions with reference to data and models.

### **Specific Comments**

On page 'iii', "water quality objective (standard)" should read "water quality objective (WQO)."

On page 'v', paragraphs 6 and 7, are apparently contradictory. In paragraph 6, improved water clarity (more light) is bad, in paragraph 7, less light is bad. This apparent contradiction needs clarification.

On pages 'iv to vi', under the heading "Factors Influencing DO Depletion in the DWSC", import of algae from up-stream and discharges from the Stockton treatment plant are not listed as factors influencing DO depletion. These factors need their own bullet points.

On page 'vi', third paragraph, the last sentence does not make sense. How do algal chlorophyll show DO depletion?

On page 'vi', 4<sup>th</sup> & 5<sup>th</sup> paragraph should be combined and moved under the "flow" bullet point on the previous page.

On page 'vi', the sixth paragraph should be moved under the new "algal import" bullet point.

On page 'vii', third paragraph, "the amount of oxygen .....has been computed" by who? The source of this calculation needs to be given.

On page 'vii', third paragraph, WQO has already been defined above.

On page 20, fourth paragraph, the 3<sup>rd</sup> sentence should reference Stringfellow (2001).

On page 23, first paragraph, the sentences "Chlorophyll to carbon ratios range from 10 to 50 µg chlorophyll per mg C. It is typically found that about 10 µg/L of chlorophyll *a* is equivalent to about 1 mg/L BOD<sub>5</sub>." need to be referenced.

On page 43, paragraph four, the third sentence does not make sense. Is the loading calculation for a 2 mg/L or 20 mg/L effluent limit?

On page 44, Changes in BOD between Mossdale and Channel Point should be made on a mass basis to determine BOD loss.

On pages 44 to 47 there is an extensive analysis of the DO demand between Mossdale, Channel Point, and Turner Cut based on data presented in Appendix D Tables. The introduction to Appendix D is confusing. It is not readily apparent from looking at the tables what group or persons collected the data, whether the data are averages or grab samples, whether calculations were made by the authors or were taken from a report. The authors should add footnotes to the tables to clarify the source of the data and how

the calculations were made. It needs to be clearly stated if this section is the summary of a CalFed project or an independent analysis of the data by the authors or a combination of both.

On pages 44 to 47 the sites are referred to as Mossdale, Channel Point, and Turner Cut. In the Appendix D Tables, they are referred to as Mossdale, Station R7, and Station R3. This is confusing. Use of station designations should be standardized throughout the report.

On page 47, fourth paragraph, last two sentences are confusing. Is the analysis discussed in the previous pages invalid because of these problems? Who did what calculations, how did they do them and why are they different? The sentence “Probably the greatest cause of the differences relates to the approach used for calculations of loads, and potential problems in reliably measuring the BOD of algae and the nitrification reactions” illustrates the importance of listing clearly where data and calculations originate, so that the reader can make an independent determination of the validity of the analysis and conclusions drawn from those results (see general comments, above).

On page 47, paragraph four, last sentence, same day values from stations that are anywhere from five to thirty days travel time apart (Figure 6) should not be used to draw conclusions about any increase in algae between the two points.

On page 70, fourth paragraph, the model, report, or data that is the basis for the conclusions in this paragraph needs to be cited.

On page 73, Table 10, the column headings have typo's or use fonts that did not print correctly.

On page 107, replace “pseudo” TAC chair with “acting” or “effective” or “interim.” I don't think there was anything “pseudo” about the job Kevin was doing.

On page 108, third paragraph, eliminate the last sentence as redundant and combine the first sentence with the next paragraph (paragraph four). The issue of late reports has already been addressed in the first paragraph (p. 108) and the follow-up studies are addressed in paragraph four.

On page 108, paragraph 4, the words ‘will not now take place’ should be “may not now take place.”

On page 109, draft peer review questions referred to in the last paragraph are not included.