Foreword

This Review is jointly sponsored by the CALFED Science Program and the California Water and Environmental Modeling Forum (Modeling Forum). The Review required substantial time and effort from the staff and consultants of the U.S. Bureau of Reclamation (Reclamation), and would not be possible without the staunch support and considerable resources committed by Reclamation and the California Department of Water Resources (DWR). Additional funding is provided by the U.S. Environmental Protection Agency (from funding to the CALFED Drinking Water Quality Program), San Joaquin River Group Authority, State Water Contractors, and the San Luis Delta Mendota Water Authority. However, these funding agencies did not participate in the administration of the Review.

This Review is different in nature from the previous CalSim-II review sponsored by the CALFED Science Program in 2003. The previous review addressed the general approach used in the model. The current Review, on the other hand, focuses on the detailed formulations of one geographical area in the model, the San Joaquin River Valley.

External technical reviews conducted by the Modeling Forum and the CALFED Science Program are not intended to provide a "stamp-of-approval" or to reject models. Rather, their primary purposes are to (1) document strengths and weaknesses, (2) provide a practicable roadmap for further improvements, and (3) discuss appropriate model application. External review reports aim to provide constructive and impartial criticisms, promote understanding and acceptance of models and model results, and identify and clarify avoidable and unavoidable model limitations.

The Review Panel evaluated the model using a high standard commensurate with the important role of CalSim-II in water management decisions. They found many significant improvements in the new representation over the previous formulation in CalSim-II, making analyses of a much broader range of water management issues possible. The Review Report provides a better understanding of model reliability for different applications. In addition, it calls for the development and discussion of quantitative estimates of uncertainty in presenting model results. These estimates would provide users of model results the critical information needed to assess model accuracy for water management analyses.

The Report identifies areas of further improvements for both the immediate future and the longer-term. The value of this Review would be enhanced if Reclamation commits sufficient resources to address these recommendations in a timely way. In the immediate term, a more detailed documentation on the bases and sources of the values assumed for model parameters would be a high priority, as would explicit quantitative error analysis and refinement of some aspects of the water quality module. The longer-term actions require substantial resources, especially in data collection and data management. A long-term development plan that prioritizes tasks and quantifies the costs and benefits is critical to securing sustained support for this critically important model.

CalSim-II is undergoing continuous improvement, and reviews of such a "moving target" are always difficult. Some of the issues raised in this Review may have already been addressed by the time the Report is released. This Review identifies several significant issues that could be resolved within a few months. These improvements, along with the most recent progress made by model developers, would call for an update of this Review Report. The Modeling Forum and the CALFED Science Program will work with Reclamation and DWR to extend the Panel's effort to account for these developments.

We have received many questions and constructive comments from the water community over the course of this Review. The comments fall into three main categories:

1. Documentation – including details on
   - Sources and justifications of data for hydrology, accretions, demand, and salinity, and how their values might change under future levels of development
   - Assumptions used in simulating the Environmental Water Account, water transfers (in and out of basin and changes in return flows), wetland operations, and groundwater
2. Model domain – in particular the portion of the San Joaquin River Valley currently not included in the model such as
   - Upstream Tuolumne River
   - Upstream San Joaquin River
3. Model Applications – specifically,
   - Range of scenarios over which the model is valid
   - Uncertainty in results for different applications
   - Making the model accessible and "users-friendly" to the stakeholders community

While these questions and comments are not responded to individually in the Report, many of the issues addressed throughout the text would be applicable to the questions raised.

California Water and Environmental Modeling Forum
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