**San Joaquin River Dissolved Oxygen TMDL Steering Committee**
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Mr. Michael Delamore
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Mr. Joseph C. McGahan
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Dear Mr. Delamore and Mr. McGahan

The San Joaquin River Dissloved Oxygen Maximum Daily Load (SJR DO TMDL) Steering Committee's Technical Advisory Committee (TAC) wishes to provide comments on the draft Grassland Bypass Project EIS/EIR that was issued on December 19, 2000. These comments are based on our knowledge of water quality issues in the San Joaquin River Deep Water Ship Channel (DWSC) near Stockton and the San Joaquin River (SJR). This committee consists of the San Joaquin River Deep Water Ship Channel watershed stakeholders who have the responsibility of working with the Central Valley Regional Water Quality Control Board (CVRWQCB) in controlling the dissolved oxygen (DO) depletion below the Basin Plan water quality objective that occurs in the DWSC each summer and fall. At this time there are about 100 stakeholders and their representatives active in the Steering Committee and its TAC.

## Overall Conclusions and Recommendations

The current draft Grassland Bypass Project EIS/EIR needs to discuss water quality management issues in addition to TDS and selenium that the Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority will need to consider in the future in formulating operations in the Grassland Bypass Project. Based on recently developed information, Mud Slough may be a significant source of oxygen demanding substances (BOD, algae, and some other organics) that could contribute to low dissolved oxygen in the SJR DWSC near Stockton. The current Central Valley Regional Board SJR DO TMDL effort is attempting to assign responsibility for reducing the amount of oxygen demand and algal nutrients discharged to the San Joaquin River.

It is recommended that the Grassland Bypass Project dischargers become active participants in the SJR DO TMDL Steering Committee and TAC. Further, the Grassland Bypass Project dischargers, as part of the Grassland Bypass Project, should significantly expand the TDS and selenium water quality monitoring program in the draft EIS/EIR to include defining sources and amounts of oxygen demand (BOD, planktonic algae, etc) algal nutrients (nitrogen and phosphorus compounds) and other constituents that impact the oxygen demand load discharged by the San Luis Drain to Mud Slough. This information will be needed by the Grassland Bypass Project dischargers to clarify their respective responsibilities for contributing oxygen demand and nutrients to the San Joaquin River. As with the control of TDS and selenium, the local expertise in the region will be the primary basis for developing control programs. This expanded monitoring will be of value to the dischargers in providing the information they will need to determine how best to manage the discharge of oxygen demanding materials and nutrients.

**Background**

Beginning with the summer of 1999, the TAC initiated studies on the causes of the DWSC DO depletion and the sources of the constituents responsible for it. During 2000/2001, over $860,000 in CALFED funds are being spent in these studies. Recently, the SJR DO TMDL Steering Committee and TAC have filed with CALFED a Directed Action proposal for $2 million per year for two years for an expansion of these studies. An electronic version of this proposal is available upon request.

In August 2000, I published a report, "Issues in Developing the San Joaquin River Deep Water Ship Channel DO TMDL" to the SJR DO TMDL Steering Committee and the CVRWQCB. This report is available from my website, www.gfredlee.com, as well as the Steering Committee's website, www.sjrtmdl.org. This report discusses the state of knowledge as of the summer 2000 on the causes and sources of constituents responsible for the DO depletion in the DWSC. I can send an electronic version of this report to anyone interested.

An initial Strawman evaluation has been completed on the causes of the DWSC DO depletion below water quality objectives, as well as the sources of the constituents responsible for the DO depletion. Based on the work that has been done thus far, the primary causes of dissolved oxygen depletion are oxygen demanding substances (BOD, ammonia and organic nitrogen) discharged by the City of Stockton and other municipalities, dairies, feedlots, etc., that discharge domestic, commercial and industrial wastewaters to the SJR and its tributaries. Also, often of greater importance is the discharge of algal nutrients (nitrogen and phosphorus compounds) to the SJR and its tributaries that develop into algae, that upon entering the DWSC, die, decompose, and exert an oxygen demand.

The summer/fall 1999 studies showed that algae developed in the SJR upstream of Vernalis were the primary causes of DO depletion within the DWSC during August and September 1999. This finding led the TAC to expand the monitoring program in the SJR upstream of Vernalis to include the major tributaries of the SJR as well as at various locations along the SJR. The recently completed Strawman analysis shows that during the summer/fall 2000, Mud and Salt Sloughs were major contributors of oxygen demand in the form of algae and other substances to the SJR. They are also major contributors of algal nutrients to the SJR that can develop into algae and thereby, exert an oxygen demand in the DWSC. This Strawman analysis also demonstrated that diversion of the San Joaquin water upstream of the DWSC as well as the deepening of the SJR to develop the DWSC, significantly aggravate the low DO problem that is found in the San Joaquin River DWSC near Stockton. These issues are being addressed by the SJR DO TMDL Steering Committee and its TAC.

**Recommendation**

The oxygen demand introduced into the SJR by Mud and Salt Sloughs represented a significant source of oxygen demand that was found at Vernalis during the summer/fall 2000. It is this finding that is causing the SJR DO TMDL Steering Committee and TAC to recommend to the Bureau and the San Luis & Delta-Mendota Water Authority that monitoring be expanded to include aquatic plant nutrients, (nitrogen and phosphorus compounds) planktonic algal chlorophyll/pheophytin, volatile suspended solids (VSS) and ten-day BODs. Also, measures of inorganic and organic particulates (TSS), turbidity and light penetration (Secchi depth) should be made. At each location where monitoring is being conducted, the flow of the waterbody being monitored should be measured. The purpose of this monitoring program should be to determine the extent that the Grassland Bypass Project discharges oxygen-demanding materials, including algal nutrients, to Mud Slough that leads to the high oxygen demand discharged by Mud Slough to the SJR.

**Regulatory Implications**

In accord with the TMDL timetable, the CVRWQCB is to issue a TMDL report to the US EPA by June 2003 which provides an analysis of the problem and an implementation plan to control it. This means that within a couple of years, all dischargers of oxygen demand and nutrients to the SJR and its tributaries in the SJR DWSC watershed could be required to begin to implement oxygen demand/nutrient control programs in accord with an oxygen demand allocation of responsibility.

Oxygen demanding materials and nutrients discharged from agricultural activities and the federal and state refuges and duck clubs have the potential to be assigned an oxygen demand and nutrient allocation as part of the oxygen demand TMDL process that is currently being developed. As a result, those responsible for managing water releases/discharges from all areas in the Mud and Salt Slough watersheds may have to conduct monitoring programs in order to determine how best to meet any oxygen demand/nutrient allocation that is assigned to them by the CVRWQCB in 2003.

As part of a proposed CALFED Directed Action project, if funded as proposed, the SJR and its tributaries' monitoring program for the summer/fall 2001 will be expanded to include sampling of oxygen demand and nutrients in the Mud and Salt Slough watersheds. This planned sampling program will identify major sources of oxygen demand and nutrients within the Mud and Salt Slough watersheds. It will not, however, provide the kind of detailed information that the Bureau and the San Luis & Delta-Mendota Water Authority will need to begin to formulate oxygen demand control programs that will likely ultimately evolve out of the TMDL allocation process. All dischargers of oxygen demand and nutrients in the Mud and Salt Slough watersheds will need to conduct more detailed monitoring programs than will be possible through the CALFED Directed Action project support to begin to develop the information that they will need to best manage oxygen demand, including algae and algal nutrients, as part of the TMDL allocation that could be assigned to Mud and Salt Slough watershed dischargers.

The Grassland Bypass Project EIS/EIR needs to be revised to include discussions of these issues. It is in the best interest of the Bureau and the San Luis & Delta-Mendota Water Authority to become involved in the SJR DO TMDL Steering Committee and TAC as stakeholders in the TMDL process. By becoming an active participant in the Steering Committee TMDL allocation process, the Mud and Salt Slough dischargers can become involved in helping to define the allocation that is assigned to various oxygen demand and nutrient dischargers in the SJR DWSC watershed. All dischargers and other stakeholders in the Mud and Salt Slough watersheds should request to be added to the email list for Steering Committee and TAC activities. This can be done by contacting Kevin Wolf at kjwolf@dcn.davis.ca.us. If there are questions about these matters, please contact me.

Sincerely yours

G. Fred Lee, PhD, DEE
Chair, SJR DO TMDL TAC

Copies to: San Luis Delta Mendota Water Users Authority
Exchange Contractors
Grassland Bypass Project Water Users
US Fish and Wildlife Service
US Environmental Protection Agency
Central Valley Regional Water Quality Control Board
California Department of Fish and Game
SJR DO TMDL Steering Committee and TAC