



# *San Joaquin River Group*

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March 11, 2002

Dr. Chris Foe  
California Regional Water Quality Control Board  
Central Valley Region  
3443 Routier Road, Suite A  
Sacramento, CA 95827-3003

Subject: Draft Strawman Report Dated January 2002

Dear Dr. Foe:

This letter contains a collection of comments by representatives of the San Joaquin River Group Authority (SJRG) member agencies. The comments are intended to be constructive in nature to help develop the Strawman Report into an easily understandable document that fully outlines the problem, the work that has been carried out to analyze the problem, and any conclusion regarding the development of a solution to the problem. We know you have said, “the report is technical in nature and that you only expect technical comments”. However, this is a very important document that will be used by the Regional Board, the Peer Reviewers, the Stakeholders and the public to draft, finalize and support the implementation plans and/or rules and regulations that are finally adopted to solve this complicated dissolved oxygen (DO) problem. It is important to have the report be well organized, easily understood, and unbiased. Therefore, many of the comments are editorial as well as technical.

As the report stands at this time, it is no more than a summary description of the studies that have been carried out, a listing of the perceived data gaps and a discussion of how those data gaps may be filled. It appears the report is written around the premise that, if something helps to improve the DO conditions in the DWSC, it therefore must be a cause of the DO problem. This is an “ends justifies the means” approach to the problem. The biggest problem is that the deadline to make a load allocation is driving the technical information even though the scientific conclusions are not available to support such an allocation at this time.

It is most encouraging that one of the alternatives to be evaluated to resolve the DO problem is merely stirring up the water in the channel as described by Dr. Russ Brown at a recent Steering Committee meeting. If such a solution can be developed within the range of costs described by Dr. Brown, then such a solution must be considered attractive.

One other alternative that must be considered in any evaluation of solutions to this problem is “Filling the DWSC”. This may not be a viable alternative, but it must be

evaluated because of the conclusion that, if the DWSC had not been constructed, there would be no DO problem in the San Joaquin River.

Following are the SJRGA general and specific comments on the Draft Strawman Report.

### **GENERAL COMMENTS**

- The report needs to be better organized. It is sometimes difficult to distinguish between hypothesis, assumptions, historical fact, data, theories, opinions, and conclusions. The reader must be able to separate these items.
- The title of the document, “Draft Strawman Allocation of Responsibility Report” indicates that the report will describe some method to allocate responsibility to various stakeholders. This has not been done.
- It is important to decide what this report is to accomplish. Is the report just summarizing the data? Is it to suggest causes of the problem? Is it to suggest solutions to the problem? All of the above? This needs to be made clear to the reader in the introduction. After this is stated, it is recommended that the report should state the following for each area: A. The hypothesis that each PI was investigating. B. The studies that were conducted and how the study was designed to provide answers to the hypothesis. C. The data or information that was derived from the study. D. Whether or not the hypothesis was proved or disproved. E. The meaning of the data and what they mean in regard to the potential solution to the DO problem.
- The tone of the report needs to be changed. It is OK to offer opinions or biased comments in the “Results and Discussion” section and the “Conclusions and Recommendations” section (which has not been included in the draft reviewed). However, in the discussion in the Methods and Materials section, should only contain the data and how the data were collected without comments on whether or not it is a good or bad procedure.
- It is extremely important to discuss the Deep Water Ship Channel (DWSC) issues first, including the fact that the modeling indicates that if the DWSC had not been constructed there would generally be no dissolved oxygen problem in the San Joaquin River. This discussion should precede any discussion of the possible causes and alternative solutions.
- It is recommended that there be a glossary or a discussion of terms. For example, “cause” needs to be defined. In that regard, we would argue that reduced flow through the DWSC is not a “cause” of the DO problem, since absent the channel, there would be no DO problem.
- The reader needs to be able to independently evaluate; A. Whether or not a definition is accurate. B. Whether or not the data support the conclusions offered.
- The Report needs more citations. Moreover, the citations used are, in many cases, out of date and/or may be biased.

## SPECIFIC COMMENTS

### 1. **Executive Summary**

- This section will have to be rewritten, based on the changes made in the body of the report

### 2. **Introduction**

- The discussion of the setting of the DWSC, including the history of the channel, as well as its size, depth, speed of water flowing in through the channel, etc. should be here. Given the crucial relationship between the size and configuration of the DWSC, as is discussed on pages 7-9, such a description is critical.
- The discussion about how/why the DO objective was established should be improved. For example, citations should be provided in support of statements that low DO harms aquatic life, prevents the migration of fall run salmon, and may block movement of aquatic resources. Further, the history of the 6 mg/L standard should be provided in full; as Mr. Gowdy indicated, despite its intended purpose, this standard has no scientific basis.
- The sixth paragraph should be deleted. It is a summary of the conclusions, not appropriate for an introduction.
- The seventh paragraph is troubling. It indicates that the goal of the strawman report is to “summarize data demonstrating the importance of upstream flow” and to “summarize data collected...on the source, nature and mechanisms controlling upstream loads.” (p. 2). If the goal is to merely summarize data, it should do so *without* suggesting conclusions that can be drawn from that data. Also, see comment on title of report.

It is our understanding that the strawman report was to take existing data and attempt to identify the possible cause(s) of the low DO problem in the DWSC. If we are correct, then the data itself would lead to the identification of the cause(s); the data would not merely be used, as is suggested, to support the three existing hypotheses (flow, configuration, load).

It appears that the data do not necessarily support the three pre-existing hypotheses, and this taints the entire report. For example, the report indicates on page 8 that if the DWSC were not present, and flow in 1999 and 2000 was at or above 500 CFS, no violations of the DO standard would occur. Yet, it is elsewhere concluded that low flow is one of the causes of the low DO problem. This conclusion is an opinion (valid...maybe yes, maybe no), and should be identified as such; its inclusion in a scientific analysis is inappropriate. During your discussion of the report before the Steering Committee on February 6, you indicated that, in your opinion, flow might not be as important a factor as some hypothesize. We assume you will rewrite your discussion on this issue.

### **3. *Methods and Materials***

- The method for assigning the responsibility for monitoring and collecting information on various aspects of the problem should be presented before the discussion on the various types of collected data. It is also important to discuss who decided who would do what, how the data are reported, and where the data can be found.

#### **Statistics**

- It is suggested that there be an explanation of whether or not the statistical computations that are outlined in the report were carried out on all of the data or just selected data. If only on selected data, there needs to be an explanation as to which data were analyzed and which data were not analyzed. In addition, if other different statistical analyses were conducted on some data, that needs to be explained as well.

### **4. *Results and Discussion***

#### **Flow**

- There does not appear to be any purpose to the first paragraph. It is not related to the data. Whether or not the system is heavily manipulated or not is irrelevant to the question of whether or not the data demonstrate that a reduction in flow is a cause of the low DO in the DWSC.
- We question the use of the 1980 report from SDWA that was prepared to support the view of the SDWA.
- It is stated that "...present flow in the lower San Joaquin River at Vernalis is reduced by 44 - 56 percent between April and September from historic values". It is recommended that you indicate the base from which this reduction occurred, because presently, during the months of August, September and October, particularly during dry years, the release of stored water from the reservoirs on the east-side tributaries to the San Joaquin River maintain a higher flow in the River at Vernalis than would otherwise be there. If the water had not been stored for release during those months, the natural flow of the river would in many cases be less than the current "manipulated" flow.
- In the first paragraph, it states that water from the three east-side tributaries is "exported from the basin." What is the basis for this statement? All of the water made available for environmental purposes in the SJR and Delta are considered "in-basin" uses under the appropriate water rights laws, rules and regulations. This and any reference to the "export" of this water must be deleted.

- The first sentence of the second paragraph says that flow was “recognized as an important factor influencing dissolved oxygen,” yet none of the remaining sentences in the paragraph support this, other than to suggest that there have been things “assumed” or “hypothesized” with no supporting data. Again, it is recommended that the assumptions and conjecture should either be clearly stated as such or eliminated. If the data does not support a certain conclusion, then reliance on old (1960s) conjecture should not be used to bolster the cause.
- The data from the use of rock barriers does not support the conclusion that flow is a cause, as in some years the increased flow resulted in no change in the level of oxygen. (p. 5). A hypothesis is given as to why the increased flow did not increase the oxygen concentration, but there is no supporting evidence. This is useful history and data, but it is not utilized, nor is a reason given as to why it is not utilized.
- The discussion of the model done by Systech on page 6 is confusing. Since the model performed “poorly,” why is it mentioned? If it is to be mentioned, then the how and why it performed poorly should be discussed.
- After noting that the Systech model performed “poorly,” the report goes on to say that it was used anyway in a “theoretical” examination of altered flows and the impacts to oxygen concentrations. The results are then used to give support to the plot of known DO concentrations against known flow from 1994-2001. This seems to be inappropriate “bootstrapping.” If the Systech model performed poorly in the “real world,” the fact that its theoretical application supports a conclusion that can be drawn from some data should be of no consequence. Since the report recommends that the 3-dimensional HydroQual model be developed and used, it seems clear that any reliance on the Systech model is inappropriate.
- The report indicates that “flow enhancement, either by itself or in combination with other control measures, may be an effective way to decrease the oxygen deficit” (p. 6) and “oxygen levels in the channel are positively correlated with flow.” (p. 7). Assuming that the data do, in fact, support both of these statements, the data do not necessarily support the conclusion that “the parties that regulate flow in the San Joaquin River are, at least partially, responsible for the DO impairment in the DWSC.”
- The fact that something can alleviate a problem does not mean that its absence is a cause. For instance, no one will argue that lack of aeration is a cause, but the data will show that additional aeration will decrease the oxygen deficit. In regards to flow, this is the type of conclusion reached in this report. This is a critical flaw and weakens the report overall.
- In the last paragraph, the report states that flow is reduced by 19-68% of historical amounts. Again, there is no citation given. Moreover, there is no identification as to what “historic level” is being used as a baseline. Again, this type of statement, made without citation, suggests that the report is merely an attempt at *post-hoc* rationalization of a pre-existing theory that lower flow is a cause of the problem.

- Based on comments at the February 6, Steering Committee Meeting, we believe that this flow section of the report will be rewritten. We hope our comments will help in that regard.
- The person that concluded, “Therefore, the parties that regulate flow in the San Joaquin River are, at least partially, responsible for the dissolved oxygen impairment in the DWSC,” should be identified. This is particularly important based on the concept discussed at the Steering Committee meeting that higher flows from the three east-side tributaries may correspond to greater DO impairment in the DWSC. There are varying opinions and the data are limited. But, it may lead one to conclude that the use of the flows, from the east-side tributaries, are an extremely inefficient method of controlling the low DO problem. All of this needs to be discussed in detail in the report.

### Stockton Deep Water Ship Channel

- This section needs to be part of the Introduction to the report. In addition, the history and description of the channel needs to be expanded.
- There is no identification of who built the channel, who operates and maintains it, and/or who benefits from it. It is important to identify these stakeholders, particularly since it may be necessary to have these stakeholders to contribute to the solution.
- Footnotes 11 and 12 should be included in the text of the discussion.
- The genesis of the EPA’s 1971 recommendation not to deepen the channel further is not clear. Is it truly based upon three hypotheses, or is there some actual study/data upon which that recommendation was based? This should be discussed further.
- The discussion of the modeling and data in this section is pretty good. The data shows that: (1) There is a consistent pattern of high levels outside the channel, intermediate levels in the entrance, and lowest levels within the channel. (2) Only 8% of the measurements taken outside the channel were below the standard, while 40% of those taken within the channel were. and (3) The simulation modeling showed that no violations would occur within the channel if it had not been created and flow was at or above 500 cfs.
- Use of the Systech model should be explained, especially since it performed “poorly” in other areas.
  - The suggested additional studies seem appropriate to fill in known and identified data gaps, as well as to validate the results of the Systech model.

### Upstream Sources

- The heading of this subsection would be better titled “Sources of Organic Material.

- There is a reference to a hypothesis that organic material is one of the major causes. This hypothesis is supported by citation to 4 studies between 1968 and 2000, two of which show that the upper basin was responsible for 80% of load imported to the channel in August and September. The percent of load from the upper basin does not support the hypothesis that load itself is one of the causes. It may be possible that load from that area is not a cause, and in that case, the percentage of load from that particular area would be irrelevant. Further, what relationship is there between the imported load and the pre-existing load? For example, is there already a large amount of oxygen demanding substances in the channel? If so, does the level/amount of imported load matter? Again, this looks like the development of a false premise that is then “proved.” It is very important to show a direct relationship between the activities of the parties (i.e. those that are asked to participate in the solution) and whatever it is they do, to the DO problem.
- The second paragraph is a description of the following sections. It does not appear to be needed here. There is no explanation (at least here) as to why the origin, growth or identity is crucial to the determination of whether or not such oxygen requiring substances are a cause of the problem. Since its not obvious, a skeptic could conclude that this is a truly a strawman, an effort to create “proof” of something which is not really relevant in an effort to prove a pre-existing hypothesis.

### Oxygen Requiring Substances From Upper Basin

- It is recommended that the words “From Upper Basin” be deleted from the title of this subsection.
- The conclusion is made that algae and algal derived organic matter is responsible for “most” of the oxygen demand from the upper basin. What is “most?” If the upper basin is responsible for 80%, what is the total percent that algae/algal derived? Further, how important is the “unidentified variables” which account for 25% variation?

### Time Dependent Oxidation Rate

- No comments.

### Seasonal Phytoplankton Pattern in San Joaquin River

- The first sentence is troubling. When and who made this “previous suggestion” and why is it relevant? The importance of this statement should be clearly laid out. If not, why discuss prior/existing hypothesis/suggestions/assumptions? Just explain the data that has actually been collected/recorded and discuss its implications.
- The same can be said for the first sentence on page 12 discussing the hypothesis that the load of oxygen requiring substances from the upper basin

is “responsible for the majority of the oxygen deficit in the DWSC in the summer.” Is this hypothesis being used to support a conclusion that is not wholly supported by the data? At least here, the relevance of the hypothesis seems clear...the load may have a direct correlation to the oxygen deficit in the DWSC. This concern can be carried over, as the report states later that the study results are consistent with an equation “and the hypothesis that the upper basin is a major source of oxidizable material in the DWSC in the summer.” (p. 12). Again, it seems inappropriate that the hypothesis itself is being used to show support for the data that supports the hypothesis.

- Further, the next sentences indicate that the hypothesis and data do not hold up well in times other than the summer. There should be some discussion to show why this does not cast doubt on the conclusions reached regarding the low oxygen in the summer? It’s not clear, but the report does not seem to go in that direction. Rather, another hypothesis is offered (regarding the importance of effluent from Stockton) that supports the earlier hypothesis. Since the hypothesis regarding the importance of load from the upper basin does not hold true in the entire year, it seems additional study is needed to determine what role load from the upper basin actually plays, as opposed to what role it is hypothesized to play.
- The report does a good job of identifying the contradictory nature of the analysis regarding flow and the oxygen demand equation. (p. 12-13). However, rather than explore this contradiction, the report merely foreshadows an alternative explanation for the importance of flow. This is troubling. Also troubling is the fact that the contradiction is based upon the results of the Systech model, the use of which is not fully explained, since it performed “poorly” in actual (as opposed to theoretical) predictions, and “our present conceptual model of how oxygen impairment works in the DWSC.” This does not seem at all scientific. When the data does not support a pre-existing notion, its time to reject the pre-existing notion, and not rationalize the data to fit into what the data was expected to show.

### Change in Concentration of Organic Material Between Vernalis and Mossdale

- The first paragraph does a good job of describing the fact that there is a controversy regarding whether or not the upper basin loads are actually delivered to the DWSC. It is clear that more work needs to be done to clarify what happens between Vernalis and Mossdale and the DWSC.
- The discussion of the methods, findings and conclusions of both the City of Stockton and Dr. Lehman of DWR seems fair, as does the discussion of the limited relevance of the work done by Dr. Dahlgren. The recommendation for more studies is appropriate given the data collected. The very studies suggested demonstrate bias. The additional studies call for an examination of the amount of load that travels from Vernalis to the DWSC, which is appropriate. But, the report then states that if large, inexplicable changes

occur, a follow up study should be done to determine why. (p. 14). This appears to say that if the data continues to not support the pre-existing notions, then we must find out why not. This is good science, but certainly not something this group or the RWQCB should pursue. This recommendation, therefore, appears to be inappropriate; if load from the upper basin is simply not a factor, let someone else find out why not. There is no need for this group/process to go around trying to find out where their assumptions didn't prove to be true.

- It must be pointed out that the only data discussed which actually looked at Mossdale, Vernalis and the entrance of the DWSC was that collected by Dr. Lehman. The other data collected were at Mossdale and Vernalis only, with assumptions made as to the amount of load delivered. Moreover, the studies done by the City of Stockton and Dr. Dahlgren don't even try to look at the amount actually delivered; as the report states, Dr. Dahlgren's data "suggest no decrease in either concentration or load...between [Mossdale and Vernalis]." So What? The data collected by Dr. Lehman showed a "loss rate of 160-300 kg/day...between Vernalis and the DWSC." Note the difference in the two studies...the Lehman study actually looked at what was delivered to the DWSC, while the Stockton/Dahlgren studies do not. Who cares what is showing up at Vernalis, if it is not, in fact, reaching the DWSC? While additional study seems necessary, the report should note that the most relevant data collected to date does not support the pre-existing notions/hypothesis/assumptions that load from the upper basin is a/the primary cause of the oxygen problem. We recognize that this issue is controversial, but this seems to be critical, since the data collected to date suggests that the upper basin load may be minimal as one of the causes, and therefore would negate the participation of the upper basin parties in any solution, voluntary or otherwise.

### Origin of Summer Mossdale Algal Bloom

- This section, as the previous section, discusses the fact that there are no data that conclusively demonstrate that algae in the River at Mossdale has any relevance to the low oxygen problem in the DWSC.
- The report notes that Orestimba Creek was sampled as "representative of surface return flow." (p. 15) There is no explanation as to how this creek was determined to be representative. This seems important, since the relevance of data collected there depends entirely upon it actually being representative.
- On page 15, algal production is stated to increase and decrease due to photoperiod; as such, algal production increases in May with lengthening days, and decreases in August and September due to shortening days. However, the report later notes that algal bloom increase coincided in 2000 and 2001 with the cessation of the VAMP flow. (p. 16). From this, the report concludes (1) Increased flow from the Eastside tributaries may act as

a dilutant of algal-rich waters (due to the fact that they have low chlorophyll (p. 16)) and (2) “Under no circumstance should eastside flows through the DWSC be reduced further during summer algal bloom season.” (p. 16, fn. 30). It seems that the Algal blooms should be expected to increase in May regardless of the timing of the VAMP pulse flows, because of the increase in the photoperiod during May. It is important to evaluate this conclusion in years when there was no VAMP pulse flow.

- There is again the suggestion that increased flow can be a mechanism for resolving the low oxygen problem. As noted before, being part of the solution does not mean that its absence is part of the problem.

### Algal Growth Model

- On page 18, you indicate two important things of interest. First, that watersheds that do not contribute to the algal loads at Mossdale ought not be penalized. This indicates that: (1) It is assumed, contrary to Dr. Lehman’s data, that algal load which reaches Mossdale reaches the DWSC, and (2) That not all load from the upper basin reaches Mossdale. The first point has been addressed; the second is important since there must be determinations of where/how upper basin algal loads do/do not reach Mossdale. Second, the report indicates that even if a basin’s load does not reach Mossdale, an accounting would still be desirable. This appears to be an inappropriate conclusion. If the load isn’t relevant to the DO problem, then that should be the end of the story. This “Strawman” is not being developed to provide an “accounting” of loads throughout the San Joaquin Valley, but to determine the cause(s) and identify potential solutions of the DO problem in the DWSC.  
The report notes that 10% of the flow contains 90% of the algal loads which reach Mossdale. (p. 18, fn. 34). From this, how does one conclude that decreased flow from the east-side tributaries is a cause?
- The conclusion reached is that summer plankton bloom at Mossdale can be reduced by east-side reservoir releases. (p. 19). Again, a potential solution is not also a probable cause.

### Nutrient Concentrations

- This section makes a few comments about cost-effectiveness. On page 19, says that it was assumed that it would not be cost-effective to reduce a nutrient at or near the rate limiting concentration. On page 20, says that concentrations in the main stem between Patterson and Mossdale are such that nutrient control there will not be cost-effective. These statements raise two points. First, there is no information regarding what methods of control could be applied and, most importantly, what they would cost. Absent any information on cost, there is simply no way that any conclusions regarding cost effectiveness can be made. Second, even if

- data regarding the cost of control were available, whether or not application would be “cost effective” is a subjective, and not an objective, determination. Therefore cost-effectiveness has no place in this report.
- The proposed recirculation solution gets short shrift. (p. 20). On the basis of two samples, the report concludes that the algal concentrations from the Delta are too high to enable recirculation to effectively combat the low DO problem. While the conclusion offered may well turn out to be correct, it appears inappropriate to say so based upon two samples taken in one year. It is also interesting that while Dr. Lehman’s data regarding algal growth between Vernalis and the DWSC are not accepted, the meager data that suggests that recirculation would have a limited impact is accepted. Again, it looks like the data is relied upon when it meets/supports pre-existing notions, but not when it does not.

#### Recommendations for Additional Work

- Additional studies are appropriate. However, as stated earlier, the studies recommended suggest bias. It is important that, under this program, only studies that relate to the issue of the DO problem be carried out.
- The issue of what happens in the river between Vernalis and the DWSC is most important and must be resolved. There are numerous unaccounted for loads discharged and removed from the River in that reach of the River.
- One final comment. Even as skeptical as one might be in regard to the use of aeration or stirring devices to resolve the DO problem, these alternatives need to be at least mentioned in the report as potential solutions

#### **5. CONCLUSIONS AND RECOMMENDATIONS**

- It is assumed a section on Conclusions and Recommendations will be added to the next draft report.

We hope the SJRGA comments help in making the Strawman Report a more factual and scientifically defensible report. If you have any questions about our comments please feel free to call me at (209-526-7405), Bill Johnston (209-765-5207), or Bill Paris (530-899-9755).

Sincerely,



Allen Short  
Coordinator

C: SJRG  
TMDL Do Steering Committee