

## List of Ongoing Studies Related to the Dissolved Oxygen Control Program

### Background

In January 2005, the Central Valley Regional Water Quality Control Board (CVRWQCB) adopted the *Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel* (DO Control Program). The DO Control Program identifies loads of oxygen demanding substances and their precursors as one of the main causes of the dissolved oxygen (DO) impairment in the Stockton Deep Water Ship Channel (DWSC). The DO Control Program requires that studies be performed to 1) identify the sources of oxygen demanding substances and their precursors in the San Joaquin River watershed, 2) understand how these substances are transformed in the watershed before entering the DWSC, and 3) understand how these substances are converted into oxygen demand in the DWSC.

### Ongoing Studies

The following is a summary of studies that are ongoing or very recently completed, which are collecting information relevant to the requirements of the DO Control Program.

#### 1. Upstream Studies

In 2005 the San Joaquin Valley Drainage Authority (SJVDA) began a three-year study titled *Monitoring and Investigations of the San Joaquin River and Tributaries Related to Dissolved Oxygen* (Upstream Studies). This study is funded by the California Bay Delta Authority (CBDA) with in-kind contributions from SJVDA members and other watershed stakeholders. The Upstream Studies should provide much of the information needed by the DO Control Program to identify sources of oxygen demanding substances (e.g. algae) and their precursors (e.g. nutrients) in the San Joaquin River (SJR) watershed and some basic information on their transformation in the watershed as they flow to the DWSC. This addresses the first area of study being required by the DO Control Program.

#### 2. Pending Amendments to the Upstream Studies

After the first year of data collection the principal investigators (SJVDA) of the Upstream Studies have identified additional studies to expand their investigation of algal growth dynamics and zooplankton grazing impacts on algae populations in the SJR. These additional studies should improve our understanding of how algae populations transform in the SJR watershed and starts to address the second area of study required by the DO Control Program, which is not currently being addressed by the Upstream Studies or any other studies in the watershed.

#### 3. Aeration Demonstration Project

A project being funded and managed by the California Department of Water Resources (DWR) to construct and operate an aeration device at Rough & Ready Island with the purpose of testing its effectiveness at improving oxygen conditions in the DWSC. The project will run initially for two to three years, after which time decisions will be made by the project proponents and the regulatory agencies about how much to rely upon aeration as part of a long-term solution to the DWSC dissolved oxygen impairment. Construction of the aerator at Rough & Ready Island has begun and should be operational by the fall of 2006.\

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### 4. Jones & Stokes Associates (JSA) Work Assignment Contract

JSA has a work assignment contract with the CBDA to provide technical support services on a variety of efforts related to the DO Control Program. This JSA contract is due to expire in June 2006, but attempts are being made by CBDA and JSA to extend it for at least another year. Ongoing efforts include:

- a. Preparation of a white paper discussing existing water quality models in the DWSC and future modeling needs to support the DO Control Program.
- b. Providing organization and facilitation of periodic technical work group meetings. These meetings are to provide a forum for principal investigators of various studies related to the DO Control Program, the concerned public/stakeholders, and involved agencies to get updated on the latest findings and exchange ideas.
- c. Maintain a website for the exchange of information related to the DO Control Program at [www.sjrtmdl.org](http://www.sjrtmdl.org)
- d. Provide DWR with technical assistance in preparing a monitoring program to measure the effectiveness of its aeration demonstration project

### 5. San Luis Drain Algae Growth Study Grant

This was a two-year grant agreement managed by the State Water Resources Control Board and performed by the San Luis and Delta Mendota Canal Authority. The study was recently completed in March 2006. The primary objective of this project was to determine if algal growth in the San Luis Drain (SLD) followed an unlimited population model or a growth-limited model. The results of the study determined that the growth-limited model provided a more consistent and accurate description of the algal growth in the SLD. A mechanistic model was written, and from it the results suggest that nutrients or mineral availability might be the limiting factors, and controls of such factors could be a successful approach for reducing algae growth in the SLD.

### 6. CVRWQCB/University of California – Davis Contract, Task 4

The CVRWQCB has a contract with the University of California, Davis (UCD) to provide scientific support on a variety of water quality issues in the region. Task 4 of this contract provides for field and lab efforts related to the DO Control Program as follows:

- a. Deployment of real-time chlorophyll monitors and some grab sampling and laboratory analysis aimed at understanding the diurnal fluctuation of algae concentrations experienced in the San Joaquin River.
- b. Through this funding additional sampling and analysis of biological oxygen demand (BOD) samples were piggybacked onto an ongoing field-monitoring program already being managed by UCD. This data provided very useful information on the growth rates and species composition changes as inputs to the San Joaquin River move downstream.
- c. Data analysis, presentation and publishing of above efforts.

## Conclusion

The Upstream Studies described above are providing much of the information that will be required to satisfy the first study requirement of the DO Control Program. If the pending amendments to the Upstream Studies are approved and proceed (very uncertain), that and the other studies listed above should provide much of the information required for the second study

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requirement of the DO Control Program. Other than the small effort described in item 4.a above, however, there is no on-going effort to address the third study requirement of the DO Control Program. Depending on how the above studies proceed, and whether a study to address this third study requirement is initiated, the CVRWQCB may need to consider regulatory action (e.g. Section 13267 letters) to compel their completion.

In addition to the above studies, the CVRWQCB is providing technical support and input to CBDA to assist them in management of the various CBDA funded studies such that they will provide information that will satisfy the needs of the DO Control Program. This effort is funded by CBDA by means of an interagency agreement with CVRWQCB. No field or laboratory research is being provided as part of this effort, only technical support.