

*Development of a Basin Plan Amendment for Salt and Boron in LSJR  
Task 2a: Compile and Update Water Quality and Salt Loading Data  
Addendum*

*Prior to the initiation of additional work, a final review of the database was completed to ensure that all of the data that were received as part of the Task 2a data gathering effort were incorporated. As a part of that review and the resulting work effort, some datasets from the 2004 Lower San Joaquin River (LSJR) Salt and Boron Total Maximum Daily Load (TMDL), which were previously unavailable, were located and incorporated into the database. This addendum describes the results of the review and addresses changes that were made to the database and the resulting edits to the original Task 2a memo that was finalized in March 2014.*

## Updates to the WARMF Database

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Water quality and salt loading data were identified, compiled, and developed into a database as part of the *Development of a Basin Plan Amendment for Salt and Boron in LSJR: Task 2a: Compile and Update Water Quality and Salt Loading Data*. The data collected consist of a large amount of surface water quality and flow information that will be used to:

- Determine baseline salt loading to the LSJR (Task 2b);
- Evaluate current surface water quality conditions (Task 3b); and
- Estimate compliance with surface water quality objectives being considered for the LSJR (Task 3b).

The data and data sources are housed within the Watershed Analysis Risk Management Framework (WARMF), and were provided to the Lower San Joaquin River Committee (LSJRC) as a database deliverable with an accompanying memo on March 4, 2014.

To make sure that all available data were captured, the LWA team completed a review of the WARMF database to identify data gaps. Available EC data within online databases were reviewed at every WARMF site location and any missing data were incorporated into the database. A final check was also completed comparing the WARMF database to the data directly provided as part of the data gathering effort. When discrepancies were found, the missing data were noted and incorporated. After review and additional data were added to the database, EC time-series plots for each site were developed and major constituent (EC, TDS, Cl, Na, SO<sub>4</sub>, and CA) time-series plots were created for key locations along the LSJR to visualize critical datagaps. The time-series plots were reviewed by the Lower San Joaquin River committee and on June 13, 2014 it was determined there were no additional critical data gaps where data was known to exist.

Specific updates to the database and changes to the Task 2a memo as a result of the review process are described below.

### ***Department of Water Resources (DWR)***

For the purposes of the work effort, electrical conductivity (EC) and flow data were provided by Ernie Taylor of DWR. An initial inspection showed that most of the data provided were already contained in the WARMF database. Upon final review, additional data not in the WARMF

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database were noted and incorporated. Updates to various locations from this source are listed in **Table 1**.

**Table 1. Additions to WARMF Database from DWR**

<b>Site Location</b>	<b>Updated Data</b>	<b>Updated Data Range</b>
Salt Slough at Highway 165	Flow	3/1/1968 – 9/30/1985
San Joaquin at Maze	Flow	10/2/1960 – 3/7/2007
San Joaquin at Patterson	Flow	10/2/1969 – 9/30/2005
San Joaquin near Stevinson	Flow	10/1/1961 – 5/26/1997
Stanislaus at Orange Blossom	Flow	10/1/1960 – 12/31/2005
San Joaquin at Maze	EC	10/2/1964 – 10/1/1992
San Joaquin at Patterson	EC	10/2/1964 – 12/30/1986

**2004 Salt and Boron TMDL**

During the initial data gathering process, it was noted that the data in the original 2004 TMDL report and its appendices had already undergone processing such as averaging and summation (e.g., daily averages summed to monthly data), thus these data did not exist in their raw form. This made a direct comparison of the WARMF database and the TMDL report data infeasible.

Subsequent to the initial data gathering process, the Regional Board and LWA Team were able to locate Regional Water Board staff reports and electronic raw data on the *Water Quality of the Lower San Joaquin River: Lander Avenue to Vernalis*. Data in these reports were found to match those in the 2004 TMDL report - Appendix A and were not in WARMF. As a result, all data in these reports were transferred to an electronic format or provided electronically by the Regional Board and incorporated into the WARMF database. Updates to datasets at various locations are listed in **Table 2**.

**Table 2. Additions to WARMF Database from Central Valley Regional Water Quality Control Board**

<b>Site Location</b>	<b>Updated Data</b>	<b>Updated Data Range</b>
San Joaquin at Crows Landing	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin at Fremont Ford	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin at Laird	Multiple constituents	10/1/1987 – 5/11/1992
San Joaquin at Maze	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin at Newman	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin at Patterson	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin at Vernalis	Multiple constituents	10/1/1987 – 9/28/1995
San Joaquin near Stevinson	Multiple constituents	10/1/1987 – 9/28/1995

**Irrigated Lands Regulatory Program**

Data from the Irrigated Lands Regulatory Program were brought to the attention of the LWA Team for inclusion in the WARMF database during the initial Task 2a data gathering efforts. Much of these data currently reside in CEDEN and, therefore, were originally added to the

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WARMF database. However, it was recognized that some surface water quality monitoring data collected prior to 2009 do not exist in CEDEN, and are only available in Excel format. These pre-2009 data were evaluated and incorporated into the WARMF database as needed. The updates to the datasets at various locations are listed in **Table 3**.

**Table 3. Additions to WARMF Database from Irrigated Lands Regulatory Program**

Site Location	Updated Data	Updated Data Range
Hospital	Multiple constituents	7/6/2004 – 9/10/2008
Ingram	Multiple constituents	7/6/2004 – 12/9/2008
Los Banos at Highway 140	Multiple constituents	7/13/2004 – 12/9/2008
Marshall Road	Multiple constituents	7/6/2004 – 9/10/2008
Mud Slough above San Luis Drain	Multiple constituents	7/13/2004 – 12/9/2008
Orestimba near Crows Landing	Multiple constituents	7/6/2004 – 10/14/2008
Salt Slough at Highway 165	Multiple constituents	7/13/2004 – 12/9/2008
San Joaquin at Sack Dam	Multiple constituents	7/13/2004 – 8/12/2008
San Joaquin near Stevinson	Multiple constituents	7/13/2004 – 12/9/2008
Westley	Multiple constituents	7/6/2004 – 11/12/2008

**CEDEN**

When reviewing the CEDEN database, critical data gaps within the WARMF database were noted at several site locations along the LSJR. At these locations it was identified that existing data should be available via CEDEN. Investigation showed that missing data was attributed to naming conventions in CEDEN not accounted for during the original database update (e.g. Specific conductivity instead of EC, total chloride vs. dissolved or not recorded chloride). A QA/QC review was done looking at all the available CEDEN parameters and possible parameter names then matching them with the corresponding WARMF parameters. Additional data identified from this process and updates to the datasets from CEDEN at various locations are listed in **Table 4**.

**Table 4. Additions to WARMF Database from CEDEN**

Site Location	Updated Data	Updated Data Range
San Joaquin at Patterson	EC	1995 – 2000
San Joaquin near Stevinson	EC	1995 – 2000
San Joaquin at Maze	EC	1995 – 2000
San Luis Drain near Stevenson	EC	4/16/1996 – 6/26/2013

**Updates to Source Metadata**

Updates to the database include the addition of the aforementioned sources. A summary of sources added to the database and links or references are listed in **Table 5**, and serves as an addendum to information in the March 4 memo Appendix A – Table 4.

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**Table 5 (additions). Additions to Sources of Data used to Create WARMF ORH and ORC Files.**

<b>Data Source</b>	<b>ORH/ORC File Abbreviation</b>	<b>Weblink or Reference Document</b>	<b>Description of Source</b>
California Data Exchange Center	Westside SJ WQ Coalition	<a href="http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality_monitoring/data/program_participants/index.shtml">http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/water_quality_monitoring/data/program_participants/index.shtml</a>	Online DWR database
Central Valley Regional Water Quality Control Board	Central Valley CRWQCB	<a href="http://www.swrcb.ca.gov/centralvalley/water_issues/swamp/historic_reports_and_faq_sheets/sjr_wq/">http://www.swrcb.ca.gov/centralvalley/water_issues/swamp/historic_reports_and_faq_sheets/sjr_wq/</a>	San Joaquin River Water Quality Reports produced by Regional Board
California Department of Water Resources	DWR Ernie Taylor	Personal communication with Ernest Taylor @ DWR Ernest.Taylor@water.ca.gov	Additional data not currently reported in online DWR database