

## **State Route 99 Crossing San Joaquin River Water Surface Elevation Analysis**

This data collection activity is not part of the 2014 MAP studies, but was undertaken at the request of the Bureau of Reclamation (Reclamation) to help with third party activities on the river. Topographic, bathymetric, and water surface survey data were collected by the Department of Water Resources Division of Integrated Regional Water Management/ South Central Region Office (DWR-SCRO) at the State Route (SR) 99 crossing over the San Joaquin River. The data was used to update the existing HEC-RAS 1-D hydraulic model for Reach 1A.

California Department of Transportation (Caltrans) is replacing the SR 99 Bridges over the San Joaquin River in the Reach 1A segment of the Restoration Area. The bridge project includes removing the original bridges and replacing them with one large structure. Part of this construction effort involves building a falsework bridge structure below the old SR 99 Bridges to prevent any material from the demolition work from falling into the river. DWR-SCRO was contacted by Reclamation to provide water surface elevation estimates to aid in the determination of whether planned flows would impact the construction project. To complete the analysis, DWR-SCRO collected topography, bathymetry and water surface elevation data to compare with the existing 1-D hydraulic model geometry and estimate water surface elevations. DWR-SCRO had completed similar modeling last year (see 2013 ATR) to aid Caltrans in determining if the releases from Friant Dam would negatively impact the construction site.

### Summary of Data Collected

On April 29, 2014 DWR-SCRO completed a topographic/bathymetric survey along six cross section alignments at the construction site under the SR 99 crossing. This information was compared with the existing HEC-RAS 1-D hydraulic model. Water surface and other key elevations immediately upstream and downstream of the bridge were also collected for model calibration. Flow was estimated to be about 113 cfs during the first survey. To monitor the increase in flows and stage and to validate the hydraulic model, DWR-SCRO conducted follow-up water surface elevation surveys on May 12, 19 and 22, 2014. The local flows during the surveys were approximately 95 cfs, 700 cfs and 900 cfs respectively as estimated from the lag relationship developed between the Donny Bridge (DNB) gage downstream and the Friant (SJF) flow gage.

### Summary of Results

The HEC-RAS one-dimensional hydraulic model was updated with the current channel configuration and it calibrated well with the actual flow data. The model output was used for the Caltrans SR 99 bridge reconstruction work to help predict the water surface elevation and the extent of the inundation for the planned increased releases from the dam. The hydraulic model water surface elevations compared well with the water surface elevations that were achieved from the releases. This restoration program tool proved to be a beneficial resource to the region. The data collected and the final report of the exercise will be available to the public in August 2014.