Comment/Response Table - Management Zone Archetype Analysis: Alta Irrigation District

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
1	ES	Executive Summary	ES-1	Glenn Meeks	Regarding general discussion of goals: We really need to tie this clearly to the priorities of the overall CVSALTS/ SNMP program, which are: 1. Provide safe drinking water to impacted communities and individuals, 2. Reduce current loading of constituents of concern (Nitrate, TDS and COECs) to groundwater through use of BMPs, and 3. Long-term managed restoration of impacted groundwater where reasonable and practicable.	Consistent with the presentation provided to CVSALTS in March 2016, language was added to the Executive Summary, Section 1 and Section 9 – lessons learned to identify how the AID efforts provide a foundation for and address the SNMP elements and goals.
2	ES	Executive Summary	ES-1	Thomas Harter	Regarding bullets: Unfinished thought - and a new thought starting without introduction. What are the priorities? And what are the goals? Are priorities and goals meant to be the same - then use the same term? Either way, who set those? How did they come about?	Comment incorporated. Also edits to Section 1
3	ES	Executive Summary	ES-1	Glenn Meeks	Regarding bullets: We're kind of missing the 3rd priority – long-term managed restoration of impacted groundwater where reasonable or practicable	Consistent with the presentation provided to CVSALTS in March 2016, language was added to the Executive Summary, Section 1 and Section 9 – lessons learned to identify how the AID efforts provide a foundation for and address the SNMP elements and goals.
4	ES	Executive Summary	ES-1	Glenn Meeks	Regarding first primary bullet, "support sustainable management of surface water and groundwater supplies": This seems more appropriate to SGMA.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.
5	ES	Executive Summary	ES-1	Glenn Meeks	Regarding first subbullet in primary bullet list: Again this seems more geared towards SGMA, not the CVSALTS/SNMP program, other than to promote reuse of recycled water in a groundwater protective manner.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.
6	ES	Executive Summary	ES-1	Glenn Meeks	Regarding subbullets 2, 3 and 4 under primary bullet: These sort of relate to the 3rd priority, but not directly, such as the potential to recharge impacted groundwater areas with stormwater to reduce COC concentrations.	Consistent with the presentation provided to CVSALTS in March 2016, language was added to the Executive Summary, Section 1 and Section 9 – lessons learned to identify how the AID efforts provide a foundation for and address the SNMP elements and goals.
7	ES	Executive Summary	ES-1, ES-2	Glenn Meeks	Regarding first three subbullets under second primary bullet: These should be presented first as they are the top priority. But still doesn't say supply alternative drinking water.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.
8	ES	Executive Summary	ES-2	Glenn Meeks	Regarding last two subbullets under second primary bullet: These come second as the next priority – reducing current loading.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
9	ES	Executive Summary	ES-2	Thomas Harter	General comment: A Section or paragraph needs to be included here that explains what this report specifically accomplishes. The above are general goals. How does this report fit in? This should be used to provide an outline of the report and guide the reader through the remainder of the Executive Summary. Before going into the next section, the reader should know what to expect from the rest of the report. Without it, I had to first read the entire ES before understanding what this report is about.	Modified the paragraph prior to the bullets.
10	ES	Executive Summary	ES-2	Glenn Meeks	Regarding second bullet under "AID Management Zone Characterization" section: Need to discuss the hydrogeology a little more than just the Corcoran Clay unit. How does it separate the groundwater being used or does it? What is the aquifer type?, the typical geology, aquifer(s) material, etc. Where groundwater is being predominantly pumped from for use and from what depths.	Comment incorporated.
11	ES	Executive Summary	ES-2	Glenn Meeks	Regarding third bullet under "AID Management Zone Characterization" section: Should also indicate depth to groundwater.	Comment incorporated.
12	ES	Executive Summary	ES-4	Debbie Webster	Regarding second bullet under "Groundwater Quality Data Characterization" section: Was this problematic or is this a reasonable solution when data is limited? (Lessons Learned)	Addressed within the Lessons Learned
13	ES	Executive Summary	ES-5	Glenn Meeks	Regarding figure: We talk about the Corcoran Clay, but I don't see it here.	For the purposes of the AID Report we recommend keeping this figure. The Corcoran Clay is discussed at length within the High Resolution Mapping work effort.
14	ES	Executive Summary	ES-6	Glenn Meeks	Regarding definition of assimilative capacity at top of page: What if a buffer is used instead of the MCL. – The Executive Committee will have to make this decision.	Per direction from CVSALTS – the AID Report uses the WQOs. No modification necessary.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
15	ES	Executive Summary	ES-7	Debbie Webster	Regarding table: I am not sure if I understand the conclusions from the charts and the significance of the p-value. What does the Alta Irrigation District in the bottom left cells mean? Is this the whole groundwater table? What is the significance of the 79 vs 84 dates?	P values highlighted in red indicate that they were too high, and therefore the test failed to detect a statistically significant trend in the data. The p-values correspond to the "Nonparametric Regional Kendall Trend" column, where the trend result is explained. The "Alta Irrigation District" in the bottom left cells indicate that the analysis was performed using all of the data in both zones. The rows above stating "Upper Zone" and "Lower Zone" indicate that the tests were only performed on wells within these zones. Text has been updated to explain this further. The "Years" column in the table indicated the span of years of the data that was used for the analysis. For example, for the alta irrigation district's upper zone analysis for nitrate, the well tests available for the analyses spanned from 1979-2014. For the lower zone analysis, the data spanned from 1984-2014.
16	ES	Executive Summary	ES-7	Glenn Meeks	Regarding text under table that states, "assimilative capacity is expected decrease over the AID MZ": Not for TDS	The nonparametric tests do indicate that the assimilative capacity for TDS has been decreasing. That being said, the parametric tests show different trends. Text has been updated to reflect the two results.
17	ES	Executive Summary	ES-8	Debbie Webster	Regarding first paragraph in "Short- and Long-Term Strategies for Salt and Nitrate Management" subsection: Would be great to also include extreme scenario discussion. If it is not included in this report, at least put a footnote here to reference it.	Comment incorporated
18	ES	Executive Summary	ES-8	Glenn Meeks	Regarding first paragraph in "Short- and Long-Term Strategies for Salt and Nitrate Management" subsection: Not really apparent what the short-term and long-term strategies are in the scenarios. The strategies seem to be the same, just modeled for longer time periods	Agree - this concept needs to be clarified. Comment incorporated
19	ES	Executive Summary	ES-8	Debbie Webster	Regarding "Short- and Long-Term Strategies for Salt and Nitrate Management" subsection: Still unsure what baseline means. Is it current loading under existing permit conditions, taking into account historical information? Include a description.	Comment incorporated
20	ES	Executive Summary	ES-8	Debbie Webster	Regarding list of scenarios: Of the three scenarios, I would love to see some type of descriptor, such as W↓ (Increased Irrigation Efficiency), R↑ (Increased Recharge) and N↓(Decreased nitrogen loading) that can be carried to the charts so that you don't have to always refer back to this paragraph to remember each scenario.	Comment incorporated – see inclusion of table below.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
21	ES	Executive Summary	ES-8	Glenn Meeks	Regarding list of scenarios: These are all BMPs. Where is the tie into long-term managed restoration where reasonable and practicable.	The range of scenarios listed here were agreed upon with the AID stakeholders. Pursuant to further direction from CV-SALTS, a new scenario may be developed and evaluated that incorporates one or more of the NIMS treatment BMPs.
22	ES	Executive Summary	ES-11	Debbie Webster	Regarding "Maps of the Volume-weighted Spatial Distribution...Nitrate...5 years...": This timeframe at this size tells me little. Except for the very bottom's dark red, I can't really see any difference. It may be the size. For these sets of figures (next few pages), is there any way to draw these differently so you don't have to take up so much room with the legend and give it to the scenarios instead?	Comment incorporated – new figures inserted.
23	ES	Executive Summary	ES-14	Debbie Webster	Regarding "Maps of the Volume-weighted Spatial Distribution…TDS…100 Years…": Why are we getting such a big TDS load only in that corner of the AID?	It has to do with the pinching out of the alluvial thickness, allowing for more shallow groundwater to reach lower elevations more quickly.
24	ES	Executive Summary	ES-15	Debbie Webster	Regarding "center" in the middle paragraph: Use a different descriptor. I was looking in the center and it looks very similar so I am not sure where you are talking about.	That is because the figures that would show this result are in the main document and not the figure shown above. Text added to clarify.
25	1	Introduction	1	Debbie Webster	First paragraph: I would prefer you use RWP or RW Policy. There are so many policies that are impacting CV-SALTS so as not to confuse them, give them some descriptor	Comment incorporated – all places with "Recycled Water Policy" have been replaced with the "RW Policy"
26	1	Introduction	2	Glenn Meeks	Regarding "overarching goals" in second paragraph: Should be reorganized to align with the top 3 priorities of the CVSALTS/SNMP program.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.
27	1	Introduction	2	Glenn Meeks	First bullet after second paragraph: This seems more SGMA related – CVSALTS goal is to attain sustainable agriculture and industry while still protecting groundwater and surface water with the CVSALTS/SNMP program priorities being: 1. To provide safe drinking water to impacted communities, 2. To reduce current COC (Salt, Nitrate and COECs) loading through use of BMPs, and 3. To implement long-term managed restoration of impacted groundwater areas where reasonable and practicable.	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.
28	1	Introduction	2	Glenn Meeks	First subbullet after second primary bullet: This is the top priority	Since the goals were developed in conjunction with the AID stakeholders, no edits were made to the AID report at this time.

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29	1	Introduction	3	Glenn Meeks	Regarding Section 1.2, Report Organization: AID This needs to include management structure, and the tie-in to the 3 priorities (replacement water, reduction of current loading and support of the long-term strategy [brine line])	The report organization was not modified. However, the document does address the connection between the AID work effort and the CVSALTS goals in Section 1 and the Executive Summary.
30	2	AID Management Zone Characterization	8	Glenn Meeks	Figure 2-4: Figure needs a legend	Comment incorporated
31	2	AID Management Zone Characterization	12	Glenn Meeks	Figure 2-9: Figure needs a legend to explain what the colors mean	Comment incorporated
32	3	Surface Water Characterization	20	Debbie Webster	Figure 3-5: Not sure what type of WDR is shown in the legend.	It is a general category for all/any type of WDR in the region, not just the POTW WDRs, which is why we highlight the key one's in Table 3-2
33	3	Surface Water Characterization	20	Debbie Webster	Table 3-2:	Add "Permitted." Align by decimal point but don't add zeros if the permit only reads as such.
34	4	Groundwater Quality Data Characterization	21	Debbie Webster	Regarding second paragraph in Section 4.1: See comments in Executive Summary regarding EC/TDS conversion.	Comment incorporated; Conversion updated in exec summary. A value of 0.64 was used to convert from EC to TDS. EC x 0.64 = TDS
35	4	Groundwater Quality Data Characterization	23	Debbie Webster	Regarding Figure 4-2 in Section 4.4, Data Gaps: Did you ever look to see how the special variation compared with land use? Were these areas typically developed but not monitored, or was it because the land is/was primarily empty with little potential sources?	LSCE retrieved publicly available data and also confidential data as described in this section. The locations of monitored wells was not cross correlated with land use. Upon evaluation of Figure 4.2 along with land use data - there is no clear, general pattern.
36	5	Methodology to Characterize Historical/ Ambient GW Quality, Assimilative Capacity & Long-Term Trends for the Archetype Area ("Methodology")	26	Debbie Webster	Regarding Table 5-1: What was the thinking for less than <100 m. This seems to require a high level of precision, especially for older data and when parcels were larger. On the spatial distribution, it seems as if both methodologies together can give you a picture of how reliable the data may be. That may need to be taken with well types, etc. to get you a true picture of data gaps.	Modern GPS units commonly have accuracies in the 5-20m range. Older data certainly has its inaccuracies, location of the well especially. It was thought that 100m was pretty generous in considering a location to be "accurate". It all comes down to the scale of the analysis really. For regional analyses, a larger margin of error may be permissible for groundwater quality data. However, for field scale analyses, a margin of error of less than 100m would certainly be necessary. We figured that 100m represented a good level of accuracy to be classified as "accurate" for SNMP work at the subbasin scale.
37	5	Methodology	26	Thomas Harter	Regarding Table 5-1: Methodology Options -Unclear why it needs to have all those rows or what the different characteristics are of those rows. Omit?	This Matrix bears a direct relationship with the Methodology Appendix in the Preliminary Draft SNMP. It is our recommendation that we show the entire Matrix in this report as well.
38	5	Methodology	27	Thomas Harter	Regarding Table 5-2: Only repeats the previous table. Delete.	We recommend that this portion of the table is kept in this section for ease of reference related to the discussion.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
39	5	Methodology	28	Debbie Webster	Regarding charts in Section 5.1.3.1, Historical Data: The issue that I have with the charts is that the "number of wells with Nitrate/TDS tests available seems to drop precipitously without explanation. Need to explain why. I doubt that sampling has just stopped.	Agreed. Text has been updated to reflect this. It is likely a function of the delay from when the wells are sampled and when this data is available in databases. It is likely not a result of reduced sampling
40	5	Methodology	32	Glenn Meeks	Figure 5-4: Where is the Corcoran Clay? How did we treat the data from within the area where the Corcoran Clay is present?	For the purposes of the AID Report we recommend keeping this figure. The Corcoran Clay is discussed at length within the High Resolution Mapping work effort.
41	5	Methodology	34	Debbie Webster	Figure 5-7: Are these mile grids?	Yes
42	5	Methodology	37	Glenn Meeks	Figure 5-12: What about where the Corcoran Clay is present?	The Corcoran Clay occurs over a very small portion of the far southwestern AID area.
43	5	Methodology	40	Glenn Meeks	Figure 5-17: What if we use a buffer and not the MCL?	Per direction from CVSALTS – the AID Report uses the WQOs. No modification necessary.
44	5	Methodology	45	Glenn Meeks	Figure 5-25: We shouldn't be using water quality beneath the Corcoran Clay unless there is definite connectivity between the Upper Zone and the zone beneath the Corcoran Clay.	For the purposes of the AID Archetype and the regulatory construct that was being considered – the three zones were evaluated – Upper, Lower, and Production. Characterization of the ambient water quality of the Lower Zone was important as it relates to baseline conditions represented in the groundwater model for deeper layers. Therefore, at times the water quality beneath the Corcoran Clay was used.
45	6	Land Cover & Other Data for Developing Mass Loading Estimates	51	Glenn Meeks	Regarding last bullet in section: What about the coalition Nitrogen Management Plans?	As the SNMPs are developed it will make sense to utilize the best information that is available at the time, which may include the Nitrogen Management Plans or others.
46	7	Archetype Area Model	52	Thomas Harter	Figure 7-1: Colored areas are the CVHM water balance subregions? Add legend or text. Also a legend for the larger black box that is not AID (groundwater model boundary). Where is the "AID modeled boundary" relative to all that?	Comment incorporated - legend added.
47	7	Archetype Area Model	53	Thomas Harter	Regarding first bullet in four bullet series before Section 7.2: In Appendix C, the computed water budget shows a 10 – 20% imbalance between inputs and outputs. How is that addressed? Even if the difference between inflows and outflows was "small" in CVHM from 1991 -2000, it must be zero for the steady state model. How is that achieved? Best would be to show the water balance that is used as the starting point, and then also show the steady-state water balance assumed for the transport model.	Good comment – the model area itself was mostly in balance during this time period according to CVHM, but that does not mean that all cells or subareas within that greater area were also in balance. There were slight imbalances from water moving in or out of particular areas within the Model Boundary, and one of those areas was the AID boundary as shown later in the document. The steady state model is allowed to balance the inflows and outflows via the general head boundaries on the north, west, and southern boundaries.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
48	7	Archetype Area Model	54	Debbie Webster	Section 7.2.2.2 Well Construction: Can you explain then why we used 200 feet as the cutoff between shallow and deep?	Section 5.1.4 explains why 200 ft was used to delineate the upper part of the aquifer system for the archetype work. This sub section is in reference to the prior IGSM model documentation.
49	7	Archetype Area Model	61	Debbie Webster	Section 7.3.1, Extracting CVH Model Cells to the AID Model: Can these be brought back to consolidated with other models in the future?	Yes
50	7	Archetype Area Model	64	Thomas Harter	Section 7.3.6, Refining Stream Package: Explanation missing on the procedure used to match inflows exactly to outflows in the steady-state flow model. This may have involved fixing some heads and letting some stream boundaries take whatever water needed to be balanced via the simulation. Fluxes should therefore be compared in the calibration and not only heads.	Stream leakage was not the most major component of contribution for flow in this model, but the values of the steady state model were similar to what was measured in CVHM during the same time period. The AID MZ Model was able to balance the inflows and outflows more using the general head boundaries.
51	8	Strategies for Salt and Nitrate Management	70	Thomas Harter	Regarding first subbullet, "Dairy General Order" under "Nitrogen Loading" bullet: N and salt application crop uptake values are not shown anywhere, for either nitrate or salt. Should be documented. Also, it is not clear what the baseline scenario is versus the Scenario 2: Baseline is prior to the dairy order? Scenario 2 is with the dairy order? If so, what is different under Scenario 2, i.e., what does this scenario 2 assume about N and salt application rates and how does that translate into more or less cows in AID, or about the fate of manure? More export? Please document. The handling of salt and nitrogen fluxes from dairies will be the most critical piece for most local SNMPs in the Central Valley. This archetype should be very explicit in how it accounts for animal N and salt from dairies (or other CAFOs).	A summary table of key inputs and outputs has been added to Appendix B. The dairy salt and N assumptions are conservative (probably high).
52	8	Strategies for Salt and Nitrate Management	70	Glenn Meeks	Regarding second sentence in second subbullet, "Irrigated Lands Regulatory Program" under "Nitrogen Loading" bullet: Should be able to get this from the Coalitions from the NMPs.	As the SNMPs are developed it will make sense to utilize the best information that is available at the time, which may include the Nitrogen Management Plans or others.
53	8	Strategies for Salt and Nitrate Management	71	Thomas Harter	Section 8.1.2, second paragraph: This is not clear. What do you mean by “10 year loading?” . After 10 years, all farming disappears? After 10 years, the baseline reverts to Scenario 1? ……??? I also do not understand the rationale for these two additional scenarios	Comment incorporated – additional text added to help describe the purpose of the additional two runs

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54	8	Strategies for Salt and Nitrate Management	73	Thomas Harter	Figure 8-2: Add a figure that illustrates the scenario loading specifically for dairies.	A summary table of key inputs and outputs has been added to Appendix B. The dairy salt and N assumptions are conservative (probably high).
55	8	Strategies for Salt and Nitrate Management	81	Glenn Meeks	Table 8-3: These are based on a 20% reduction in nitrogen loading and nitrate concentrations still increase over a 100 year time span? Shouldn't we be recommending additional measures to reach improved water quality?	Three modeling scenarios were run to see what the response in ambient groundwater quality would be to a range of controls that may be implemented. The fourth modeling scenario was run to see that the response in ambient groundwater would be to an extreme "bookend" case where there would not be any agriculture. While the scenarios are extremely helpful in determining what can reasonably be achieved, there were a limited number that were run. CVSALTS may consider running another scenario that would include additional treatment controls from the NIMS Report.
56	8	Strategies for Salt and Nitrate Management	83	Glenn Meeks	Table 8-4: Same comment as above (previous comment) – concentrations continuing to increase – no additional measures proposed to improve water quality?	Three modeling scenarios were run to see what the response in ambient groundwater quality would be to a range of controls that may be implemented. The fourth modeling scenario was run to see that the response in ambient groundwater would be to an extreme "bookend" case where there would not be any agriculture. While the scenarios are extremely helpful in determining what can reasonably be achieved, there were a limited number that were run. CVSALTS may consider running another scenario that would include additional treatment controls from the NIMS Report.
57	8	Strategies for Salt and Nitrate Management	86	Glenn Meeks	Same comment as above – Nitrate concentration continues to increase and no additional measures proposed to improve water quality.	Three modeling scenarios were run to see what the response in ambient groundwater quality would be to a range of controls that may be implemented. The fourth modeling scenario was run to see that the response in ambient groundwater would be to an extreme "bookend" case where there would not be any agriculture. While the scenarios are extremely helpful in determining what can reasonably be achieved, there were a limited number that were run. CVSALTS may consider running another scenario that would include additional treatment controls from the NIMS Report.

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58	8	Strategies for Salt and Nitrate Management	89	Glenn Meeks	Same comment as above	Three modeling scenarios were run to see what the response in ambient groundwater quality would be to a range of controls that may be implemented. The fourth modeling scenario was run to see that the response in ambient groundwater would be to an extreme "bookend" case where there would not be any agriculture. While the scenarios are extremely helpful in determining what can reasonably be achieved, there were a limited number that were run. CVSALTS may consider running another scenario that would include additional treatment controls from the NIMS Report.
59	9	Lessons Learned and Recommendations	100	Debbie Webster	Section 9.2, Boundary Delineation: I think it would be appropriate to include a lesson learned from Alta on the boundaries. As you say below, the assessment went outside Alta's boundaries, but there was an issue showing the trends outside AID. This is something that is worthwhile discussing in this section. Regulatory decisions made outside the boundary could impact the trends and qualities, but may or may not be included in the assessment. Ideally, this issue would have been dealt with upfront, but there will be times when the politics or regulatory pushes result differently.	Comment incorporated – see footnote 32
60	9	Lessons Learned and Recommendations	101	Debbie Webster	Section 9.3.1, third paragraph: Is there a conclusion here? Did these turn out to be reasonable assumptions given the limited data? Is this approach valid in the absence of true data? Did people feel confident enough to make regulatory decisions?	Comment incorporated
61	9	Lessons Learned and Recommendations	102	Debbie Webster	Section 9.3.1, fourth paragraph: Not surprising, especially given that older data would not have been in electronic form easily transferred into a database	Comment noted
62	9	Lessons Learned and Recommendations	102	Debbie Webster	Item 3 in first list of three items in Section 9.3.1: With the limited data, did people feel as though they could move forward. Can data collection be phased in?	There are approaches for assessing trends and ambient groundwater quality for varying degrees of data sufficiency
63	9	Lessons Learned and Recommendations	102	Debbie Webster	Item 3 in second list of three items in Section 9.3.1 (before Section 9.3.2): Did you find that there were areas where your level of confidence varied? Was there areas where there was concern that nitrate or TDS may be high but the data was limited or non-existent?	The availability of data certainly plays into how confident one can be regarding the results, especially when interpolating over large distances. For this reason, we provided the locations of the wells on the interpolation figures to show the reader where data may have been abundant and where the data may have been scarce.
64	9	Lessons Learned and Recommendations	103	Debbie Webster	Section 9.3.2, regarding list of five items: How important is this if the area or suspected sources is not ag dominated?	Land use is not limited to agriculture – industrial and domestic/residential land uses, golf courses, etc. all have important implications for mass loading.

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
65	9	Lessons Learned and Recommendations	103	Thomas Harter	Section 9.4.1, next to last sentence in second paragraph in section: Excellent point!	Comment noted
66	9	Lessons Learned and Recommendations	103	Debbie Webster	Section 9.4.1, first item in list of six items: Was the model able to take into account if the ag water was recycled/used several times from one field to the next?	According to AID, this is uncommon in the project area. Irrigation assumptions provided in Appendix B: • Groundwater quality used to irrigate (Figure B-12) varies from TDS below 250 mg/L (mostly west of AID) to over 650 mg/L (mostly in the south and east of AID). This parameter affects the salinity of irrigation water in a linear fashion due to a) the assumed 50% blend of groundwater and surface water, and b) a uniform assumption of surface water TDS (55 mg/L).
67	9	Lessons Learned and Recommendations	104	Thomas Harter	Section 9.4.1, last item in list of six items: add a bullet to describe efforts needed to understand fate of N and salt from dairies and incorporate those into the modeling and policy evaluation efforts	A summary table of key inputs and outputs has been added to Appendix B. The dairy salt and N assumptions are conservative (probably high).
68	9	Lessons Learned and Recommendations	105	Glenn Meeks	Regarding Section 9.5: We should be looking at management practices that are going to improve water quality for a management zone, not just modeling practices that don't seem to make much of a difference than if nothing at all was done	Three modeling scenarios were run to see what the response in ambient groundwater quality would be to a range of controls that may be implemented. The fourth modeling scenario was run to see that the response in ambient groundwater would be to an extreme "bookend" case where there would not be any agriculture. While the scenarios are extremely helpful in determining what can reasonably be achieved, there were a limited number that were run. CVSALTS may consider running another scenario that would include additional treatment controls from the NIMS Report.
69	9	Lessons Learned and Recommendations	106	Debbie Webster	Section 9.6, regarding "GSP" in item three in list of six items: How much in this case does fracking play a role?	The impact of fracking was not analyzed for this effort.
70	9	Lessons Learned and Recommendations	107	Thomas Harter	Section 9.7, regarding "legacy conditions in some areas of the Central Valley" in second paragraph: It is not true that this is entirely a legacy condition. The scenarios chosen would eventually become a legacy of their own, if groundwater quality was completely clean. See Figures 8-6 and 8-8.	Comment noted
71	9	Lessons Learned and Recommendations	107	Thomas Harter	Section 9.7, regarding "legacy conditions in some areas of the Central Valley" in second paragraph: How can the regulatory framework adapt to the proposal of such scenarios under the 1968 Antidegradation Policy?	This is being considered as a part of the CVSALTS Executive Committee
72	9	Lessons Learned and Recommendations	107	Thomas Harter	Section 9.7, regarding "legacy conditions in some areas of the Central Valley" in second paragraph: Some will argue, using the results in Section 8, that the proposed scenarios are replacing a bad legacy with a better, but still bad legacy	Comment noted

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73	9	Lessons Learned and Recommendations	107	Thomas Harter	Section 9.7, regarding "legacy conditions in some areas of the Central Valley" in second paragraph: Can this modeling approach be also used to identify the characteristics of Scenarios that would need to be “invented” that lead to meeting water quality goals set out in the RWB 5 basin plan?	Yes, but that was not the approach CV-SALTS commissioned
74	Appx B	Surface Load Modeling with SWAT	B-2	Thomas Harter	Table B-1: HYDRUS is capable of many of the situations indicated here as missing. The following rows in that column should have a check: soil microbial processes, organic matter, soil temperature, irrigation water quality, type of fertilizer, application method, snowmelt	Table updated
75	Appx B	Surface Load Modeling with SWAT	B-3	Thomas Harter	General: Prof. Minghua Zhang’s research group has published papers applying SWAT to the Sacramento Valley and to the San Joaquin Valley, so this is not the first use of SWAT in the Central Valley. Some examples from Google Scholar – there are more: *Watershed modelling of hydrology and water quality in the Sacramento River watershed* , California. DL Ficklin, Y Luo, M Zhang - Hydrological Processes, 2013 - Wiley Online Library Abstract; Agricultural pollutant runoff is a major source of water contamination in California's Sacramento River watershed where 8500 km 2 of agricultural land influences water quality. The Soil and Water Assessment Tool (SWAT) hydrology, sediment, nitrate and pesticide ... *Climate change sensitivity assessment of a highly agricultural watershed using SWAT* . DL Ficklin, Y Luo, E Luedeling, M Zhang - Journal of Hydrology, 2009 - Elsevier. Quantifying the hydrological response to an increased atmospheric CO_2 concentration and climate change is critical for the proper management of water resources within agricultural systems. This study modeled the hydrological responses to variations of atmospheric CO_2 ... Dynamic modeling of organophosphate pesticide load in surface water in the northern San Joaquin Valley watershed of California. Y Luo, X Zhang, X Liu, D Ficklin, M Zhang - Environmental Pollution, 2008 - Elsevier. The hydrology, sediment, and pesticide transport components of the Soil and Water Assessment Tool (SWAT) were evaluated on the northern San Joaquin Valley watershed of California. The Nash–Sutcliffe coefficients for monthly stream flow and sediment load ...	Wording modified to "one of the first", and added references.
76	Appx B	Surface Load Modeling with SWAT	B-3	Thomas Harter	Regarding phrase "edge effects" in next to last paragraph: Briefly explain "edge effects" in this context.	Explanatory footnote added

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77	Appx B	Surface Load Modeling with SWAT	B-7	Thomas Harter	Last sentence in last paragraph before Section B.1: To surface water or also to groundwater?	Yes, both surface & groundwater. SWAT runs vertical and horizontal hydrology for all HRUs. Comment incorporated.
78	Appx B	Surface Load Modeling with SWAT	B-10	Thomas Harter	Section B.1.1, regarding "dairy manure applications" in second paragraph: How was dairy manure application computed, in terms of N and in terms of salts?	Notes from Till Angermann - neither Harter and Menke (2005) nor our Scenario 1 are specific to the archetype model domain. All numbers are on a field-scale, for manured fields, in lbs/ac/yr for a corn/cereal rotation. Pre-order conditions after Harter and Menke (2005): Input=1070 (mainly from liquid manure); Harvest=500; Volatilization=0-100 (assume 5% of fertilizer input for this exercise = 53); Leach=517. Scenario 1: Input=900 (mainly from liquid manure; proportionally less synthetic fertilizer); Harvest=530 (assume slight increase in yields); Volatilization=0-100 (assume 5% of fertilizer input for this exercise = 44; Leach=326. This scenario may reflect what is happening on a majority of dairies trying to comply with the GO. It is based on a 1.7 AR ratio. Our Scenario 1 is also based on the assumption that it will continue to be best for dairy farmers to get the most out of their manure on their farm before they export any due to potential savings on synthetic fertilizer (SF) purchases. It may turn out that getting closer to the RB requirement of 1.4 will require a higher proportional input of SF. In some cases, this may mean to export what you previously used (very frustrating) or extending pipeline to fields not previously reached by your liquid manure stream (not possibly for every dairyman).

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79	Appx B	Surface Load Modeling with SWAT	B-12	Thomas Harter	Section B.1.1, regarding "dairy manure applications" in second paragraph: How was dairy manure application computed, in terms of N and in terms of salts?	Continued from previous comment: Remember, the 1.4-1.65 from "Managing Dairy Manure in the CV of CA" assumes that the farmer has conveyance infrastructure and controls in place that let him deliver irrigation water and manure nutrients to his fields at the rate and time they are needed. That is not always the case at the present time. Salt: Salt leaching was calculated based on application of 0.7 ft liquor depth (TDS=3000 mg/L) and irrigation water TDS=500 mg/L; 4 ft irrigation depth (Pre Dairy Order), 3 ft irrigation depth (Scenario 1). It was assumed that 10% of the applied salt will be taken up by the plants (that includes ammonia and nitrate). Pre-Order: Input=11,152; Leach=10,037 Scenario 1: Input=9,792; Leach=8,813
80	Appx C	Volume & Mass Water Budget Approach & Transport Simulations of Salt & Nitrate	C-6	Thomas Harter	Regarding Figure C-1: What time period is reflected here? Is this the average for 1991 - 2000?	Yes - comment incorporated
81	Appx C	Volume & Mass Water Budget Approach & Transport Simulations of Salt & Nitrate	C-6	Thomas Harter	Regarding Figure C-1: Water Flux - More water is going out than in – indicating overdraft and decreasing groundwater storage, which is consistent with water levels declining, but inconsistent with the steady-state analysis (how is it related to that?).	There are overall steady state conditions within the greater AID MZ model area, but within AID proper, there are more outs than ins.
82	Appx C	Volume & Mass Water Budget Approach & Transport Simulations of Salt & Nitrate	C-6	Thomas Harter	Regarding Figure C-1: Nitrate and Salt Fluxes: How much is from crops vs. dairy vs. POTW?	A summary table of key inputs and outputs has been added to Appendix B. The dairy salt and N assumptions are conservative (probably high).
83	Appx C	Volume & Mass Water Budget Approach & Transport Simulations of Salt & Nitrate	C-32	Thomas Harter	Regarding, "The difference maps are grouped according to constituent and groundwater zone", in first paragraph in Section C.2.4: Excellent idea!	Thank you - comment noted

Comment No.	Section No.	Original Section Title	Original Page Number	Commenter	Comment	Response
84	Appx D	Transport Model Results	D-1	Thomas Harter	Regarding last sentence in third paragraph: Section C showed that the water balance for 1991 – 2000 was out of balance. How was a steady-state flow model created from that imbalance? In a steady-state flow model, by definition, inflows and outflows are exactly identical. Please briefly explain here. It may already be explained elsewhere in the report, in which case you may also refer to that section here	The flow model is indeed a steady-state model, which balances the in's and out's mainly through the general head boundaries on the north, west, and south sides of the model. Within the model itself, there are areas where more water enters or exits, based on the local stresses