

Salt and Nitrate Sources Pilot Implementation Study

Draft Report Comments – 1/15/09

Prepared for the Central Valley Salinity Coalition

General Comments and Recommendations

This first section provides general overarching comments on the draft report and includes most of our recommendations. The recommendations are provided in this section allow the team maximum flexibility to incorporate them. These comments either reflect CVSC technical review or may generalize or expand on comments provided in the Technical Committee Presentation Meeting.

1. A response summary should be an attachment to the report, other comments are attached.
2. The report would benefit from a conclusions section in Chapter 5 or elsewhere. It might identify:
 - a. Goals from the workplan and the objectives of the study and how they were met
 - b. Significance of the data and overall balance of the pilot areas
 - c. Compare the pilot areas and their data and quality strengths and weaknesses
 - d. Provide diagrams or graphics similar to Figure 2-2 that shows the values and overall balance of salts and nitrates for the three pilot areas.
 - e. Consider using pie charts or other graphics to show the relative contributions of salt such as data provided in paragraph 1 on page 4-8 or Attachment Figure A2-14.
 - f. Summarize the findings, conclusions and recommendations for the executive summary
3. To the extent the team is capable, within the constraints provide an assessment of the level of “completeness” of the salt and nitrate characterization. Identify significant gaps if any for the recommendations.
4. Reiterate the rationale for selection of the pilot areas from the workplan and then compare to what was accomplished.
5. Expand the Executive Summary to include brief background on the study areas and perhaps a map of the Region with the areas indicated. Also expand the executive summary to include the important conclusions of the report. Move the (less than critical) recommendations to a conclusions and recommendations section.
6. It may be beneficial for the Study team to make a presentation of the data from the full report in order to provide a complete comparison including the diagrams and graphics that may be added.

7. Recommend the final report include a section which identifies the following: (from a recommendation in the workplan review comments):
 - a. *Data needed to characterize an area for salt and nitrate sources. As discussed in the meeting, the information needed to “fill the box” adequately to assure that any of the pilot area salt balance and sources are understood.*
 - b. *Generalized methodology should be presented between the objectives and the pilot study areas to help the reviewer understand why the various efforts are being undertaken in the pilot areas.*
 - c. *Once the generalized approach and data needs are stated, identify the sources of this data for the pilot areas and how the report fulfills the generalized approach.*
 - d. *Identify and outline the procedural steps used to ensure the data is appropriate for this study*
 - e. *Identify how other data sources, especially those identified in the committee meeting on July 14 ~~will be~~ were included, used for corroboration, or not used in the study.*

8. Comments in the Workplan also requested:

“Prepare an overview or non-technical executive summary for the report and include a similar preparation for the draft report. Something on the order of a press release for a lay audience to maximize the value to all stakeholders.”

Consider adding this document to the attachments or to accompany the final report.

9. For all pilot areas list data sources and list the agencies or groups from which data was requested. This could be added to the attachments.

10. No data is presented that validates the amount of “atmospheric deposition” of TDS/EC, however in all three pilot it is a significant source and is not well explained. It there is uncertainty about this source is it testable by sensitivity or monitoring. What drives the variability of the values for the different pilot areas?

11. Please provide information on how the final report, tables, graphics, text, and WARMF model and supporting data will be provided to CVSC for future efforts.

Specific Comments

1. Page ES-2: Significant Sources and Sinks verify they are generally in order of significance. Consider repeating this for the three pilot areas at the end of the ES with generalized significance.
2. Page ES-3: If possible bold or otherwise categorize those that were significant sources of data. Or address in the conclusions section. Consider a flow or input-output chart in section 1 or in the generalized methodology section
3. Page ES-5: Rows in Near Surface Groundwater section are missing. It might be useful to add the overall inputs and outputs and identify the net increase or decrease.
4. Page ES-6: Columns for % of input or output may be useful. Potentially a graph or chart showing their similarities and differences in the areas would assist understanding.

5. If added, in the Map showing the pilot areas show surface inputs and outputs if possible. The Maps shown in the attachments (Figure A3-3, 3-10-3-13) or A3-27 for example) would be useful in the ES. Summary statistics about the areas summarized vs the total CV region and the Population vs the total CV region would add value and assist the committee with interpreting and estimating the cost for the rest of the CV.
6. Page ES-7: Recommend conclusions and finding review before recommendations
7. Page ES-7: Because of the number of recommendations, can they be further characterized
 - Importance needed for scientific rigor
 - Significance/likelihood to impact conclusions
 - Assumption/data gap
 - Useful for other areas to complete
8. Page 2-9: Chart labeling does not print accurately/distorted
9. Page 2-10: Consider using this schematic chart with the data from the tables on ES-5-6 & 7 to explain the general situation of the pilot area.
10. Page 3-1 etc: As provided in the workplan show the table of sources of data, land use and other information to be updated from report to reporting
11. Page 3-1: Provide a table for data gaps identified in Section 5 and add its reference here
12. Page 3-5: Consider adding the region map showing all three pilot areas in the Central Valley Region.
13. Page 3-17: Move explanation for the charges on page 3-24 closer to that page for readability.
14. Page 3-27: first bullet in last paragraph is colored blue
15. Page 3-28: Table 3-7 is excellent for soil parameters for WARMF, are there similar tables for other WARMF parameters that can be included, even in an appendix?
16. Page 4-1: Recommend and introduction to the pilot study results section as it differs from section 3 that was mostly ordered by media and data type, this section follows the pilot area organization.
17. Page 4-1: The first paragraph describes the “Loading output and flux output” there is little in the body of the report that demonstrates these. An index of mass balances shown in the appendix may be very useful if one wants to review the information in the attachments. Like the old Thomas Guides had an index map to each catchment and page number.
18. Page4-5: Graph shows only a few observed data points for nitrate Cache Creek above Rumsey. Can some discussion be added about the adequacy and representativeness of this chart for other data?
19. Page 4-8: Consider showing the % of the total for each source and a diagram such as Attachment Figure A2-14 to assist understanding. Indication of the major sources and any validating data should accompany the descriptions on 4-10.
20. Page 4-11: first paragraph: Could the salt also be stored in the soils? Last line in the last paragraph on chloride data. This should also be reflected in the recommendations.
21. Table 4-5: Attempt to keep the tables on one page for readability. Provide additional detail on the connections between WARMF and other models including MODFLOW.

22. Page 4-14: It may be useful to add flow to table 4-8. It is unclear why imported water would increase by more than 3x in a wet year scenario??
23. Figure 4-12: Does this show that the TDS in the Groundwater increased 200 mg/l TDS in 10 years? If possible reorganize the figures to be closer to the text explaining them.
24. Page 4-26: This is an excellent table; the use of color codes and notes makes it much more readable and understandable.
25. Table 4-14: Again % of total load may be useful in comparison or bold significant contributors and discuss them with any validating data.
26. Table 4-16: Tule Atmospheric deposition is very low without explanation.
27. Table 4-18: uses pounds rather than KG consider using similar units.
28. Table 4-20: Is diversion "out of the basin" or just out of surface water to irrigation?
29. Page 4-39: paragraph 2, the Modesto areas is compared to the Tule which has not yet been described. Reference the next section or other correction.
30. Page 4-43: #3 the last sentence indicates a recommendation that should be repeated in the recommendations section.
31. Page 4-52: table 4-23 indicates no nitrate contribution for septic tanks when there is a 10,000 pound per day contribution of TDS. Why is this?
32. Page 4-52: For total groundwater sections, please indicate the total groundwater volume of the area.

Yolo	TDS kg/d	Nitrate kg/d (N)	%	Total Input 3,506,000	Total Output 3,141,000	Net increase 365,000	TDS kg/yr 133,225,000	Tons/Yr 146,548	lbs/Acre/Year 406.64	Tons/person/year 1,480	Tons/Acrefoot/year
Surface Water											
Total Inputs	1,625,000	6,530									
Inflows from Upstream	619,000	662	38%	619,000							
Imported Water	647,000	2,750	40%	647,000							
Inflows from Near-surface Groundwater	298,000	2,278	18%	298,000							
Point Sources	58,000	594	4%	58,000							
Reaction Product	3,000	246	0%	3,000							
Total Outputs	1,590,000	6,696									
Biological Uptake Reaction Decay	76,000	1,220	1%		76,000						
Diversion	314,000	740	4%		314,000						
Outflow to Downstream	1,200,000	4,690	17%		1,200,000						
Near-surface Groundwater											
Total Inputs	1,205,000	22,320									
Atmospheric Deposition	399,000	910	5%	399,000							
Irrigation	639,000	3,390	8%	639,000							
Fertilizer / Land Application	121,000	15,560	2%	121,000							
Point Sources	3,000	20	0%	3,000							
Septic Systems	<1,000	0		0							
Mineral Weathering Reaction Product	43,000	2,440	1%	43,000							
Total Outputs	1,134,000	19,610									
Net Plant Uptake Reaction Decay	139,000	6,870	12%		139,000						
Outflow to Surface Water	303,000	2,230	27%		303,000						
To Groundwater	692,000		61%		692,000						
Change in Storage											
Deeper Groundwater											
Total Inputs	676,000	10,510									
Recharge from Near-surface Groundwater	676,000	10,510	100%	676,000							
Stormwater Recharge Wells "Rock Wells"	0	0		0							
Total Outputs	417,000	4,699									
Pumping for Irrigation	396,000	4,281	95%		396,000						
Pumping for Municipal Industrial Use	21,000	218	5%		21,000						
Pumping for Groundwater Control	0	0			0						

Modesto			%	Total Input 17,851,700	Total Output 14,262,000	Net increase 3,589,700	TDS kg/yr 1,310,240,500	Tons/Yr 1,441,265	lbs/Acre/Year 3,999.19	Tons/person/year 5,640.96	Tons/Acrefoot/year
Surface Water											
Total Inputs	6,770,000	32,800									
Inflows from Upstream	6,100,000	19,000	90%	6,100,000							
Imported Water	0	0	0%	0							
Inflows from Near-surface Groundwater	299,000	9,220	4%	299,000							
Point Sources	304,000	3,130	4%	304,000							
Reaction Product	68,900	1,440	1%	68,900							
Total Outputs	7,060,000	34,400									
Biological Uptake Reaction Decay Settling	173,000	724	2%		173,000						
Diversion	1,180,000	10,100	17%		1,180,000						
Outflow to Downstream	5,710,000	23,600	81%		5,710,000						
Near-surface Groundwater											
Total Inputs	7,840,000	307,000									
Atmospheric Deposition	48,800	2,170	1%	48,800							
Irrigation	2,390,000	14,200	30%	2,390,000							
Fertilizer / Land Application	4,660,000	167,000	59%	4,660,000							
Point Sources	138,000	2,840	2%	138,000							
Septic Systems	0	0	0%	0							
Mineral Weathering Reaction Product	613,000	121,000	8%	613,000							
Total Outputs	5,470,000	197,000									
Net Plant Uptake Reaction Decay	1,410,000	167,000	26%		1,410,000						
Outflow to Surface Water	827,000	6,670	15%		827,000						
To Groundwater	3,230,000		59%		3,232,000						
Deeper Groundwater											
Total Inputs	3,230,000	23,100									
Recharge from Near-surface Groundwater	3,230,000	23,100	100%	3,230,000							
Stormwater Recharge Wells "Rock Wells"	0	0		0							
Total Outputs	1,730,000	25,200									
Pumping for Irrigation	1,730,000	25,200	100%		1,730,000						
Pumping for Municipal Industrial Use	0	0	0%		0						
Pumping for Groundwater Control	0	0	0%		0						

Tule			%	Total Input 4,303,100	Total Output 3,059,520	Net increase 1,243,580	TDS kg/yr 453,906,700	Tons/Yr 499,297	lbs/Acre/Year 1,385.44	Tons/person/year 2,344	Tons/Acrefoot/year
Surface Water											
Total Inputs	405,400	4,530									
Inflows from Upstream	260,000	3,120	64%	260,000							
Imported Water	82,700	52	20%	82,700							
Inflows from Near-surface Groundwater	15,400	916	4%	15,400							
Point Sources	0	0	0%	0							
Reaction Product	47,300	441	12%	47,300							
Total Outputs	391,000	4,550									
Biological Uptake Reaction Decay Settling	1,820	0	0%		1,820						
Diversion	238,000	1,180	61%		238,000						
Outflow to Downstream	151,000	3,370	39%		151,000						
Near-surface Groundwater											
Total Inputs	3,140,000	209,000									
Atmospheric Deposition	854,000	2,740	27%	854,000							
Irrigation	753,000	34,300	24%	753,000							
Fertilizer / Land Application	1,180,000	110,000	38%	1,180,000							
Point Sources	0	0	0%	0							
Septic Systems	10,700	0	0%	10,700							
Mineral Weathering / Reaction Product	342,000	61,900	11%	342,000							
Total Outputs 1960000 139000	1,960,000	1,390,000									
Net Plant Uptake Reaction Decay	1,030,000	116,000	53%		1,030,000						
Outflow to Surface Water	41,700	2,810	2%		41,700						
To Groundwater	884,000		45%		884,000						
Deeper Groundwater											
Total Inputs	758,000	15,200									
Recharge from Near-surface Groundwater	758,000	15,200	100%	758,000							
Stormwater Recharge Wells "Rock Wells"	0	0		0							
Total Outputs	713,000	34,600									
Pumping for Irrigation	713,000	34,600	100%		713,000						
Pumping for Municipal Industrial Use	0	0	0%		0						
Pumping for Groundwater Control	0	0	0%		0						



January 14, 2010

Mr. Daniel Cozad
Central Valley Salinity Coalition
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Subject: Comments on Salt and Nitrate Sources Pilot Implementation Study Report Final Draft

Dear Mr. Cozad:

California Urban Water Agencies (CUWA) has reviewed the subject report and appreciates the opportunity to provide comments. The WARMF model appears to be a good tool for estimating the concentrations and loads of salt, nitrate, and chloride in the Central Valley. However, due to the limited amount of time available to review the report, CUWA was not able to engage a modeling expert to review and critique the sections of the report on the modeling methodology.

General Comments

Several of the objectives of the study, listed in the Executive Summary and Introduction, were not accomplished:

- *Objective 5. Indicate how the methodology will account for total salt loading balance and accumulation and identify critical concentration discharges.* There is no discussion in the report about the critical concentration discharges. The discussion about the load of salt and nitrate coming from upstream sources does not contain any information about the concentrations in those upstream sources. In general, the upstream sources have low concentrations of salt and nitrate and the large loads are due to high quantities of water. These sources are not controllable sources. The report needs to provide more information on the concentrations of salt and nitrate in the various sources and more discussion about which of the sources are potentially controllable.
- *Objective 7. Identify how historic, current, and future source quantities will be determined or estimated to provide trend information.* There is limited discussion about the need to evaluate future source quantities in the report but there is no discussion of the methodology to be employed to estimate future source quantities.

- *Objective 8. Identify and quantify areas where nitrates are impacting beneficial uses of water.* There is no discussion in the report about the impacts of salt and nitrate on beneficial uses. The impacts of nitrate should be discussed from both the public health perspective (exceedences of the maximum contaminant level) and from the impact of nitrate in stimulating algal blooms that result in both drinking water and ecosystem impairment.

The report needs a Conclusions Section. The Conclusions Section should contain a discussion about the controllable sources in the watershed and a discussion of beneficial use impairment.

CUWA strongly supports the recommendation that there be a single point of contact at the Regional Water Board for discharger data. It appears that the consultants were not able to access some data on point source discharges. CUWA recommends that the report contain a recommendation that the Regional Water Board require all dischargers to submit their data in electronic format to the Regional Water Board.

The report does not describe how urban runoff discharges are treated in the model. Is urban runoff considered to be a point source discharge or a non-point source discharge?

The graphics in the report are poor quality and difficult to read. CUWA recommends that they be improved for the final report.

There is a mixture of units used in the report. The report authors should decide if they are going to use metric or English units and the units used in the tables of data and figures for the three study areas should be consistent so that study area loading rates can be compared. The units for nitrate should also be consistent throughout the report. In some cases nitrate is presented as N and in others it is presented as NO₃.

Specific Comments

Page ES-4 – There is no reference to the Modesto and Tule study area results and there is no discussion of the results for any of the study areas.

Pages ES-6 and ES-7 – Why is chloride omitted from these two tables?

Page ES-8 – CUWA strongly supports the recommendation that there be a single point of contact at the Regional Water Board for discharger data.

Page 3-29 – The Regional Water Board should have the facility location, flow, effluent quality, and land discharge area for all dischargers in the Central Valley in their permit files. It is unclear why these data were not available to the report authors.

Page 3-29 – The report needs to contain a description of how dischargers were classified as major and minor. Is it based on discharge volume?

Mr. Daniel Cozad
January 14, 2010
Page 3

Tables 3-8, 3-9, and 3-10 – The average discharge volume should be presented for each of the point source dischargers.

Page 3-35 – Some of the water diverted to the Putah South Canal is used for drinking water in the cities of Vacaville, Fairfield, and Vallejo. It is not all used for irrigation.

Table 3-12 – Putah South Canal is not a water user. The water users are Solano County Water District and Solano Irrigation District.

Page 3-37 – Modesto Irrigation District diverts water from the Tuolumne River for drinking water.

Table 3-21 and similar tables – Present nitrate as N to be consistent with other tables and figures. There are too many significant figures in the concentration estimates.

Figure 3-20 – This map does not contain all of the data shown in Table 3-21.

Page 3-77 and maps and tables that follow – There are inconsistencies between the numbers presented in the tables and the numbers on the maps. There needs to be a better explanation of what data are being presented and why there are differences.

Page 4-1 – There should be an explanation of what is included in the point source and non-point source categories.

Figure 4-1 – This figure should show a time series of flow or concentrations to be consistent with the description in the text.

Page 4-8, Mass Balances – This section should include more details on the point source category. Which dischargers contribute the most load?

Tables 4-14, 4-15, 4-16, and 4-17 – Chloride loads should be included in these tables.

Page 5-8 – It is unclear what this recommendation means: 2. *Identify insights provided by tools used to estimate future implications of mass loading.*

CUWA appreciates the opportunity to submit comments. Please call me if you have any questions.

Sincerely,



Elaine M. Archibald
Executive Director

COMMENTS ON DRAFT SALT REPORT

January 18, 2010

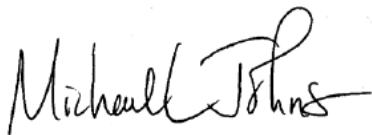
TO: Daniel Cozad

FROM: Michael L. Johnson, MLJ-LLC

RE: Salt and Nitrate Sources Pilot Implementation Study Report *Final Draft*

Please find attached several comments on the Draft Report divided into “General Comments” and “Specific Comments”. In general, the amount of detail in draft report sparse; however, given the time frame and the current length of both the report and the appendices, additional verbiage may be difficult to add. Most importantly, though, is that the authors did not address all of the objectives listed in the Executive Summary and this should be rectified prior to the finalization of the report.

I apologize for the late delivery.



Michael Johnson



GENERAL COMMENTS:

There are numerous small typographical and punctuation errors that I am sure will be corrected in the final draft. I did not take the time to note each one but a careful reading will catch errors that a quick spell check will not identify, e.g. “form” and “from”, “and” instead of “an”. Formatting in many of the tables is inconsistent and needs to be formalized.

Although I understand the time frame for this analysis was relatively short, the report suffers from a lack of detail on several issues. Significant detail is provided on the modeling in the report attachments, but the rationale for several key decisions is lacking. For example, the relevance of the age of the groundwater in the Tule basin is not well explained and consequently, the cost of the analysis could be questioned.

There are several tables with inconsistent references to methods used to develop the parameter values (i.e. superscripts at the bottom of the table but no association within the data in the table or vice versa) and in many cases a general lack of description and/or reference to a method by which the data were obtained or estimated.

Specific issues are addressed below.

SPECIFIC COMMENTS:

1. The document could be improved with a list of acronyms as well as a consistent use of acronyms.
2. The Executive Summary provides a list of 9 study objectives. Reading through the document, it is not clear that all 9 are addressed in the text. For example, objective #8 is to identify and quantify areas where nitrates are impacting beneficial uses of waters. Although it is possible to read through the text and apply some of the modeling results to think about beneficial uses, there is no explicit discussion of beneficial uses or impairments. The report should contain an explanation of why some of the objectives were not possible to address as well as provide a description of how these objectives might be addressed in the future.



3. In Table 3-3, there is a column for land application area (units of acres). There is no superscript on the column to indicate how the area was determined. The text on page 3-16 does not include a reference to how the land application area was developed. The information included in the report only references the source of the data stating that the data was obtained from the Regional Board for the latitude and longitude of the production areas along with associated acreages and herd sizes. More detail should be provided that explains how this data was used to develop the land application area.

It is unclear if the land application area data were directly from the Regional Board's dairy program or if they were estimated. If the values were estimated, the consultant should perform a "spot check" of the estimated values based on records of land designated by each dairy as application areas as well as sales records with location of purchase for dairy manure; these records should be maintained by the Regional Board's dairy program. A spot check is recommended since it is doubtful that the records are electronic and therefore a full analysis of the data (if not already included) could prove too time consuming.

4. On page 3-17, there are three undefined terms "Resting dairy land", "Unconstrained dairy land" and "Land constrained dairy land" which need to be defined. While their definitions may be common knowledge in the dairy industry, they are not well understood outside of the dairy industry.
5. Tables 3-4, 3-5, and 3-6 contain incomplete superscripts in the heading or body of the table. References to the superscripts are provided below the table which means either the superscripts need to be inserted into the table or the reference should be removed from below the table.
6. It is not explained how the % NO₃ in Table 3-5 was obtained. There is no reference regarding where these data were obtained from or, if they were calculated in house by the consultants, what the method was for generating the %NO₃ numbers.
7. The URL should be provided for any online source of information within the text. For example, salt added as gypsum was extracted manually from CDFA reports but there is no citation for these reports. Since there is no reference to the CDFA reports in the reference portion of the report it is unclear if the reports were available online or obtained directly from CDFA.



8. The report clearly explains why the major and minor point source dischargers received little attention in the analysis (outside of budget constraints). In the Yolo County study area, it is unlikely that these discharges are going to contribute substantially to the salt or nitrate load. However, in the Modesto and Tule study areas, it is not clear that these dischargers are a minor component when developing the salt or nitrate load. This point is addressed in Section 5 with the first priority recommendation but could be addressed in more detail in the methodology and results section (Section 3 and 4).
9. There is a statement on page 3-49 that with “perfectly efficient irrigation”, all water would end up as evapotranspiration. While it may be conceptually correct within the confines of the model, it is technically incorrect as some water is going to end up in plant tissue. A substantial portion of this plant-water is removed from the land (harvested) and moved out of the basin to be processed. The same is true for the salt and nitrogen that is removed with the harvest. Plant uptake is listed as a sink in Table 2-1 but is not discussed in any detail later in the report. Estimates are provided in the attachments indicating that this component has been incorporated into the modeling. The statement should be modified.
10. Much of the text starting on page 3-53 (section *Salts vs. Nitrates*) is written in the future tense as if the text had been copied and pasted from the proposal. The previous section (previous to page 3-53) is written in the past tense to reflect work performed. The sections written in future tense need to be revised to reflect their completion or revised to infer that they are future work to be done. Given the results, the work has been performed and the future tense is not appropriate.
11. I did not check all of the numbers in the text against the tabled values, but I did spot-check a couple of tables. The text at the bottom of page 4-10 and the top of page 4-11 refers to Table 4-4, the mass balance accounting for near-surface groundwater. My calculations based on the tabled values indicate that uptake by plants consumed 35 percent of the nitrate and 12 percent of the TDS as opposed to the 30 and 20 percent listed in the text. According to my calculations using numbers from the table, exfiltration to surface water is 27 percent for TDS, 35 percent for nitrate, and 21 percent for chloride. The chloride calculations agree but the other two calculations do not. It is possible that this discrepancy is a result of my misreading of the text but the tables and text should be compared for consistency.



12. It is not clear from Section 5 if there are any real conclusions to be made. It is apparent that the authors believe that the model could be improved substantially if additional data were available. But, it is not clear whether or not the authors believe that the current estimates of loadings and the mass balance calculations are sufficient for regulatory action. Also, it is not clear if the last objective of the study as identified in the Executive Summary, determine the applicability of the methodology to develop salt and nitrate load estimates for the entire Central Valley, has been met.

The current study areas were selected because of the significant amount of data already available for the analyses. Even with the amount of data already available, the models had difficulty with some areas of the analysis. Given the paucity of data available in other locations within the Valley, do the authors believe that these tools are sufficient to arrive at loadings and allow a mass balance to be performed for the entire Central Valley? Some statement addressing this point should be made, or at least the authors should indicate when such a conclusion could be made.





January 19, 2010

CV Salts Source Study Comments

Dear Mr. Cozad,

Thank you for the opportunity to submit comments on the Salt and Nitrate Source Pilot Implementation Study recently released by the Central Valley Salinity Coalition. We applaud your attempt to develop effective methodologies to quantify and track the significant salt and nitrate sources impacting the vulnerable water resources of the Central Valley, particularly given the limited amount of time available to complete this initial study. However, we would like to take this opportunity to raise several questions and concerns. **As we are not experts in modeling, some of our concerns may be answered by further explanation of the models and methodologies employed in the study.** In particular, we would like to have a better understanding of how these models will be able to improve over time and how the margin of error can accurately be ascertained given the significant data gaps that the report identifies. We would also like to have more clarity on the conclusions that can be drawn from this initial study and how environmental justice organizations like ours can most effectively engage with this important effort.

Our specific concerns with the report are as follows:

Data Deficiencies

We are particularly concerned with the significant data gaps identified in the initial report, as it appears that the models would be substantially more effective with more comprehensive data. Because of this concern, the credibility of the Modesto and Tule River area models is undercut somewhat by the severe data deficiencies identified in the study for those areas. We hope that the group will consider placing as much emphasis on maintaining and improving these models as the report currently places on the Yolo model.

In addition, it is unclear from the report whether the domestic well data gathered by the United States Geological Service (USGS) for the State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment (GAMA) Program was or could be used in the Tule River model. If this data has not been integrated into that model, we suggest that it be integrated for the final draft of the report, in addition to other data available from GAMA and other state or county-maintained databases for the Tule River area.



Given that the study is co-sponsored by a state agency that is involved in the collection and compiling of water quality data, we believe that the study could include considerably more data in the Modesto and Tule River area models without a significant delay. The report acknowledges that “[i]n the Modesto and Tule River areas, it is also likely that additional data may be available but were not publicly accessible from state or federal web sites.” 5-4. We recommend that the group prioritize gaining access to any applicable state and federal data and that the Regional Board assist in this effort.

Finally, it would be helpful to provide more clarification in the discussion of data averaging to assure readers that averaged data is not inappropriately being input into the model.

Calibration

The report mentions that there is a need to calibrate the Modesto model. We recommend that this take place before the report is finalized. Likewise, the report does not appear to address whether there is any plan to calibrate the Tule River model, which raises the question of whether it can be done with the data currently available in that model and if not, what is needed to complete this model. We recommend that the priorities reflect the necessary steps to complete both of these models.

Municipal Wells

We are troubled by the lack of discussion of municipal wells in the report, particularly given the significant impact of nitrate contamination on drinking water supplies in the Central Valley. We note that the report states that “[t]he split of agricultural and municipal use has not been determined, so for the mass balance all pumping was assumed to be agricultural.” 4-52. We recommend that the report consider in more detail the difference between agricultural and municipal wells and the impact of these differences on the models.

Where the report describes near surface groundwater as groundwater that interacts with surface water “well above the depths where pumping occurs,” we would appreciate some clarification of whether this statement applies to domestic wells in addition to agricultural wells.

Nitrate Sources (fertilizer, dairies, septic tanks, etc.)



We have several questions and concerns with respect to the various nitrate sources identified and discussed in the report. With respect to fertilizers, we are troubled by the fact that the fertilizer data used in the modeling was purely theoretical and based on the assumption that fertilizer application has been appropriate without reference to any application or sales data. *See* Attachment 8. Similarly, we are also concerned that the models also include the assumption that crops are taking up 100% of available nitrogen in the soil, including 100% of the nitrogen made available by fertilizer application. These assumptions may have significant impact on the results of the study, and we recommend that they be carefully examined and potentially modified, ideally by the addition of relevant data.

We are also concerned by the report's treatment of septic tanks and would appreciate some clarification of the role that septic tanks play as a source of salt and nitrate and how the models and analysis take this role into account. If this lack of clarity regarding septic tanks arises from a lack of data, we recommend that the group prioritize identifying and securing access to sources of this data. We would appreciate more clarity as to the conclusions regarding septic tanks that can be drawn from the initial study.

Finally, we are concerned that the study does not appear to be considering point source discharges from Confined Animal Feeding Operations (CAFOs), including dairies, or that it is not clear how the study is taking these discharges into account. In particular, we would appreciate clarification of whether the models include point source discharges from CAFO waste lagoons and land application, as well as the anticipated strategy for acquiring this data from facilities that do not currently have NPDES or WDR permits. We recommend that the study include greater specificity and more data on these sources of salt and nitrate, and we are troubled by the report's statement that, "[d]ata for dairies were not collected because these discharges are simulated with land application rates in the WARMF model rather than input explicitly." 3-31. Where available, actual data for these facilities should be included in the study.

Land Cover and Soils Recommendations

In the "land cover and soils" recommendations, we would urge that the recommendation to "[a]ssess regional variations in gaseous N losses (volatilization, denitrification) in soils and aquifers" be moved to the first priority in that category. We are aware of studies that indicate that this number could be significant, and we believe that integration of this data into the models is of high priority.

Groundwater Quality



We strongly support the “groundwater quality” recommendations suggested by the report and hope that the group will work toward achieving these goals.

Next Steps

The document states (Page 2-8) that “This investigation is limited to provide a generalized regional scale analysis of transport paths and is not designed to represent detailed salt and nitrate contamination patterns. A fully coupled groundwater flow and transport model would be a necessary tool for such purpose”. Unfortunately, that is exactly the type of model we think is needed to address the severe salinity and nitrate issues in the Central Valley. We are concerned that this very expensive and time-consuming effort is not providing the necessary tools to measure or address the growing problem of nitrates in Central Valley drinking water.

Thank you again for the opportunity to submit our comments. We look forward to continuing to work together with you and the Coalition as this process continues.

Best Regards,

A handwritten signature in black ink that reads "Laurel Firestone".

Laurel Firestone
Co-Executive Director & Attorney at Law
Community Water Center

A handwritten signature in black ink that reads "Jennifer Clary".

Jennifer Clary, Water Policy Analyst
Clean Water Fund

A handwritten signature in black ink that reads "Martha Guzman Aceves".

Martha Guzman Aceves, Legislative Analyst
California Rural Legal Assistance Foundation

SOUTHERN SAN JOAQUIN VALLEY WATER QUALITY COALITION

***Kaweah River Sub-watershed
Kern River Sub-Watershed
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4886 E. Jensen Avenue
Fresno, California 93725
(559) 237-5567***

January 15, 2010

Mr. Daniel Cozad
Integrated Planning and Management, Inc.
360 Lakeside Avenue
Redlands, CA 92373

Re: Salt and Nitrate Sources Pilot Implementation Study Report

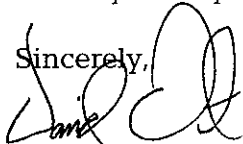
Dear Mr. Cozad:

This letter is being transmitted on behalf of the Southern San Joaquin Valley Water Quality Coalition (Coalition). Coalition members have had a chance to quickly review the final draft report (Report) of the Salt and Nitrate Sources Pilot Implementation Study (Study). The review was conducted based on the stated goals of the Study being to develop and document procedures and methodologies to quantify, fairly and equitably, the significant salt and nitrate sources in the Central Valley. The brief review time which has been allowed to date has been utilized by Coalition members to determine if the stated goals of the Study were achieved. This review has resulted in the tentative conclusion that there are a number of concerns with respect to the conduct and procedures related to the Report and the conclusions reached by same. The Coalition members intend on conducting a more thorough evaluation of the Report and generating specific comments.

At this time, however, our review to date puts us in a position where we strongly recommend to the Technical Advisory Committee that this consultant work product be subjected to a thorough peer review. We feel that such a review will allow for many of the problems which we have discovered to date to be addressed and will likely result in the issuance of a revised Report.

The Coalition strongly urges such a peer review in order to either verify the conclusions contained in the subject Report, or to recommended changes in same which will lead to a beneficial Study.

Thank you for your consideration of these comments.

Sincerely,


David Orth, Coordinator
Southern San Joaquin Valley Water Quality Coalition

DO/EA/sjs



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File#: 82231.00003

January 13, 2010

VIA E-MAIL

Joe Karkoski
Daniel Cozad
Central Valley Regional Water Board
11020 Sun Center Drive
Rancho Cordova, CA 95670-6114

Re: **IRRIGATED LANDS PROGRAM**

Dear Joe and Daniel:

The study engaged by Larry Walker Associates and Newfields concerning nitrates and salts involved three targeted areas of the valley, Yolo, Modesto and Tulare. It has now been presented with a December 21 date.

Considerable questions have arisen as to the next steps associated with these three area studies. Are they going to be sent out for peer review? Will the presentation of this study be subject to hearing or public response? Are the results of this study going to be used to engage similar evaluations to other areas of the valley? Is this study going to be used to advance some particular regulatory program? This information would be helpful.

Sincerely,

William J. Thomas
of BEST BEST & KRIEGER LLP

WJT:lmg

Central Valley Regional Water Quality Control Board staff comments on:

Salt and Nitrate Sources Pilot
Implementation Study Report
Final Draft dated 21 December 2009

General Comments:

- 1.) One of the tasks included in the RFP was to define the term “salt and nutrient sources of significance”. Although the authors identified what they considered the significant sources in the table on page ES-2, the criteria by which those sources were chosen is not discussed. What were the criteria used to select the identified “significant sources”? Also, some of the sources in the “Process” category of the mass balances, such as imported water, are very large sources of salt. But they were not included in the table on page ES-2. Should imported water be considered a significant source? If not, why not?
- 2.) Mass balances are conducted for surface water, near-surface groundwater, and deep groundwater in each study area. It would be helpful to also conduct mass balances for each study area in its entirety, comparing how much salt and nitrate enters the area with how much leaves the area.
- 3.) For the Mass Balance Accounting process, provide additional information regarding the percent of total inputs or outputs that each process represents for each constituent.
- 4.) For the Mass Balance Accounting for Near-Surface Groundwater tables, break down the irrigation process into imported irrigation water and non-imported irrigation water.
- 5.) The land use/source classification system used for this study should be carefully evaluated in terms of its usefulness for the purposes of CV-SALTS and revised accordingly. Some suggested improvements are:
 - Include more information on each land use/source category (i.e.; what are the discharges or releases from each category that the data represents? For instance, does the “urban residential” data represent domestic wastewater only, and what does the “water” data represent?).
 - Evaluate if all categories listed are manageable sources. If some are not, identify them as unmanageable sources and separate them out from the manageable sources.

- Organize as many of the listed categories as possible into larger categories that coincide with the Regional Board's regulatory programs.
 - For the "Loading Sources of Inflows from Near-surface Groundwater" tables (e.g.; Table 4-2), re-organize the Land Use/Source categories and, where possible, place each into one of the significant sources categories listed in the table on page ES-2. Those Land Use/Source categories that do not fit into any of the significant sources categories could be placed into their own separate category or dropped from the table since, by definition, they are not significant.
- 6.) The "Loading Sources of Inflows from Near-surface Groundwater" tables (e.g.; Table 4-2) contain loading data for specific sources. Has this data been correlated in any way with the "Mass Balance Accounting for Near-surface Groundwater" tables? It does not appear that the load numbers in the tables do correlate. Can this be explained?
 - 7.) In Section 4, there is a small "Trend Analysis" section for each study area that discusses the use of recharge volumes, and other inflow and outflows to the aquifer system to determine whether changes to the salt, nitrate and water balances stemming from changes in land use and practices will result in future groundwater quality changes. Was this exercise conducted? If so, please report the results.
 - 8.) If a distinction is made between "shallow groundwater" and "deep groundwater, those terms should be clearly defined for each study area.
 - 9.) In some areas of the Central Valley, managed wetlands are a significant source of salt load. Would the methodology used for this study allow the loads from managed wetlands to be quantified?

Specific Comments:

p. 3-47 – It is not indicated whether a request for groundwater data was sent to local agencies. Was this done?

p. 3-48 – Out of 21 irrigation districts, for which electronic groundwater data was requested, only one provided data. This demonstrates the need for CV-SALTS to develop a strategy to engage local agencies in the effort.

P 3-51, 1st parag. – The report indicates that the data from CDEC contained many errors. Where CDEC data was used, how were errors handled?

p.3-51, Table 3-18 – Why are surface runoff and drainage discharge not included as inputs? Is percolation to shallow groundwater not considered a significant output?

p. 4-8, Table 4-1 – The Yolo area has two sources of imported water. It would be helpful to quantify the load imported from each source.

pp. 4-32 & 4-35, Tables 4-13 & 4-16 - In-flows to SW from near-surface GW (299,000 lb/dy TDS) and outflow to SW from near-surface GW (827,000 lb/dy TDS) are significantly different. Explain or correct.

p. 4-35, Table 4-16 – No data was given for septic systems. Please explain.

p. 4-35, Table 4-17 – No data was given for pumping from municipal wells. Please explain.

p. 4-39, Top of page – Item # 2 – The questions regarding the origin of groundwater were not answered.

p. 4-52, Table 4-23 – The table shows zero nitrate loading from septic systems. Please explain.