

1. **Assessment of Data Uncertainty:** We have a very deterministic impression of the data and information we use for decision making and have little idea about data uncertainty. Would we make the same decisions if we knew that our EC data at a downstream monitoring site was $\pm 20\%$. How do we represent uncertainty without confusing our audience? How can we account for uncertainty into our decision making or setting of site-specific objectives?

Continuous (15 minute) environmental sensor data exists – but is rarely used to make sensor accuracy assessments. Can this analysis be performed without major effort?

2. **Monitoring Network :** The loading of TDS to the SJR from various sources such as surface drainage, subsurface drainage, groundwater accretions, wetland drawdown and irrigation operational spill cannot readily be separated given our current monitoring networks. In some instances such as the Grasslands Bypass Project and the San Luis Drain – monitoring stations at either end of the 28 mile long Drain reach allow the signal from subsurface tile drainage to be quantified with some certainty. Are there other opportunities, either through monitoring or modeling to improve our estimate of component flows and salt loads being returned to the SJR?

In the short-term – modeling provides the most cost-effective means of obtaining this information. However opportunities should be taken to improve quantification of salt sources through more innovative and focused monitoring.

3. **Importance of Salt Importation:** How useful is water year type in explaining water quality trends? Is there any correlation between the San Joaquin River index and water quality? Do we need to consider lagged causal factors for salinity, such as salt storage when a dry year is followed by a wet year? Can we develop statistical models or tools to improve predictive skill?

Development of this capability has significant implications for accurate flow and salinity forecasting together with real-time assessment of River assimilative capacity.

LSJR Subcommittee Homework
Important Water Quality Facts to be Presented in Report
(from CV Water Board staff)

For Setting Water Quality Objectives

(Submitted by Dennis Westcott:

- History of Violations
- Water Quality Conditions on the River
- Use of Freshwater to Dilute Salt)

1. **Hydrologic changes in the basin:** What have been the major changes in the hydrology of the basin since 1995, and do we have the data to demonstrate water quality impacts caused by those changes?
2. **Timing and quality of discharges:** Is there data available to distinguish differences in the timing and the quality of discharges from wetlands vs. those from the rest of irrigated agriculture?
3. **EC:TDS ratio:** Can we verify the ratio for the project area on an average basis and, if it varies seasonally, on a seasonal basis?
4. **Continuous monitoring stations:** Do we have a good inventory of the continuous monitoring stations in the project area? Are there continuous monitoring stations between each of the major discharge points into the SJR (Stanislaus, Tuolumne, Merced, Salt Slough, Mud slough)?
5. **Data quality:** Can we determine the reliability of the data? (see Nigel's concern)

For Developing TMDLs

(Submitted by Dennis Westcott:

- Salt loading to the river
- Importance of salt importation)

Related Questions for Committee to Consider

1. **Background:** What is the background timeframe? How far back in time should the data go?
2. **Time series:** What is the most appropriate time series to use in evaluating data? (annual, seasonal, monthly, weekly, daily)
3. **Seasonality vs. WY types:** For what type of data is WY type important? For what type of data is seasonality important? Are there data types for which both or neither are important?
4. **Determining leaching fractions:** If modeling, such as Dr. Hoffman's, will be used to establish objectives to protect AGR, leaching fraction will be a critical input. How will leaching fraction be determined and, if data will be required in making a determination, is that data available?

Dennis,

I spoke to Chris at Summers Engineering and got the following info:

The Westside coalition is doing monthly monitoring on the mainstem SJR, including EC.

The sites are at Sack Dam, Lander Ave and Las Palmas .

They have been at those sites more or less every month since 2005 so historic EC data is available from the Westside Coalition.

As Nigel knows, CDEC also collects realtime data for Sack Dam (site code SDP) and Las Palmas (SJP).

The Lander Ave CDEC site is currently off line due to bridge work, but there's another site very close (SMN). I

I have a concern that has been on my mind for awhile. I reviewed the State Water Boards proposed process for regulating wetland dredge and fill actions in Calif. I was surprised to learn that the Central Valley Region, along with all but 2-3 others, does not have a wetland definition in any of the Regional Water Plans. This is a surprise considering the Central Valley has to largest remaining wetland acreage within the State. If the Region is going to formulate Salinity/salt and boron water quality regulations the will include wetland water discharges then it seems fitting that they also develop a definition for wetlands, including managed wetlands. I don't feel it is the LSJR Committee's responsibility to develop a definition, but to recommend to the Regional Board that they do so ASAP either through the ILRP or CVSALTS processes.

I raised the following questions:

1. **History of Violations:** Can we show the history of salinity violations of the Vernalis Objective? I have seen several presentations that show violations prior to 1995 but can we update that through the present?
2. **Salt Loading to the River:** What is the mean annual loading of TDS to the SJR from various sources such as groundwater, Mud and Salt Sloughs, Upstream of Mud and Salt Slough, Eastside tributaries, Westside tributaries, surface return flows, and subsurface return flows? Again there have been several estimates made prior to 1995 but can it be done up to the present? Can it be done by water year type (critical, dry, below normal, above normal, wet, etc)?
3. **Importance of Salt Importation:** Can we show the CVP Delta deliveries of salt to the SJR Basin separately for Ag and wetland use? Could this be divided out by water year?
4. **Water Quality Conditions on the River:** Is the data base sufficient to show monthly average salinity by location on the SJR (Maze, Patterson, Newman, Crows Landing, etc)? Is it possible to show it by water year type or for various periods such as April 1st to October 1st? Is the data sufficient to show a shorter averaging period than monthly?
5. **Use of Freshwater to Dilute Salt:** Is it possible to show New Melones releases, by years, which were made specifically for meeting the water quality objective at Vernalis?

We agreed that if you were going to pose similar type questions, they needed to be sent to me by COB, Tuesday, April 7th. I will compile the questions and submit them to a review group (Nigel Quinn, Lisa Holm, Ernie Taylor, Ric Ortega and Jim Martin). The review group will make a qualitative evaluation on whether:

1. Existing data can likely be used to prepare such a presentation;
2. Existing data can not support such an analysis or presentation; or

3. Existing data is likely there but would require extensive work to develop such a presentation.

The review group would then describe their findings to the Lower San Joaquin River Committee at our next meeting on April 28th in Modesto.

San Joaquin River Water Quality Analyses:

Conceptual Model for Salinity (for Drinking Water Policy):

http://www.waterboards.ca.gov/centralvalley/water_issues/drinking_water_policy/

Grassland Bypass Project Reports

<http://www.sfei.org/gbp/sjrip>

White Paper on Assimilative Capacity/Loading from Salinity TMDL subareas

<http://www.sanjoaquinriverrrtmp.com/> (I've asked Gene to check for exact location, since it seems to have moved).

MAA documents (DMC "excess salt loads" over past ten years in the compliance report)

http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/vernalis_salt_boron/#draftmaa