OFFICE MEMO

TO: Bob Suits	**DATE:** 2004.09.16
FROM: Michael Mierzwa	**SUBJECT:** Short- and Long-Term DOC September - December Forecasts of Jones Tract Pump-out

Findings

Historical and forecast DOC at Delta export locations were simulated using DSM2. Using short- and long-term Delta operational forecasts from DWR Operations and Maintenance (O&M), modeling indicates that DOC should decrease at all four export locations shortly after the Jones Tract pump-out operations end in early October given the current projected pumping operations as provided by Jim Peddy[1]. The maximum forecast DOC given the projected pump-out operations at Banks (SWP) Pumping Plant is 4.88 mg/L on Sep. 21, 2004. The maximum forecast DOC at Tracy (CVP) Pumping Plant is 5.48 mg/L on Sep. 17. A similar long-term forecast conducted in early July 2004 estimated DOC concentrations peaking substantially higher, between 7 and 8 mg/L at Banks and Tracy during this same late September period[2]. A brief summary of the methodology of this revised forecast and reasons behind the lower revised forecast DOC are discussed below.

Forecast Assumptions and Methodology

The current forecasts used a DSM2 historical simulation from Jan. 1990 through August 2004 to establish initial conditions for a short-term forecast from Sep. 1 through Sep. 14. The final results from the short-term forecast were used as the initial conditions for the long-term forecast, which was run from Sep. 15 through Dec. 31.

The methodologies used in the early July 2004 forecasts were slightly modified as part of an on-going Municipal Water Quality Investigations (MWQI) Real-Time Data Forecasting (RTDF) effort.

A high DOC growth rate in Jones Tract was used in the historical because it best fit MWQI's observed data. From there high, mid, and low growth scenarios were then used in both the short- and long-term forecasts. Martinez stage in the short-term forecast smoothly transitions from recent historical stage data to an astronomical based forecast[3]. Though the long-term forecast uses a pure astronomical based forecast Martinez stage, the gradual transition from observed to astronomical-based forecast stage is accounted for by using the short-term forecast as a transition between the historical and long-term forecasts (note: this is the only major difference in the long-term modeling approach since it was last used in early July 2004).

The July 2004 DSM2 forecasts assumed that Jones Tract had a 150 TAF storage capacity and that the surface area (which is fixed in DSM2 and used to generate carbon in the DOC growth algorithm) was 522,000,000 sq. ft. Updated information provided by Pete Smith and Gerald Bawden from the USGS were used in these new DSM2 forecasts[4]. The combined storage area for both Jones Tracts was now assumed to be 96.9 TAF and the surface area

was 514,000,000 sq. ft. This is an important assumption, because in the previous DSM2 forecasts a larger volume of water was released from the islands. The smaller volume of water being stored means that less carbon rich water is being added to the Delta channels. Though the surface area is used to determine the mass of carbon added to the combined Jones Tracts in the model, the current assumed surface area is only slightly smaller than the previously estimated surface area.

The modeled DOC on Jones Tract for the historical simulation and the short- and long-term forecasts is shown in Figure 1. This historical simulation used the high DOC growth rate. High, mid, and low growth rates were separately simulated in both the short- and long-term forecasts. All three growth rate scenarios assumed the same initial condition on Sept. 1. MWQI grab sample data taken from June through August on both Jones Tracts is shown in order to access the validity of the DSM2 DOC growth rate assumptions. The simulated high DOC growth rate results are consistent with the MWQI grab samples.

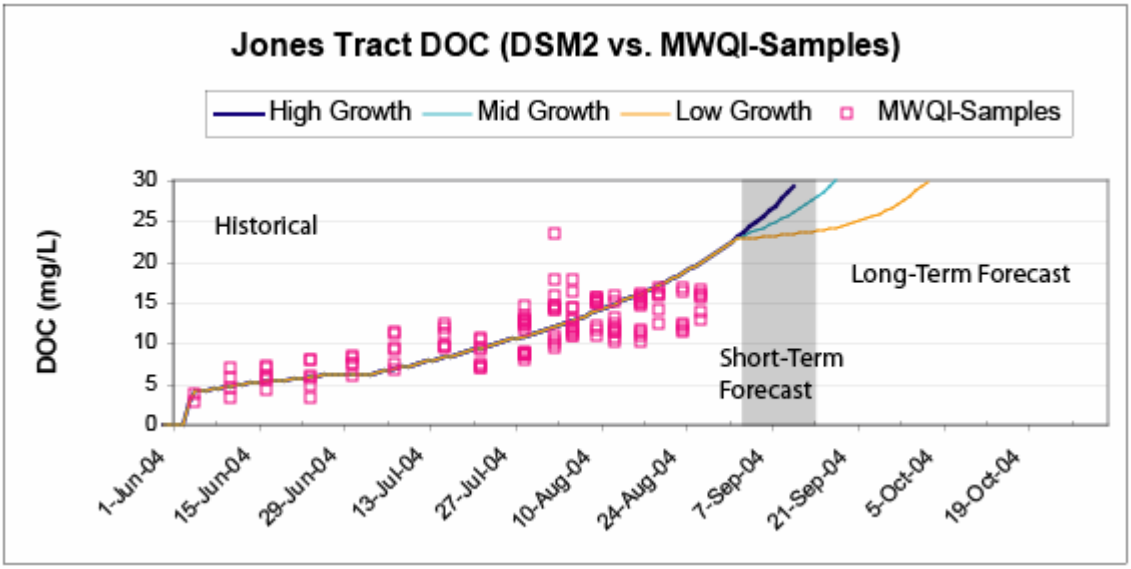

Figure 1: Jones Tract DOC (DSM2 vs. MWQI-Samples).

A series of sensitivity studies using different pump-out schedules was used to investigate the impact of pump-out operations on the DOC concentrations at Banks Pumping Plant (SWP). These studies (not shown) suggested that Jim Peddy's proposed pump-out operations, which call for a slight decrease in pump off operations in late September resulted in lower DOC concentrations than if the current ~660 cfs pump-out rates continued through the end of September.

As mentioned above, the revised DOC forecast at Banks is substantially lower than the early July DSM2 forecast. This is explained by the decreased estimate of storage volume in Jones Tract and consequential decreased pumping duration and rate from Jones Tract.

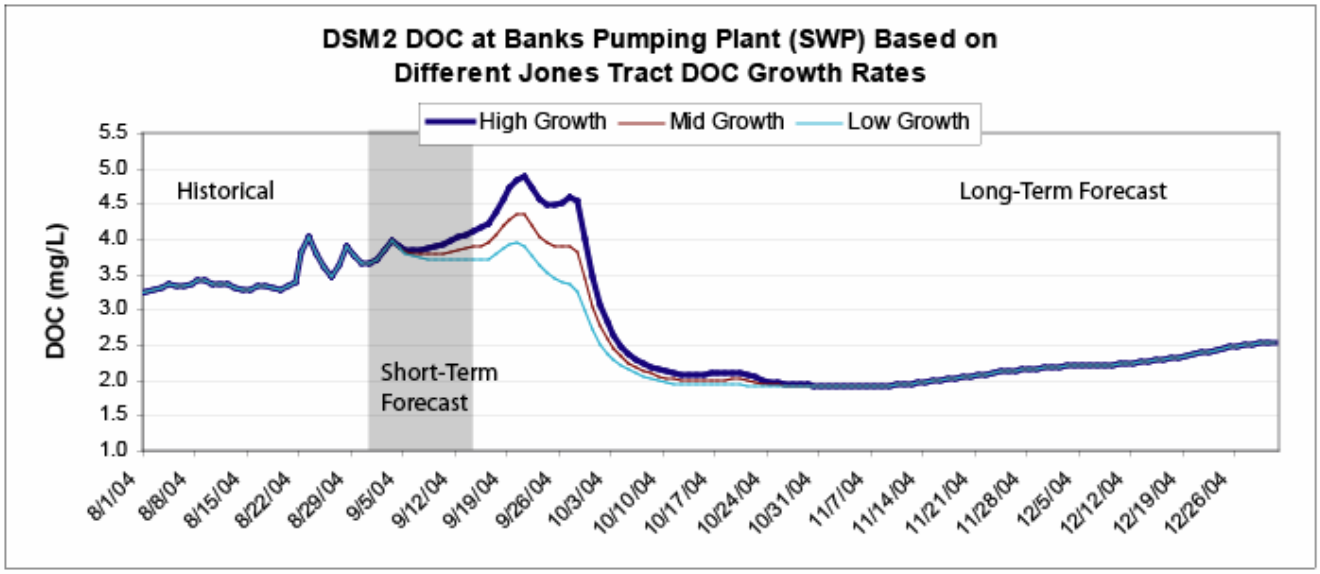

Figure 2. Forecast DOC at Banks Pumping Plant (SWP) August through December 2004.

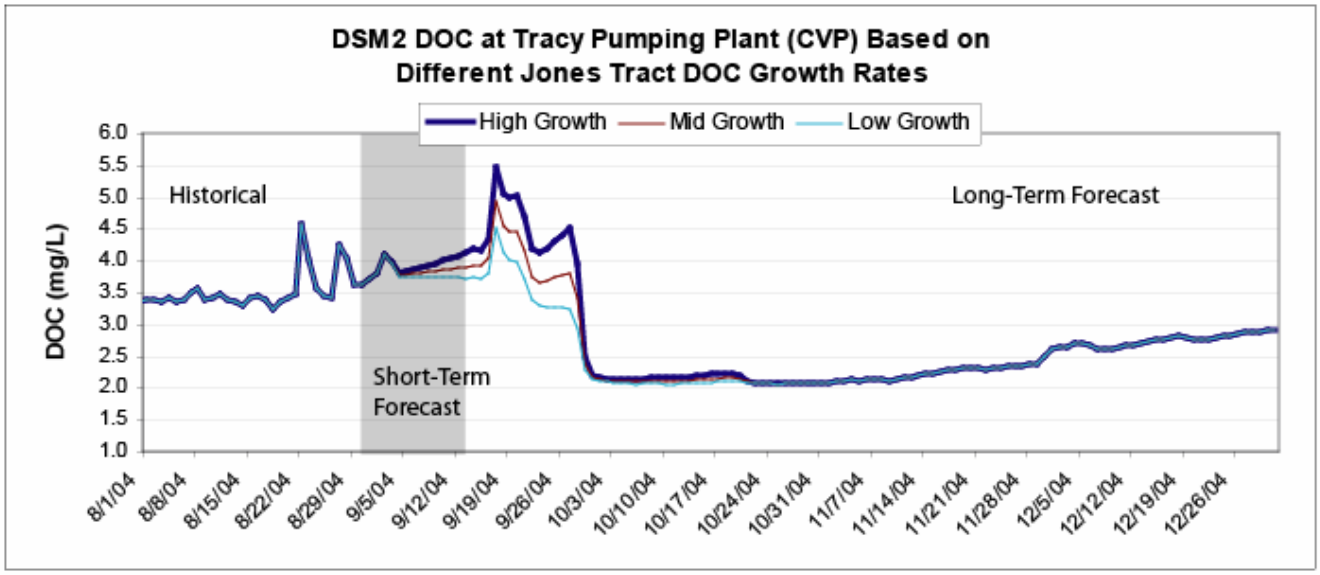

Figure 3. Forecast DOC at Tracy Pumping Plant (CVP) August through December 2004.

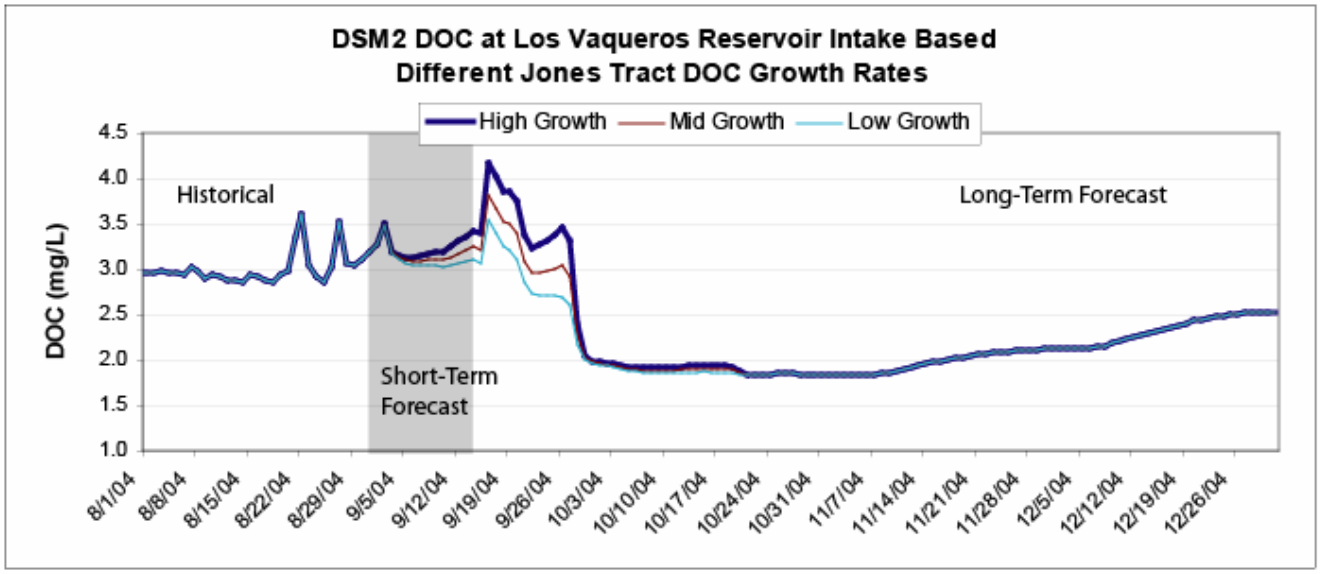

Figure 4. Forecast DOC at Los Vaqueros Reservoir Intake August through December 2004.

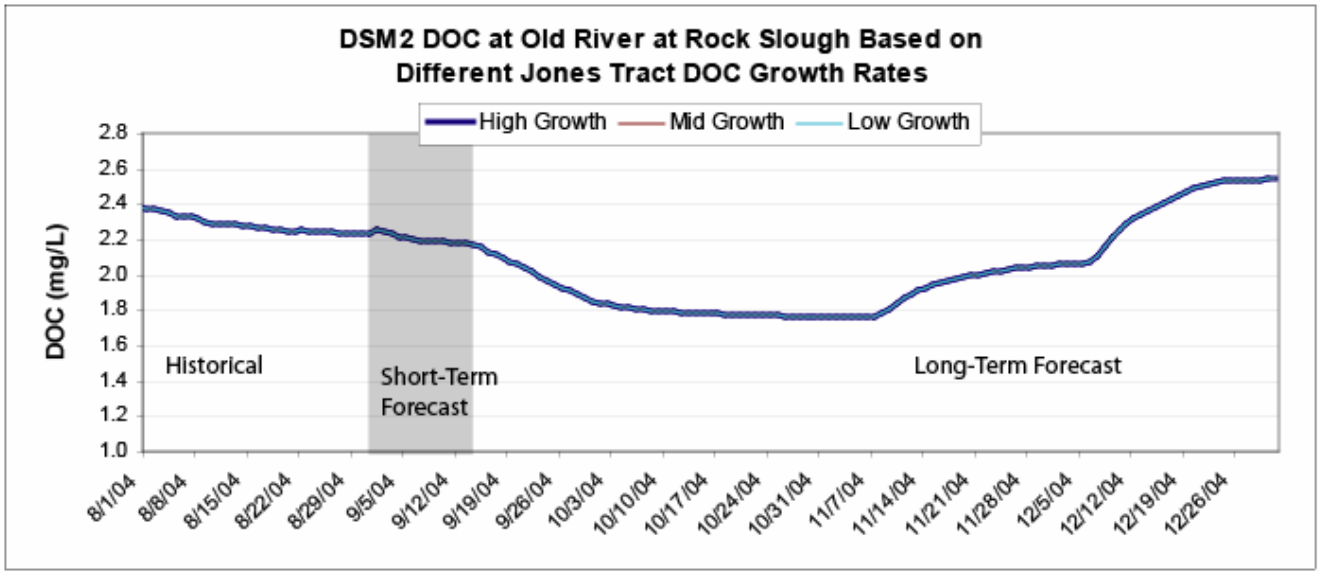

Figure 5. Forecast DOC at Old River at Rock Slough August through December 2004.

Future Directions

A future memo will cover in more detail the assumptions and sensitivity to these assumptions associated with this forecast. These sensitivities were examined, but not discussed in this summary memo.

Though the model was checked to see if the flows into Jones Tract are reasonable, future historical studies will go back and better calibrate and validate the modeled methodology used to simulate the Jones Tract break itself. In particular, the coefficients that regulate flow in and out of the flooded islands can be improved upon by making comparisons between modeled and observed hydrodynamic data near the Jones Tract levee breach.

References

1. Peddy, J. (2004). Jones Tract Pumpout Schedule. Email and phone correspondence dated September 9, 2004. California Department of Water Resources, Division of Engineering. Sacramento, CA.

2. Mierzwa, M., J. Wilde, and B. Suits. (2004). "Short- and Long-Term DOC Forecasts at Delta Export Locations with Pumpout of Flooded Jones Tract." Memo dated July 8, 2004. California Department of Water Resources, Bay-Delta Office. Sacramento, CA. http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/news/DOC_July2004_forecast_070804.pdf

3. Ateljevich, E. (2001). "Chapter 10: Planning Tide at the Martinez Boundary." Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh. 22nd Annual Progress Report to the State Water Resources Control Board. California Department of Water Resources, Office of State Water Project Planning. Sacramento, CA.

4. Smith, P. (2004). "Areas and Volumes of Delta Tracts." Email correspondence dated July 2, 2004. United States Geological Survey. Sacramento, CA.