

# Quarterly Programmatic Report

Component Project Title: Downstream Tidal Exchange in DWSC  
Component Project PI: Russ T. Brown  
PI Affiliation: Jones & Stokes  
Address: 2600 V Street, Sacramento CA 95818  
Phone: 916-739-3032  
Email: russb@jsanet.com

Program Manager Rebecca Kramer, NFWF Phone 415-778-0999  
Project Manager G. Fred Lee Phone 530-753-9630  
CALFED Project 01-N61- 06  
Quarter Ending June 30,2002

## Deliverables

<u>Deliverable</u>	<u>Due</u>	<u>% Completed</u>	<u>Date Completed</u>
Task 1: Turner Cut Dye Study	8/31/02	70%	
Task 2: Water Quality Modeling	02/28/02	100%	02/28/02
Task 3 Evaluate Tidal Exchange	8/31/02	63%	
3.1 Evaluate for range of flows			
3.2 Calibrate exchange in WQ Model			

## Narrative

### Overall Project

The planned Turner Cut dye study has been replaced with salinity (EC) surveys in the vicinity of Turner Cut. The Columbia Cut dye study has been replaced with preliminary water quality modeling of the 2001 data, as recommended by the TAC. Analysis of the historical EC data from the City of Stockton river stations R5 to R8 indicate that significant tidal exchange of water upstream of Turner Cut is only likely with DWSC flows of less than 500 cfs. Downstream tidal exchange is not likely to improve DO conditions at R5. Because the EC at R5 was always much higher than the EC at R7 or R8 during the very low flows in the summer of 1990 and 1991, periods of sustained reverse flows in the DWSC upstream past Stockton do not appear likely. The preliminary report was prepared for peer review and presented to the TAC. Modeling with the DSM2 and Stockton water quality model will proceed in the final quarter of the project. The final report will be available in September 2002.

### **Task 1 Turner Cut Dye Study**

The dye studies that were originally proposed to evaluate this tidal mixing and exchange near Turner Cut were not conducted. Preliminary analysis of historical revealed that the electrical conductivity (EC) of the SJR provided a natural tracer that would more clearly illustrate the tidal exchange near Turner Cut.

Longitudinal EC profiles were measured during October 2001 to provide greater detail in the salinity gradient near Turner Cut. Measurements at high tide and low tide confirmed the tidal excursion near Turner Cut. Because DWSC flows during the period of these EC measurements were greater than 1,000 cfs, the salinity gradient was generally located downstream of Turner Cut. This confirms that the downstream tidal exchange will not affect DO concentrations upstream of Turner Cut if the DWSC net flow is greater than 1,000 cfs.

Tidal flow measurements have been combined with the DWSC geometry to provide estimates of the tidal excursion distance (between high and low tides) along the DWSC. The tidal excursion at the Rough and Ready station is about one mile. The tidal excursion at Turner Cut is 2 miles moving upstream and three miles moving downstream.

EC data from previous years (1991 and 1992 drought) have been used to confirm the tidal exchange. DWR EC measurements from 1999 have been processed to show other examples of the longitudinal EC gradients near Turner Cut. The final report will be available in September 2002.

### **Task 2 Water Quality modeling of 2001 data**

As recommended by the TAC, the 2001 data was modeled with the Stockton WQ model by Systech Engineering. A review of the 2001 modeling will include an evaluation of the conversion of field data to model input, and the ability of the model to match downstream measurements will be included in the final report. Sensitivity simulations were made to test the response of DO concentrations to flow, river and RWCF BOD concentrations, and a few key model coefficients. Finally, the downstream tidal exchange rate was modified to determine the model response to more accurate calculations of this process. These results will also be summarized in the final report.

### **Task 3 Evaluate Tidal Exchange and Calibrate WQ Model**

The model calibration work will be completed next quarter. The DSM2 model will be compared with the Stockton water quality model near the downstream end of the DWSC for tidal flows and mixing. The final report will be completed by September 30, 2002.

## Fiscal Quarterly Report

Component Project Title: Downstream Tidal Exchange in DWSC  
 Component Project PI: Russ T. Brown  
 CALFED Project: 01-N61- 06  
 Quarter Ending: June 30, 2002

Total Estimated Cost: \$74,000  
 CALFED Funding: \$74,000  
 Other Funding: \$0  
 Completion Date: 8/31/02

	Quarterly Budget			Annual Budget		
	Budget	Accrued	Balance	Budget	Accrued	Balance
Task 1: Turner Cut Dye Study		\$1,573		\$28,775	\$20,095	\$8,680
Task 2: WQ Modeling for 2001		\$0		\$20,925	\$20,910	\$15
Task 3: Evaluate Tidal Exchange and Calibrate Model		\$2,023		\$24,300	\$15,327	\$8,973
<b>Total Project</b>		<b>\$3,596</b>		<b>\$74,000</b>	<b>\$56,332</b>	<b>\$17,668</b>

Estimated Expenses for Next Quarter: \$17,500  
     July: \$2,500  
     August: \$10,000  
     September: \$ 5,000 (Assumes 1-month extension)