

Santa Ana River Wasteload Allocation Model Update

BASIN MONITORING PROGRAM TASK FORCE

November 14, 2018



11/14/2018



Updated Responses to Comments on Draft TM No. 3

Summary of Comments for Draft TM No. 3 - WLAM Predictive Scenario Runs (30-Oct-18 Task Force Meeting)

Source	No Action Necessary	Minor Edit	Additional Explanation or Table/ Figure	Need to Discuss with the Task Force	Total No. of Comments
	Corresponding Comment Number				
City of Corona	-	G-1-1, G-1-2, and G-6	1, 3, G-2-1, G-3, G-4, and G5	2 and G-2-2	11
EVMWD	-	4	1, 2, and 3	-	4
IEUA/CBWM	2c, 4a, and 7	G-2, 5, and 8	G-1, 1, 2a, 3, 4b, 4c, 4d and 6	2b	15
OCWD	-	3, 6, 7, 9, 12, 17, 18, and 19	2, 4 and 5	1, 8, 10, 11, 13, 14, 15 and 16	19
Total					49

Summary of Comments for Draft TM No. 3 - WLAM Predictive Scenario Runs (Updated 14-Nov-18)

Source	No Action Necessary	Minor Edit	Additional Explanation or Table/ Figure	Additional Analysis or Model Runs	Total No. of Comments
	Corresponding Comment Number				
City of Corona	-	G-1-1, G-1-2, and G-6	1, 3, G-2-1, G-3, G-4, and G-5	2 and G-2-2	11
EVMWD	-	4	1 and 3	2	4
IEUA/CBWM	2c, 4a, and 7	G-2, 5, and 8	G-1, 2a, 3, 4b, 4c, 4d, and 6	1 and 2b	15
OCWD	-	3, 6, 7, 9, 12, 17, 18, and 19	2, 4, 5, 8, and 10	1, 11, 13, 14, 15 and 16	19
Risk Sciences				1, 2, 3, 4, 5, and 6	6
Total					55

Comments on Draft TM No. 3 from City of Corona – Comment No. 2

No.	Section	Pg.	Comment	GEOSCIENCE Response
2	2.4.1.2	12	TDS and TIN for Recycled Water Discharges In the last WLAM update effort (Scenario 8), the TDS concentration in Plant 1 effluent was varied over the year to simulate higher summer-time TDS concentrations (>700 mg/L) and lower winter-time TDS concentrations (<700 mg/L). The purpose was to simulate the typical variability in TDS concentration in the Plant 1 effluent to more accurately evaluate compliance with the Reach 3 TDS objective. Why wasn't the variability in TDS concentration for Plant 1 effluent used in this WLAM update?	At the suggestion of the Task Force, the same approach used for the 2008 WLAM for Corona discharge will be used in the 2017 WLAM HSPF scenarios. Summer (May to November) discharge will be simulated with a TDS concentration of 725 mg/L while winter (December to April) discharge will be simulated with a TDS concentration of 665 mg/L, such that the average TDS concentration of Corona effluent will be equal to the permitted limit of 700 mg/L.

Comments on Draft TM No. 3 from City of Corona – Comment No. G-2-2

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-2-2	2.3.2	9	This section also states that the estimates for future stormwater diversions in the WLAM scenarios are based on historical stormwater diversion data. Is it correct to use historical diversion data as an estimate for future diversions, considering that recent facility improvements have been made to increase stormwater diversions for recharge?	Due to basin modifications and increased stormwater capture, future stormwater capture is likely higher than that which occurred during historical conditions. Therefore, stormwater capture assumptions will be updated for the revised model runs. Future projections for stormwater capture in Chino Basin have already been received from Chino Basin Watermaster (CBWM) and will be used in the revised runs.

Comments on Draft TM No. 3 from EVMWD – Comment No. 2

No.	Section	Pg.	Comment	GEOSCIENCE Response
2	2.3.1.2.4	8	It is not clear whether WLAM considers Lake Elsinore discharges into Temescal Creek as shown on Table 4-6, WEI 2009. These discharges need to be included and mentioned in this section.	GEOSCIENCE will rerun the model scenarios to include the spills from Lake Elsinore.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 1

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	2.3.1.2.4	8	<p>EVMWD Regional WTP/Lake Elsinore Assumptions</p> <p>This section describes a methodology to simulate EVMWD discharges from the Regional WTP during Lake Elsinore Outflow periods. The methodology used to simulate Lake Elsinore outflows and its TDS/N is different than what has been done in the prior WLA analysis. The new HSPF model does not account for Lake Elsinore Outflows. Instead, assumptions about when Lake Elsinore is full are made and then it considers that during these times EVWMD discharges at full capacity.</p> <ul style="list-style-type: none"> • This method may likely underestimate the flow in Temescal Creek (and thus inflow to Prado) when Lake Elsinore is discharging. The Table 4-6 of the 2008 WLAM report shows that during these periods outflow ranges from about 6,100 afy to 48,000 afy. 	<p>Per the Task Force, GEOSCIENCE will work with CDM Smith and Dr. Anderson from University of California, Riverside (UCR) to develop flow and water quality assumptions for spill from Lake Elsinore for the hydrologic period from Water Year 1950 through 2016, based on their modeling work in support of the Lake Elsinore & Canyon Lake (LECL) Total Maximum Daily Load (TMDL) revision.</p>

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 1 (Cont.)

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	2.3.1.2.4	8	<ul style="list-style-type: none">• This method likely over-estimates the TDS and TIN of flow in Temescal Creek (and thus the TDS/TIN inflow to Prado), by excluding the Lake outflows and assuming the flow is dominated by EVMWD discharges that are assumed to be 700 and 10 mgl, respectively. Table 4-6 of the 2008 WLAM report shows that during these periods Lake outflow, TDS ranges from about 441 mgl to 674 mgl; and TIN is about 1 mgl.• Some of the Lake outflows occur over long periods of time and through the month of August, when compliance with the Reach 3 SAR objective is assessed.	

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 1 (Cont.)

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	2.3.1.2.4	8	<p>The methodology used to determine periods of outflow from Lake Elsinore post 1999 requires modeling expertise review. The report states that it is based on historic discharges from the Regional WTP to Temescal Creek and includes a 2.5-year period of maximum discharge from January 2005 through June 2007, which is significantly longer than any of the periods from 1969 to 1993, which included some of the wettest periods in the historical record. If used, EVMWD should confirm that the maximum discharge over this period was solely related to lake levels and not the timing of its permitting for full-scale operation of its recycled water discharge program to supplement the Lake levels.</p> <ul style="list-style-type: none">• Please expand to explain why the previously used methodology should be changed to this new methodology and obtain concurrence from the BMPTF.	

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 2b

No.	Section	Pg.	Comment	GEOSCIENCE Response
2b	2.3.2	9	Recommend that stormwater discharge time series be calculated based on future land use and stormwater management conditions for watersheds tributary to each recharge facility and the diversions calculated in the 2017 WLAM HSPF directly based on actual stormwater diversion facilities be used instead of the method described here using historical diversion data. Future stormwater diversions are far greater than historical diversion due to land use changes, and do not resemble past diversions. This will make it consistent with past WLA investigations and will remove the impact that changes in land use would have made on this data.	Due to basin modifications and increased stormwater capture, future stormwater capture is likely higher than that which occurred during historical conditions. Therefore, stormwater capture assumptions will be updated for the revised model runs. Future projections for stormwater capture in Chino Basin have already been received from Chino Basin Watermaster (CBWM) and will be used in the revised runs.

Comments on Draft TM No. 3 from OCWD – Comment No. 1

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	2.3.1.3	9	In recent years, there has been little if any discharge to surface water from the Arlington desalter – recommend that there be consideration to setting this discharge to zero.	Discharge from the Arlington Desalter cannot resume in the future if it is not accounted for in the WLAM scenarios. As such, Western Municipal Water District (Western) has requested that discharges continue to be included in the scenario assumptions. The exact discharge values for the revised runs will be verified with Western.

Comments on Draft TM No. 3 from OCWD – Comment No. 8

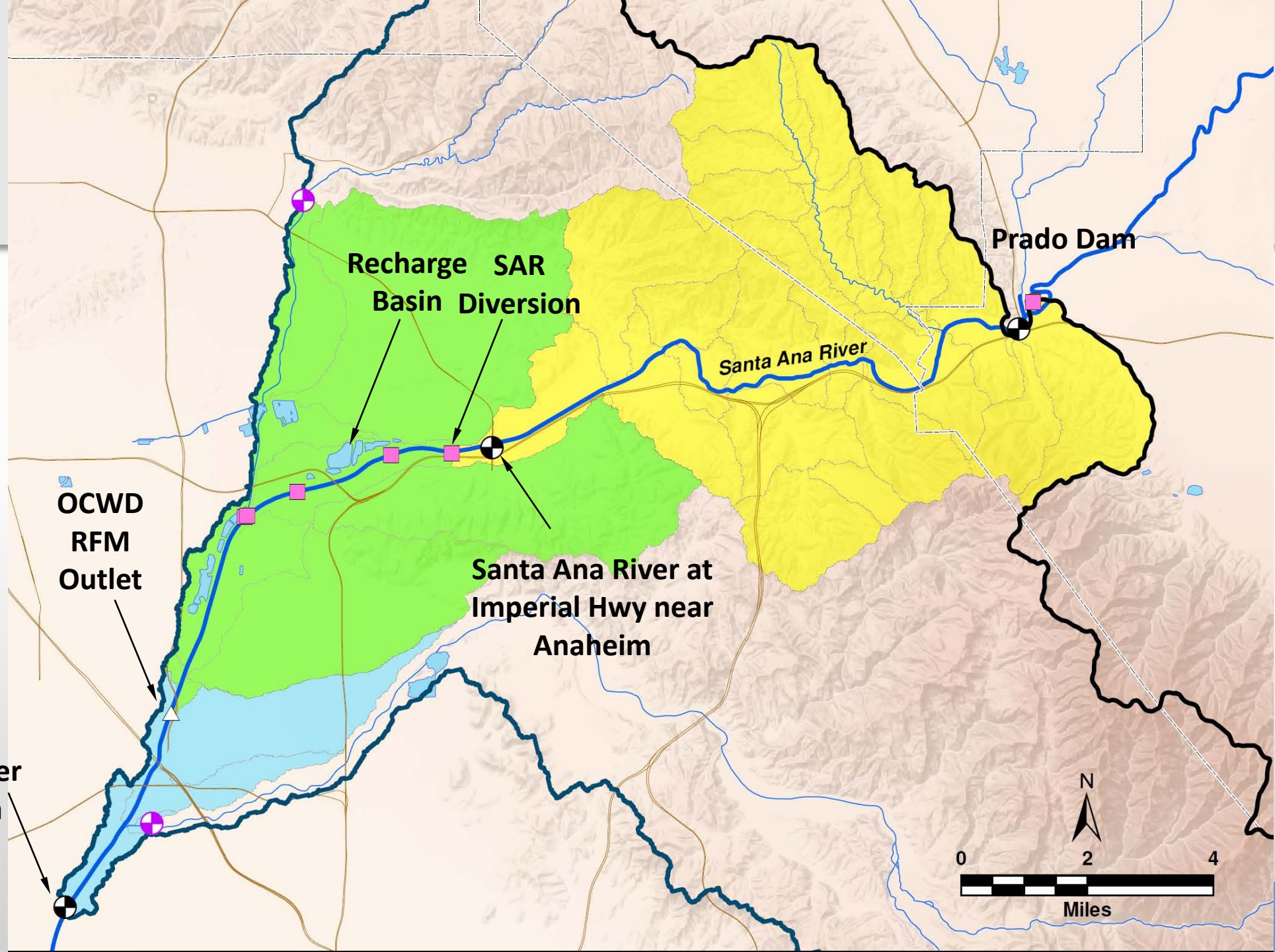
No.	Section	Pg.	Comment	GEOSCIENCE Response
8	3.1.7	22	The draft memo says “The Basin Plan Amendment to adopt the Salt and Nutrient Management Plan for the Upper Temescal Valley GMZ is expected to be approved by 2020. Nevertheless, the 2017 WLAM HSPF was used to evaluate the impact and the compliance of streamflow and groundwater recharge with the proposed TDS and TIN.” The Task Force should discuss if this is acceptable; it may be necessary to evaluate the WLA model results with the adopted water quality objectives and the proposed objectives.	The Upper Temescal Valley GMZ represents a new GMZ that has no current water quality objectives . Therefore, the proposed objectives will continue to be used per the suggestion of the Regional Board and Task Force.

Comments on Draft TM No. 3 from OCWD – Comment No. 10

No.	Section	Pg.	Comment	GEOSCIENCE Response
10	Table 3-8	24	It is not clear if footnote 1 in this table is correct; this should be discussed by the Task Force	Risk Sciences will provide clarification to GEOSCIENCE to be included in the Draft Final Report.

HSPF and OCWD Recharge Facilities Model (RFM)

Santa Ana River
At Santa Ana



Comments on Draft TM No. 3 from OCWD – Comment No. 11

No.	Section	Pg.	Comment	GEOSCIENCE Response
11	Table 3-9	25	The estimated maximum TDS concentration for recharge into the OC Groundwater Management Zone shown in Table 3-9 need further evaluation given how the estimated maximum concentrations listed are significantly lower than average concentrations historically observed in SAR Reach 2. OCWD will need to review these values in additional detail with Geoscience Support Services and the Task Force before we are ready for these results to be used in the wasteload allocation process.	Currently, the 2017 WLAM HSPF scenarios do not account for streambed percolation in the Orange County Groundwater Management Zone (GMZ) except for the stretch from the outflow of OCWD's Recharge Facilities Model (RFM) to the Santa Ana River at Santa Ana streamflow gage. Percolation along this stretch of the Santa Ana River will be accounted for in the revised scenario runs to help ensure that the model results reflect observed water quality at the Imperial Highway gage and are not biased by the high quality stormwater that influences streamflow below the RFM outflow location.

Comments on Draft TM No. 3 from OCWD – Comment No. 13

No.	Section	Pg.	Comment	GEOSCIENCE Response
13	3.2.1	27	Please provide additional details regarding which section of the SAR is utilized in the calculated concentrations shown in Table 3-10. In general terms, the section of the SAR in Orange County that should be utilized in calculating SAR recharge into the Orange County Management Zone should have its upstream point near or just downstream of OCWD's Imperial Highway Inflatable Dam (diversion point near Imperial Highway). We should discuss further regarding the appropriate downstream location of the section, given the lack of water quality data to calibrate the model at the downstream end of the recharge section of the SAR in Orange County (near Santa Ana).	See responses to OCWD's Comment No. 11.

Comments on Draft TM No. 3 from OCWD – Comment No. 14

No.	Section	Pg.	Comment	GEOSCIENCE Response
14	3.2.1	27	Please provide additional details regarding how OCWD's RFM was utilized in the calculations used to generate estimated concentrations shown in Table 3-10.	GEOSCIENCE will update the calculation per the responses to OCWD's Comment No. 11.

Comments on Draft TM No. 3 from OCWD – Comment No. 15

No.	Section	Pg.	Comment	GEOSCIENCE Response
15	3.2.1	27	We recommend that Geoscience Support Services and the Task Force discuss whether just the SAR or the SAR and other recharge basins that receive SAR water be accounted for in Section 3.2.1 and Table 3-10.	Per the Task Force, recharge basins that receive SAR water will not be accounted for.

Comments on Draft TM No. 3 from OCWD – Comment No. 16

No.	Section	Pg.	Comment	GEOSCIENCE Response
16	Table 3-10	27	The estimated TDS concentration for SAR Reach 2 shown in Table 3-10 need further evaluation given that the estimated maximum concentrations listed are significantly lower than average concentrations historically observed in SAR Reach 2. OCWD will need to review these values in additional detail with Geoscience Support Services and the Task Force before we are ready for these results to be used in the wasteload allocation process.	See responses to OCWD's Comment No. 11.

Comments on Draft TM No. 3 from Risk Sciences – Comment No. 1

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	-	-	The scenario I am most interested in adding is one where we evaluate Santa Ana River Reaches 3 and 4 (above Riverside-A) without the proposed new discharges by the City of Riverside to this zone. I am trying to figure out how much of the projected degradation shown in your previous model run is due to this new source of N & TDS in this particular reach.	Sensitivity runs and/or mass balance analyses will be conducted to address this comment.

Comments on Draft TM No. 3 from Risk Sciences – Comment No. 2

No.	Section	Pg.	Comment	GEOSCIENCE Response
2	-	-	Since the vast majority of POTW discharges to Reach 3 and 4 have TDS limits <650 mg/L, and everybody is meeting these limits, it is hard to understand why we are busting the 700 mg/L water quality objective in August. Is there some scenario we can run that will help us figure out what the unknown source of TDS is that is causing the problem?	Sensitivity runs and/or mass balance analyses will be conducted to address this comment.

Comments on Draft TM No. 3 from Risk Sciences – Comment No. 3

No.	Section	Pg.	Comment	GEOSCIENCE Response
3	-	-	We need to make sure that the results shown for SAR-Reach 3 at the Prado Basin, and for SAR-Reach 3 below Prado Dam, and for SAR-Reach 2 overlying OCGMZ are relatively consistent with each other or that we explain why they appear to differ so significantly from one another. This one is hugely important because we appear to be busting the August-Only objective for TDS at the dam.	Currently, the 2017 WLAM HSPF scenarios do not account for streambed percolation in the Orange County Groundwater Management Zone (GMZ) except for the stretch from the outflow of OCWD's Recharge Facilities Model (RFM) to the Santa Ana River at Santa Ana streamflow gage. Percolation along this stretch of the Santa Ana River will be accounted for in the revised scenario runs to help ensure that the model results reflect observed water quality at the Imperial Highway gage and are not biased by the high quality stormwater that influences streamflow below the RFM outflow location.

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Comments on Draft TM No. 3 from Risk Sciences – Comment No. 4

No.	Section	Pg.	Comment	GEOSCIENCE Response
4	-	-	We need to understand what is driving the slight degradation to San Timoteo-Reach 1 above the Bunker Hill-B GMZ in Scenario A. To my knowledge the only existing permitted discharge in this area is the geothermal discharge. Is this somehow related to Sterling's proposed discharge? The degradation is relatively minor. But, as a legal technicality, the Board may need to authorize a small allocation of assimilative capacity.	Sensitivity runs and/or mass balance analyses will be conducted to address this comment.

Comments on Draft TM No. 3 from Risk Sciences – Comment No. 5

No.	Section	Pg.	Comment	GEOSCIENCE Response
5	-	-	Cumulative Frequency Distribution graphs would be a huge help in interpreting the results. I think we need two graphs for each of the six scenarios - one for TDS and one for TIN. Each graph would show cumulative probability on the X-axis and concentration on the Y-axis. The 1-year, 5-year, 10-year and 20-year data output would be shown by different lines on the same graph. Might also be a good idea to had horizontal lines to indicate the applicable water quality objective, current ambient quality and the 67-year average to each graph as well.	Cumulative frequency distribution graphs will be prepared and included in the Draft Study Report.
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Comments on Draft TM No. 3 from Risk Sciences – Comment No. 6

No.	Section	Pg.	Comment	GEOSCIENCE Response
6	-	-	Need to make sure we have accurately account for diversions of dry weather runoff to off-channel percolation basins by the San Bernardino County Flood Control District in the eastern side of the watershed (outside of IEUA's service area).	The revised 2017 WLAM HSPF scenario runs will attempt to more accurately account for diversions of dry weather runoff to off-channel percolation basins by the San Bernardino County Flood Control District (SBCFCD) in the eastern side of the watershed. We will work closely with the Task Force and SBCFCD to develop these additional assumptions.

Third Budget Amendment Request

Task 3d – Revise Assumptions for the Six WLAM Scenarios and Rerun

- Lake Elsinore Spill,
- Corona Discharge TDS Concentrations,
- Stormwater Capture,
- Arlington Desalter Discharge,
- Dry Weather Runoff to Off-Channel Percolation Basins, and
- Streambed Percolation in Orange County Groundwater Management Zone:

Task 3e – Conduct Additional Analyses on the Results from the Six WLAM Scenarios

- Any differences in water quality results for Santa Ana River Reach 3 at Prado Basin, Reach 3 below Prado Dam, and Reach 2 overlying Orange County GMZ will be systematically investigated and discussed in the report**
- Cumulative Frequency Distribution graphs of TDS and TIN will be prepared for each GMZ.**

Task 3f – Conduct Sensitivity Runs or Mass Balance Analyses to Understand Key Issues

- **How much degradation, if any, is caused by relocating a portion of the City of Riverside discharge to Santa Ana River Reaches 3 and 4 (above Riverside-A GMZ)?**
- **Why is the August-only TDS objective of 700 mg/L being exceeded when the vast majority of POTW discharge is below 650 mg/L. What is the source for the TDS that is causing a problem?**
- **What is driving the slight degradation to San Timoteo Reach 1 above Bunker Hill-B GMZ in Scenario A?**

Task 10 – Monthly Monthly Meetings

- **An additional two (2) meetings will be needed (i.e., January and February Task Force Meetings)**

Proposed Budget Amendment

TASK		Total Additional Hours	Total Additional Cost
3d	Revise Assumptions for the Six WLAM Scenarios and Rerun	56	\$7,780
3e	Conduct Additional Analyses on the Results from the Six WLAM Scenarios	38	\$5,060
3f	Conduct Sensitivity Runs or Mass Balance Analyses to Understand Key Issues	74	\$11,130
10.0	Prepare For and Participate in up-to 2 Half-Day Monthly Meetings Where GSSI will Describe Project Status and/or Present Draft and Final Results to the BMPTF	30	\$5,740
TOTAL		198	\$29,710

Budget Amendment Summary

TASK		Original Approved Budget (6-Jan-17)	Amended Budget (8-Feb-18)		Amended Budget (15-Aug-18)		3 rd Budget Amendment Request (12-Nov-18)	Total Project Budget
			Amendment	Approved Budget	Amend- ment	Approved Budget		
1.0	Update the Data Used in the Waste Load Allocation Model (WLAM)	\$25,665	\$4,600	\$30,265	-	\$30,265	-	\$30,265
2.0	Update and Recalibrate the WLAM	\$59,255	\$30,255	\$89,510	-	\$89,510	-	\$89,510
3.0	Evaluate Waste Load Allocation Scenarios for Major Stream Segments	\$33,150	-	\$33,150	-	\$33,150	\$23,970	\$57,120
4.0	Develop WLAM for Managed Recharge in Percolation Basins	\$16,070	\$(12,374)	\$3,696	-	\$3,696	-	\$3,696
5.0	Estimate Off-Channel Recharge From Natural Precipitation	\$6,385	-	\$6,385	-	\$6,385	-	\$6,385
6.0	Run the WLAM in Retrospective Mode, Using Historical Discharge Data, to Estimate the Quantity and Quality of Recharge that Actually Occurred	\$8,290	-	\$8,290	-	\$8,290	-	\$8,290
7.0	Compile the WLAM into a Run-Time Software Simulation Package	\$17,340	-	\$17,340	-	\$17,340	-	\$17,340
9.0	Draft Task Reports, Draft and Final Report	\$45,005	TM 2: \$7,245 TM 4: \$(5,760) Total:\$1,485	\$46,490	-	\$46,490	-	\$46,490
10.0	Monthly Project Meetings	\$35,640	-	\$35,640	\$11,480	\$47,120	\$5,740	\$52,860
11.0	Pilot Evaluation of the Doppler Data Compared to Precipitation Gauge Data	\$3,000	-	\$3,000	-	\$3,000	-	\$3,000
TOTAL		\$249,800	\$23,966	\$273,766	\$11,480	\$285,246	\$29,710	\$314,956

Updated Project Schedule

- **Submit Draft Study Report in Mid-January 2019 and**
- **Submit Final Study Report in Mid-February 2019**