

May 24, 2012

**CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG-TERM SUSTAINABILITY (CV-SALTS)
TECHNICAL SUBCOMMITTEE RECOMMENDATIONS REGARDING EC-STUDY TECHNICAL
QUESTIONS**

On 8 March 2012, the CV-SALTS Technical Committee reviewed and discussed several technical issues related to salinity studies to determine appropriate salinity water quality objectives to protect agricultural supply water (EC studies). The committee focused on questions that have been raised during Regional Board staff's recent review of site-specific EC study submittals by the cities of Roseville, Manteca, Colusa, and Vacaville. Discussion points, findings and recommendations for the issues discussed have been documented in Attachment 1 (CV-SALTS Technical Committee EC Study Recommendations, March 2012). Many of the recommendations built on recommendations provided by the committee in a 26 August 2011 letter covering a review of the City of Davis draft EC study workplan (also attached).

In addition to discussing technical issues related to the reviewed documents, the subcommittee also briefly discussed some over-arching policy issues such as utilizing input from local irrigation water users in the process of establishing site-specific EC objectives, defining what level of crop protection is reasonable, and factors that should be taken into consideration in determining the most salt sensitive crop to be protected in a study area. While the subcommittee recognizes that it is more appropriate for the Executive Committee to provide formal recommendations on these issues, some factors they agree need to be addressed include:

- Input from local irrigation water users would be helpful in determining crops that should potentially be protected in a study area and the desired water quality to grow those crops based on the available water sources.
- Establishing different levels of reasonable protection in terms of crop yield, including minimums for different water-year types, in particular during drought conditions.
- Insuring the approach to determining the most sensitive crop to be protected accounts for actual practices, considers economics, and is consistent with the laws, regulations and policies governing the Regional Board.

We appreciate the opportunity to comment on the technical questions and issues presented by Regional Board staff.

Nigel Quinn
Chair, CV-SALTS Technical Advisory Committee

Parry Klassen
Chair, CV-SALTS Executive Committee

cc:

Pamela Creedon, Executive Officer, Central Valley Regional Water Quality Control Board

Attachment 1

CV-SALTS Technical Committee EC Study Recommendations May 2012

1) Is it appropriate to use results from previous EC studies in other areas if the model inputs for the previous study are the same or more limiting than site-specific conditions in the new study area?

Yes: The subcommittee recommended that, at least until local salt and nutrient management plans are developed, the approach of using the modeling results of a previous study is appropriate if it can be demonstrated that the model inputs for the previous study are similar or more limiting than the site-specific conditions in the new study area. The subcommittee also indicated that the approach could be valid even when all the inputs of the previous study are not the same or more limiting, but some inputs are less limiting than conditions in the new study area. However, the committee recommended that in situations where some inputs are less conservative it may be more cost effective to actually run the model since additional checks and/or studies would need to be conducted, such as comparison with the Hoffman model results, to confirm that the approach is valid.

Recommendation: The approach in question is appropriate, but, in situations where all inputs for previous studies are not the same or more limiting, it may be more cost effective to run the model rather than to use additional checks, such as the Hoffman model, as confirmation. [What about the case where an effluent limit for EC of 900 umhos/cm would be applied? In that case, is less rigor appropriate?]

2) What are the key model inputs that need to be similar? If the study you are basing your results on gives a range of objectives, should you always choose the lowest number?

Staff provided the subcommittee a table comparing the model inputs and input sensitivities for both the Hoffman and Grattan models. The subcommittee identified the following as the key inputs for the Hoffman model: the most salt sensitive crop; leaching fraction; moisture extraction pattern; and precipitation. The committee did not comment on the input sensitivities for the Grattan model (as the relative sensitivities were provided by Dr. Grattan), but a question was raised whether one of the inputs listed, leaching fraction (LF), is actually an input into the Grattan model. Staff contacted Dr. Grattan regarding this question and was informed that LF is an input in the model because it determines the applied water at each irrigation. However because it is a transient model accounting for water flows in the root zone, a final LF is calculated which usually varies somewhat from the initial targeted LF. Therefore this initial targeted LF is a key input because it affects the total applied water.

Recommendation: Key model inputs that should be compared for the Hoffman model are most salt sensitive crop, leaching fraction, moisture extraction pattern, and precipitation.

3) Is the use of a transient model acceptable?

The subcommittee confirmed its recommendation made previously for the City of Davis workplan that use of a transient model is acceptable, although peer review of this model is desired. As an alternative to peer review of the Grattan model, in some instances using the Hoffman model as an initial check on transient model results will suffice..

Recommendations: The use of transient models is acceptable, but an initial check of results should be conducted using the Hoffman model unless the transient model has been peer reviewed.

4) What is the appropriate winter bare soil evaporation rate for Vacaville?

In conducting the South Delta study, Dr. Hoffman used a bare soil evaporation rate of 0.7 inches per month, based on a 4-year DWR study (*MacGillivray and Jones, 1989*) conducted in the Central Valley from Red Bluff to Bakersfield. The subcommittee agreed with the use of *MacGillivray and Jones, 1989* to determine default bare soil evaporation rates for Central Valley and that the use of 0.7 inches per month is an appropriate value for the South Delta and Vacaville.

The subcommittee also indicated that site-specific studies of winter bare soil evaporation rates might be beneficial to dischargers in certain situations and recommended they should be considered as another acceptable approach for determining winter bare soil evaporation rates.

Recommendation: The use of *MacGillivray and Jones, 1989* to determine site-specific winter bare soil evaporation rates for various locations in the Central Valley and the use of a rate of 0.7 inches per month for Vacaville is appropriate. But dischargers should, if they choose, be allowed to conduct their own site-specific studies to determine winter bare soil evaporation rates for their study areas.

5) Is the exponential pattern for soil water root uptake the appropriate default for the Hoffman model?

Two soil water uptake patterns can be used in the Hoffman model – the 40-30-20-10 pattern and the exponential pattern - and the model is highly sensitive to which of the two is used. In the South Delta report, Hoffman calculated objectives using both patterns, but recommended using the exponential pattern because it fits field and plot experiment results. The subcommittee concurred with Dr. Hoffman's recommendation.

Recommendation: The subcommittee recommends the use of the exponential soil water uptake pattern for the Hoffman model rather than the 40-30-20-10 pattern.

6) Is the methodology Dr. Hoffman used to determine leaching fractions in the South Delta report appropriate for other areas? In the absence of site-specific data, is 15% appropriate to utilize as a conservative assumed leaching fraction for other Central Valley areas?

For the South Delta study, Dr. Hoffman calculated leaching fractions using tile drainage and applied water data previously collected in the South Delta and checked those calculations with independent soil sensor data from the South Delta. It was the subcommittee's opinion that Dr. Hoffman's approach was appropriate and could be used in other study areas.

For situations where site-specific data for determining leaching fractions is not available, the subcommittee recommended a default value of 15%, citing the fact that anything more conservative than that is seldom seen in the Central Valley

Recommendation: Where data is available, utilize a methodology similar to Hoffman's for the South Delta report, and where data is not available, use a default leaching fraction of 15%.