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Memorandum

Date: July 14, 2009

To: Peter Kozelka, Ph.D., US EPA, Region 9

Cc: John Craig, Steve Carter, Amy King, Tetra Tech, Inc.

From: John Hamrick, Ph.D., P.E.

Subject: Resolution of Sediment Loading from the Los Angeles River into Los Angeles-Long Beach Harbors and San Pedro Bay

This memorandum documents the resolution of sediment loading from the Los Angeles River into Los Angeles-Long Beach Harbors and San Pedro Bay. Specifically, it provides revised results for sediment deposition patterns in the vicinity of the Los Angeles River outflow and the greater harbors areas obtained using revised watershed model sediment loading output. These results will be incorporated into a revised version of the modeling report (Tetra Tech, 2009), hereafter referred to as the 'report'.

Watershed Model Revisions

Sediment results presented in the February 2009 modeling report showed erosion near the mouth of the Los Angeles River Estuary (Tetra Tech, 2009). This area has historically exhibited significant deposition, resulting in periodic dredging by the Army Corps of Engineers. Sediment output from the LSPC watershed model is used as input to the receiving water model. Low predicted sediment concentrations from the watershed model (less than 10 mg/L from the Los Angeles River and less than 3 mg/L from the San Gabriel River based on average daily model output) have been documented during the comment period; therefore, we investigated the sources of error in the watershed models.

Watershed model input files were reviewed in detail. For the Los Angeles River LSPC model, the model version was updated from the version used for the TMDL. The changes in model version required different parameterization for the sediment particle distribution. These values were updated and subsequent hourly watershed model runs predict more realistic sediment concentrations (Figure 1). This figure presents the central three months of the EFDC simulation period, which have the highest flow events. The San Gabriel River watershed model also previously showed low sediment concentrations; however, a different solution was found to predict realistic concentrations. Specifically, the LSPC model was previously reading an incorrect point source input file. This has since been updated to maintain consistency with the San Gabriel River Metals TMDLs and the LSPC model is currently predicting more realistic sediment concentrations. In addition to making these necessary corrections, hourly watershed model sediment output is now used as input to the receiving water model, as described below.

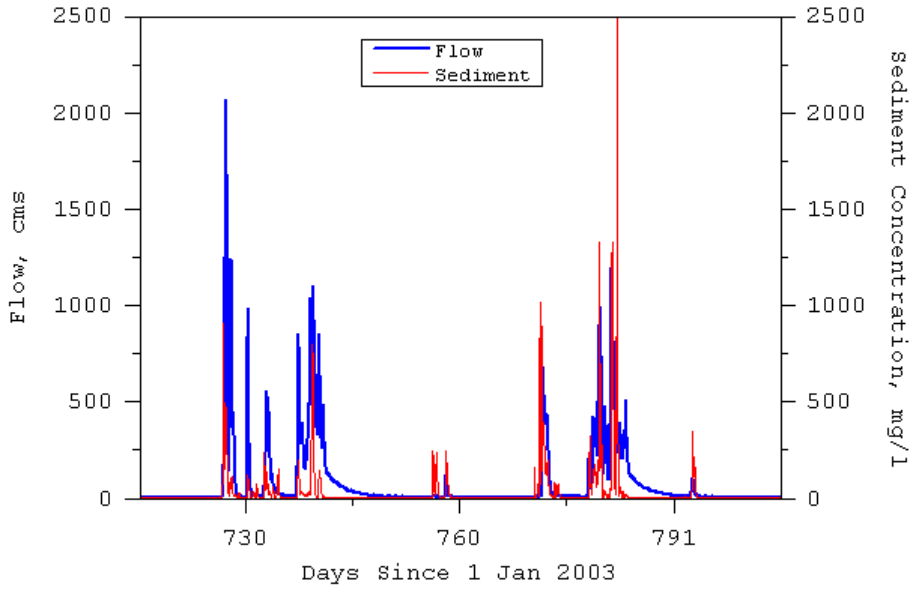

Figure 1. Hourly watershed model results for Los Angeles River flow and sediment concentration (mid-December 2004 to mid-March 2005)

Receiving Water Model Revisions

To evaluate the change in sediment deposition patterns near the mouth of the Los Angeles River resulting from the revised watershed concentrations (Figure 1), a seven-month simulation spanning October 2004 through April 2005 was conducted. This period was selected since it includes a number of high inflow events which were documented to result in shoaling in the navigation channel in the vicinity of Queensway Bridge, the transition region from the channelized river to San Pedro Bay. In addition to the watershed model sediment concentrations, observed flow for the Los Angeles River from gage F319 were used as input to the EFDC model. These flow data were used (instead of the predicted flow from the watershed model) to maintain consistency with simulations associated with previously revised salinity predictions.

The bed elevation change associated with the revised model inputs over the seven month simulation period are illustrated in Figure 2. The results show regions of net erosion in the narrow channelized section of the river. This region is hypothesized to be depositional under low flow conditions with high flow events resuspending the previously deposited material, resulting in net erosion. As the river outlet region widens toward and downstream of Queensway Bridge, net deposition occurs with the model predicting deposition in excess of one meter (Figure 2). The deposition decreases eastward into the open water of San Pedro Bay. Net deposition in San Pedro Bay and westward into the Outer Harbor is small in terms of bed elevation change, but encompasses a large spatial area. In summary, the revised sediment concentrations from the Los Angeles River watershed model and observed hourly flows from gage F319 were used as inputs to the receiving water model. The subsequent simulations resulted in deposition in the vicinity of Queensway Bridge and eastward into San Pedro Bay. These results will be incorporated into a revised modeling report during the summer of 2009.

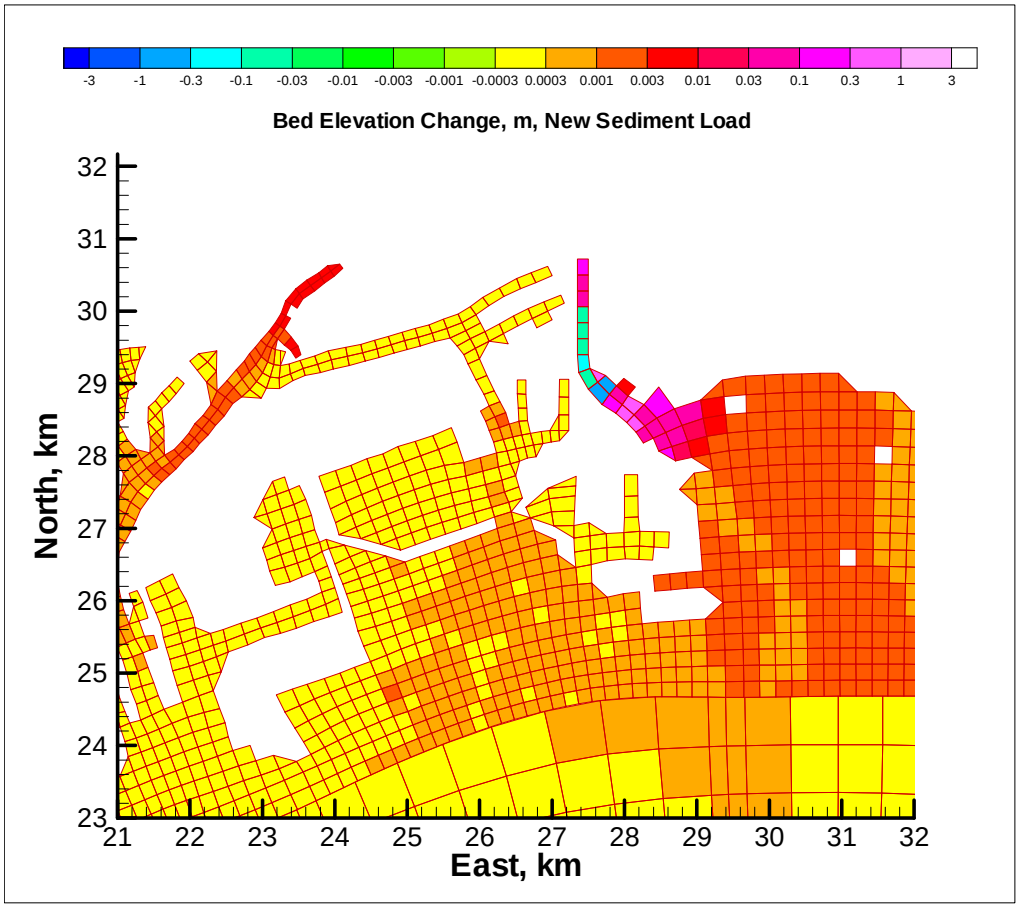

Figure 2. Bed elevation change using hourly flow and sediment loads from the Los Angeles River

References

Tetra Tech, Inc. (2009). Los Angeles-Long Beach Harbors and San Pedro Bay Hydrodynamic and Sediment-Contaminant Transport Model Calibration. Prepared for USEPA Region 9 and Los Angeles Regional Water Quality Control Board. Draft – February 2009.