Santa Ana River Wasteload Allocation Model Update

BASIN MONITORING PROGRAM TASK FORCE

October 30, 2018

SAWPA

GEOSCIENCE

Overview

- Review of Project Schedule
- Review Comments on Draft TM No. 3 – WLAM Predictive Scenario Runs
- Next Steps

Overview

- **Review of Project Schedule**
- Review Comments on Draft TM No. 3 – WLAM Predictive Scenario Runs
- Next Steps

Updated Project Schedule

Task	Description	2017												2018										
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1	Update the Data Used in the Waste Load Allocation Model (WLAM)																								
2	Update and Recalibrate the WLAM																								
3	Evaluate Waste Load Allocation Scenarios for Major Stream Segments																								
4	~~Develop WLAM for Managed Recharge in Percolation Basins~~																								
5	Estimate Off-Channel Recharge from Natural Precipitation																								
6	Run the WLAM in Retrospective Mode, Using Historical Discharge Data, to Estimate the Quantity and Quality of Recharge that Actually Occurred																								
7	Compile the WLAM into a Run-Time Software Simulation Package																								
9	Prepare Draft Task Report for Task 1																								
	Prepare Draft Task Report for Task 2																								
	Prepare Draft Task Report for Task 3																								
	~~Prepare Draft Task Report for Task 4~~																								
	Prepare Draft Task Report for Task 5																								
	Prepare Draft Task Report for Task 6																								
	Prepare a Draft Study Report and a Final Study Report																								
10	Monthly Project Meetings																								
11	Pilot evaluation of the Doppler Data Compared to Precipitation Gauge Data																								

▲ Date TM Submitted

Updated Project Schedule (18-Sep-18)

Overview

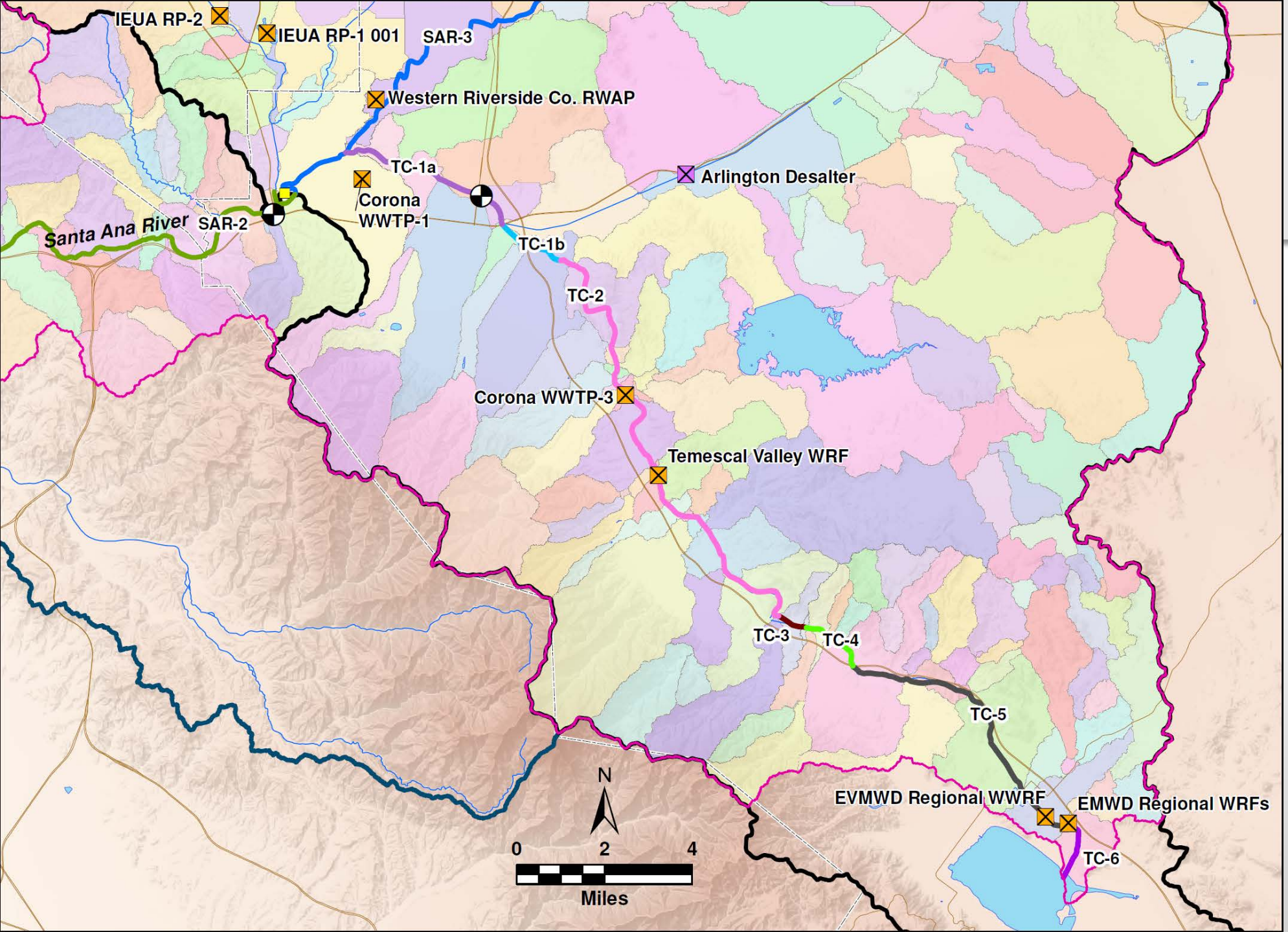
- Review of Project Schedule
- **Review Comments on Draft TM No. 3 – WLAM Predictive Scenario Runs**
- Next Steps

Summary of Comments for Draft TM No. 3 - WLAM Predictive Scenario Runs

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

Clarification

Lake Elsinore Discharge



Lake Elsinore Discharge 2008 WLAM Assumption

4.2.7 Lake Elsinore Discharge

Historical outflow from Lake Elsinore could not be used in the WLAM planning simulations due to planned operational changes. Planned operations at Lake Elsinore will utilize a reduced storage capacity, causing more frequent discharge (outflow) from the Lake.

The EVMWD plans to discharge recycled water to the Lake, thereby operating the Lake at 1,240 feet mean sea level. For the WLAM simulations, Lake Elsinore discharges were estimated based on the HEC-5 simulations developed by Riverside County, which reflect planned operations.

Table 4-6
Modeled Lake Elsinore Discharge and Water Quailty during Periods of Outflow

Period of Overflow[1]		Days	Average Flow (cfs)	Total Flow (acre-ft)	Average TDS (mg/L)
From	To				
3/3/69	5/31/69	90	34	6,107	617
2/3/79	7/8/79	156	22	10,312	624
2/14/80	3/9/80	25	583	28,841	575
3/20/80	8/2/80	136	120	32,402	465
3/4/83	8/31/83	181	93	33,217	674
1/29/93	7/20/93	173	141	48,326	441
				Arithmetic Average	566
				Volume Weighted Average	537

1. Period of overflow estimated with County of Riverside HEC-5 model.

Source: WEI, 2009

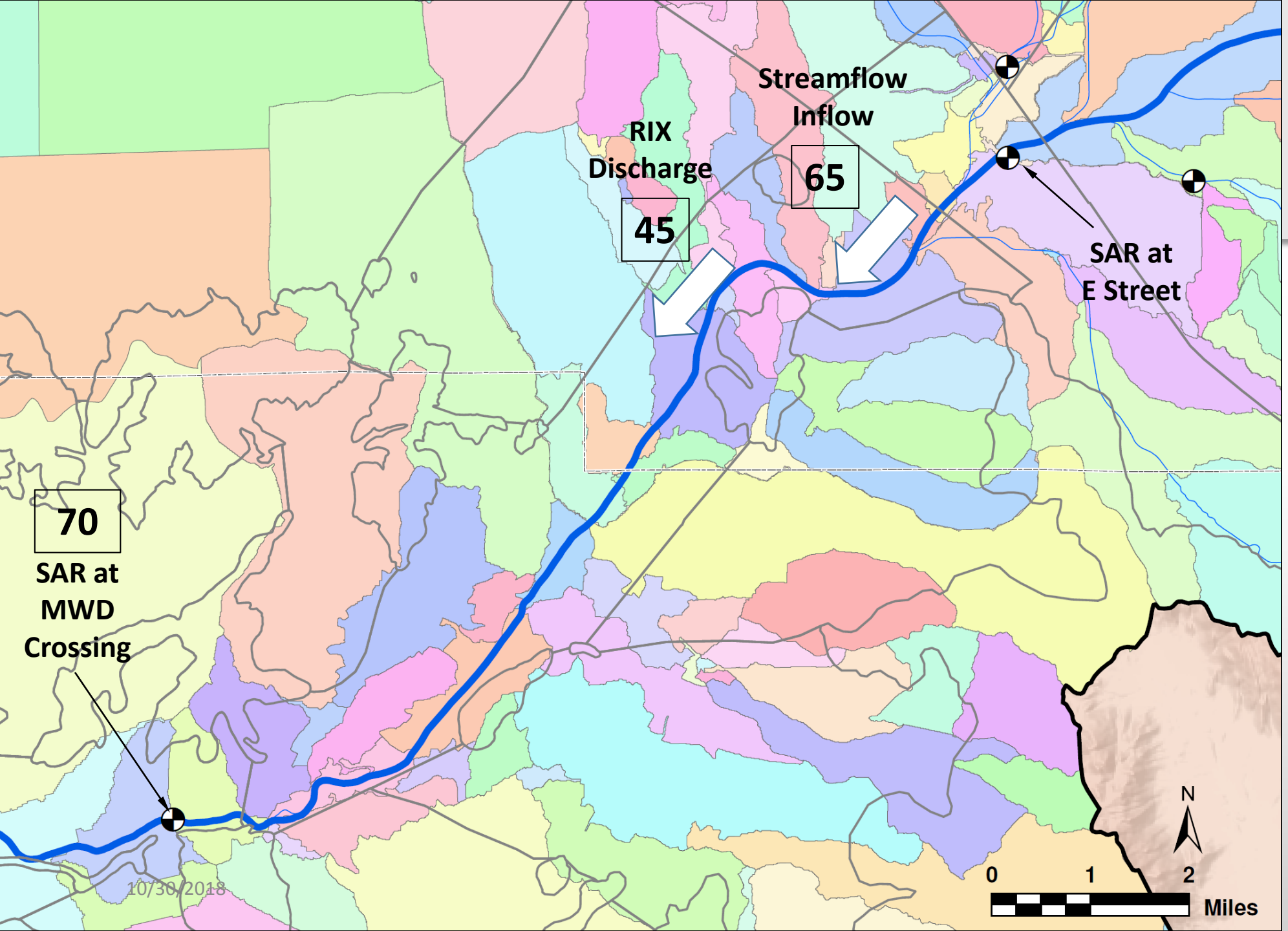
Lake Elsinore Discharge - 2017 WLAM HSPF Assumption

- According to conversations with EVMWD, the lake has not spilled since modifications in the 1990s and spills are not anticipated in the future.
- The current Lake Elsinore agreement precludes EVMWD from discharging water into the lake when it reaches 1247 ft, which is 8 feet below the spill elevation (1255 ft).
- Under this condition, discharge from the Regional WWRF is increased from 0.5 MGD to 12.0 MGD under 2020 conditions, and to 16.8 MGD under 2040 conditions.

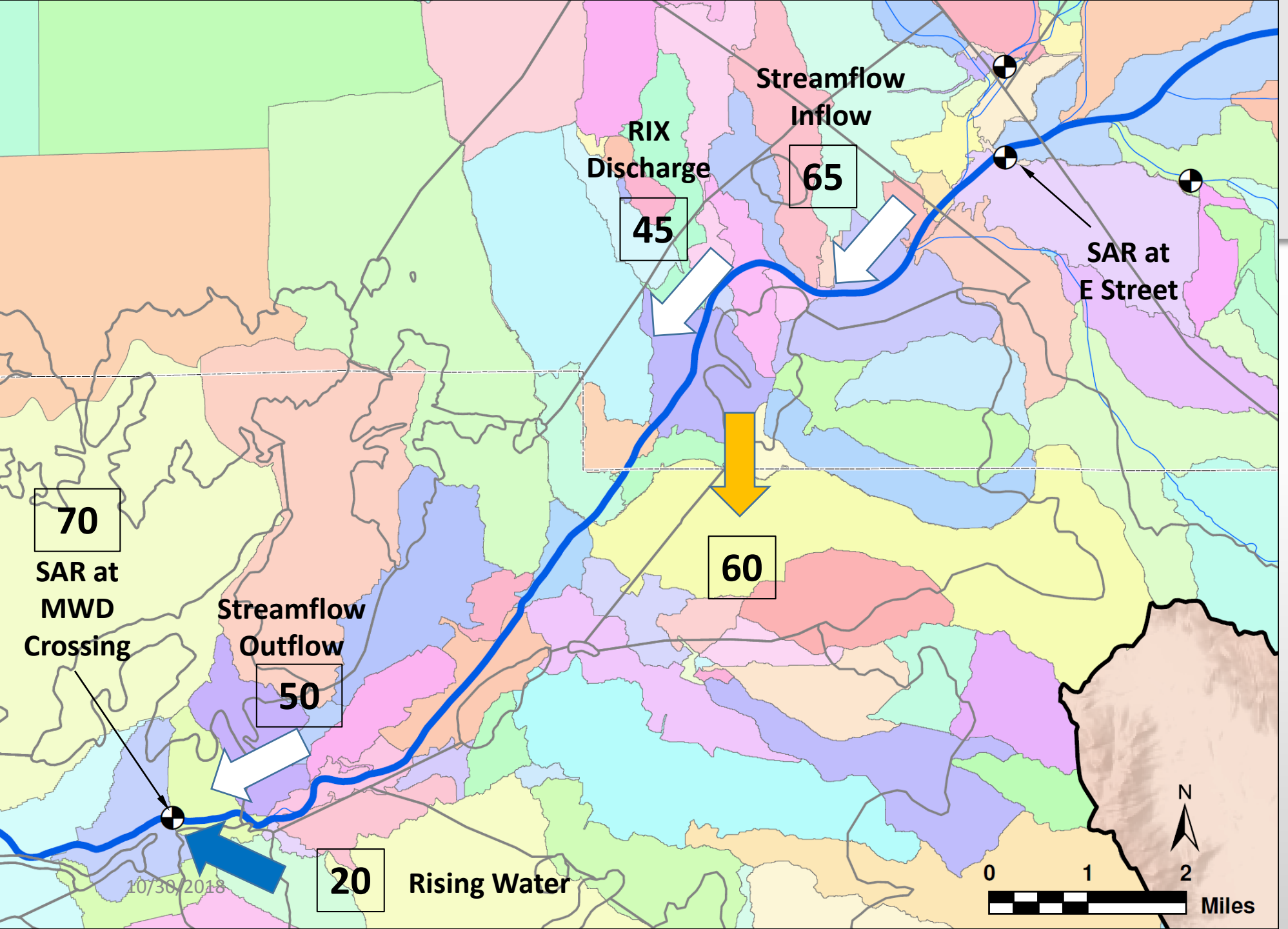
Table 2-2. Periods of Maximum EVMWD Regional WWRF Discharge to Temescal Creek

Hydrologic Period of Maximum Discharge		Scenarios A, B, and C (2020 Conditions)	Scenarios D, E, and F (2040 Conditions)	Source
From	To	[MGD]		
3/3/1969	5/31/1969	12.0	16.8	2008 WLAM (WEI, 2009; Table 4-6)
2/3/1979	7/8/1979			
2/14/1980	3/9/1980			
3/20/1980	8/2/1980			
3/4/1983	8/31/1983			
1/29/1993	7/20/1993			
1/1/2005	6/30/2007			Historical recycled water flows in Temescal Creek
2/1/2011	9/30/2011			

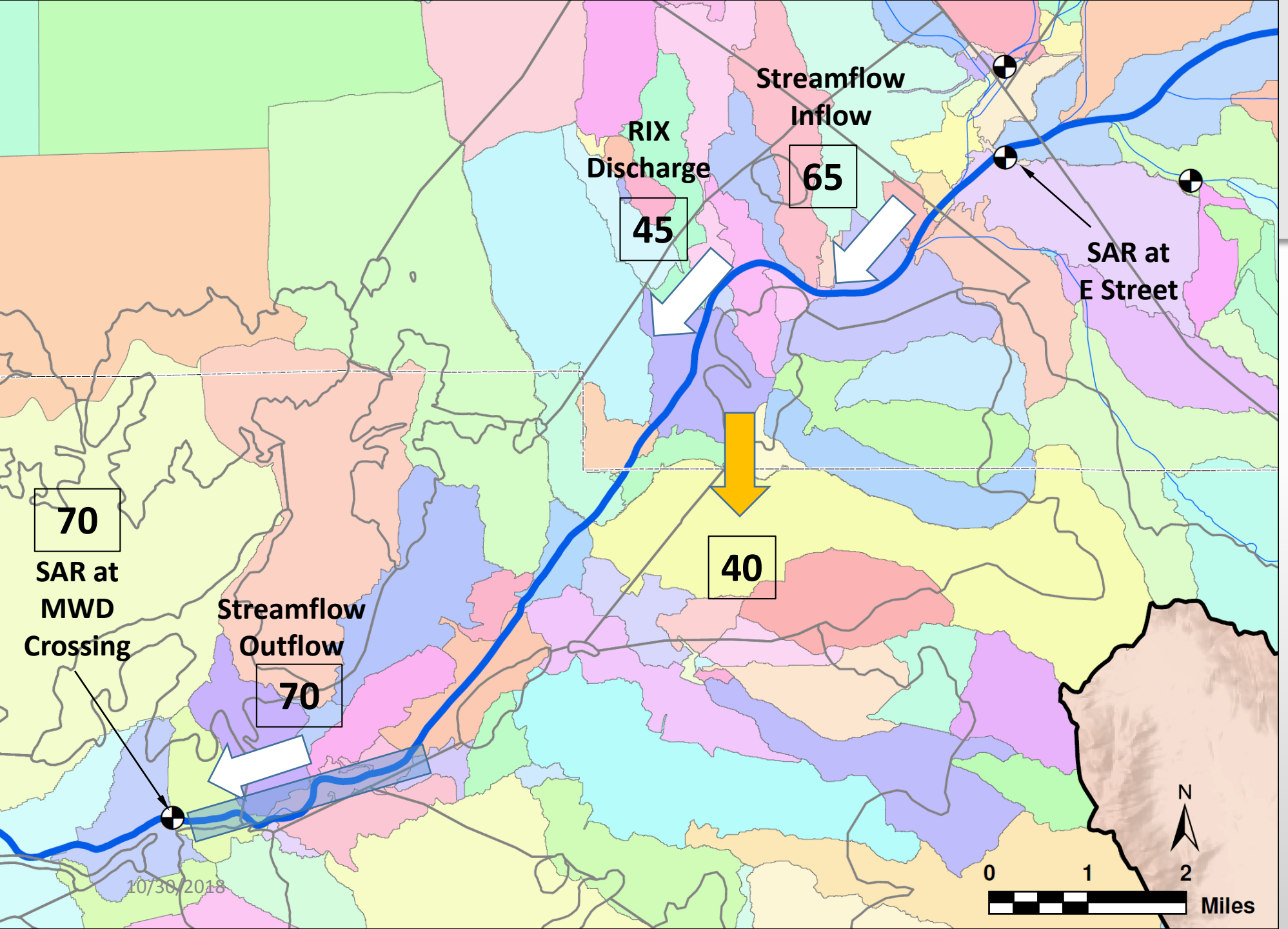
Rising Water Approach 2008 WLAM



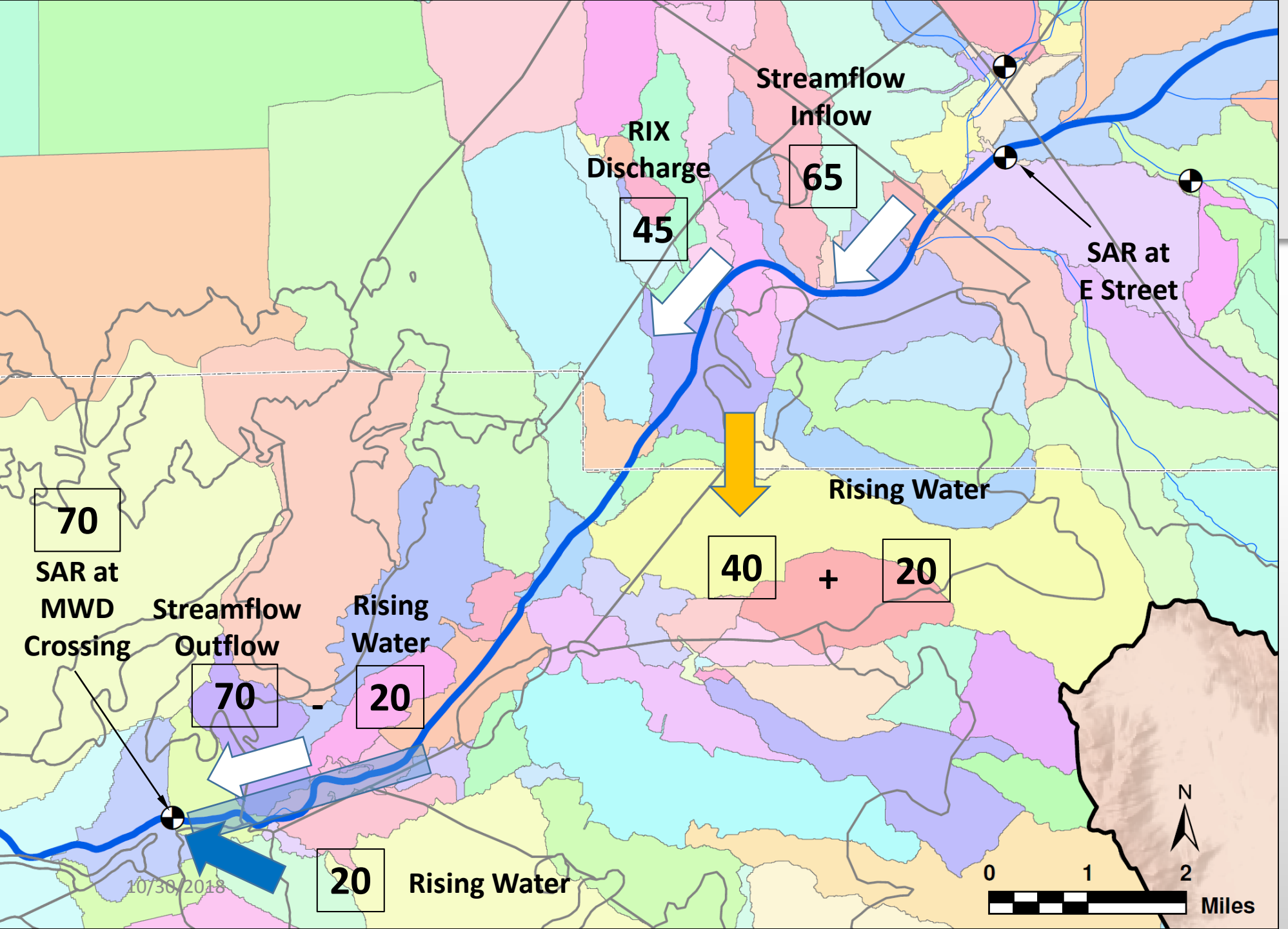
Rising Water Approach 2008 WLAM (Cont.)



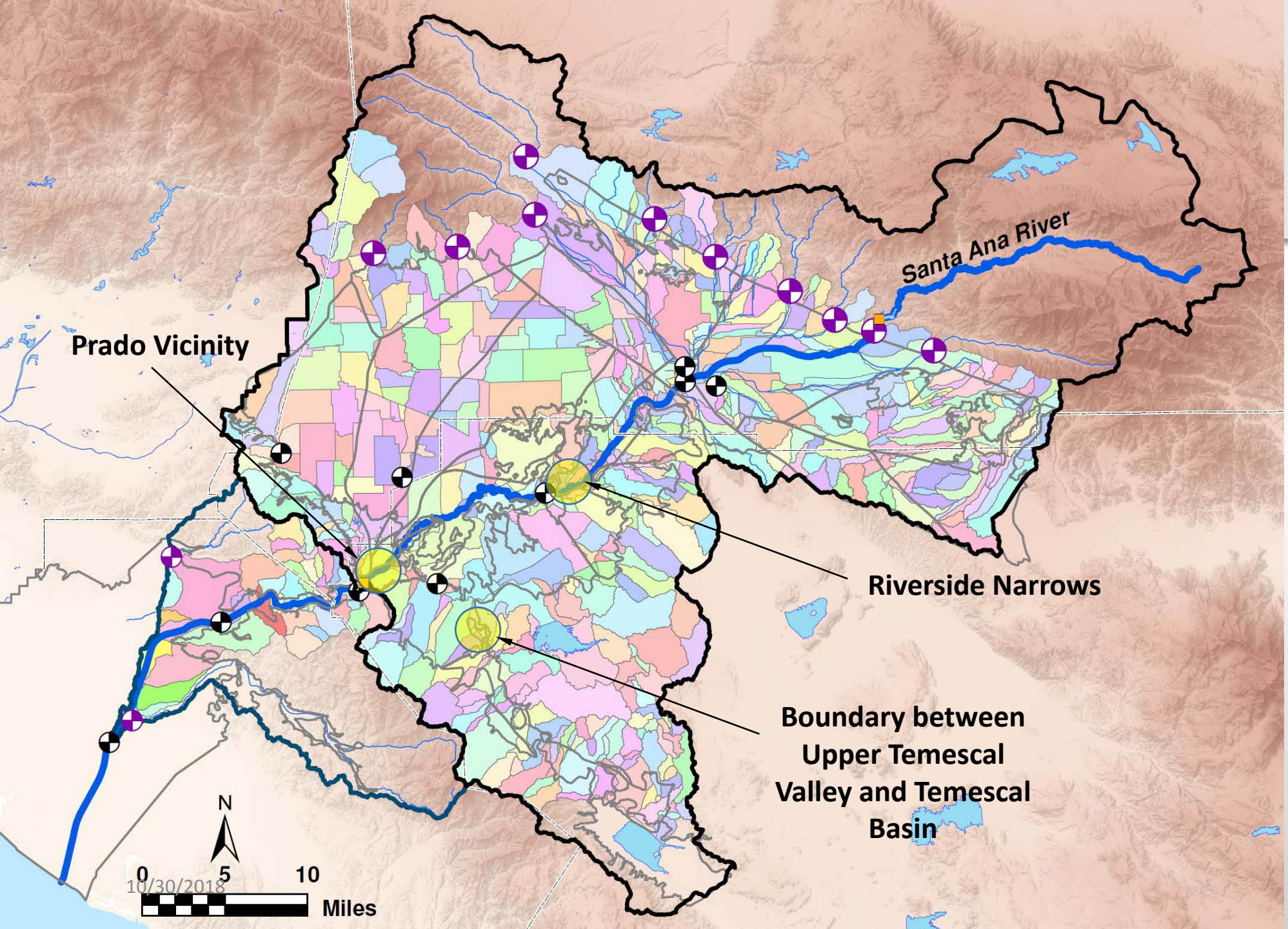
Rising Water Approach 2017 WLAM HSPF



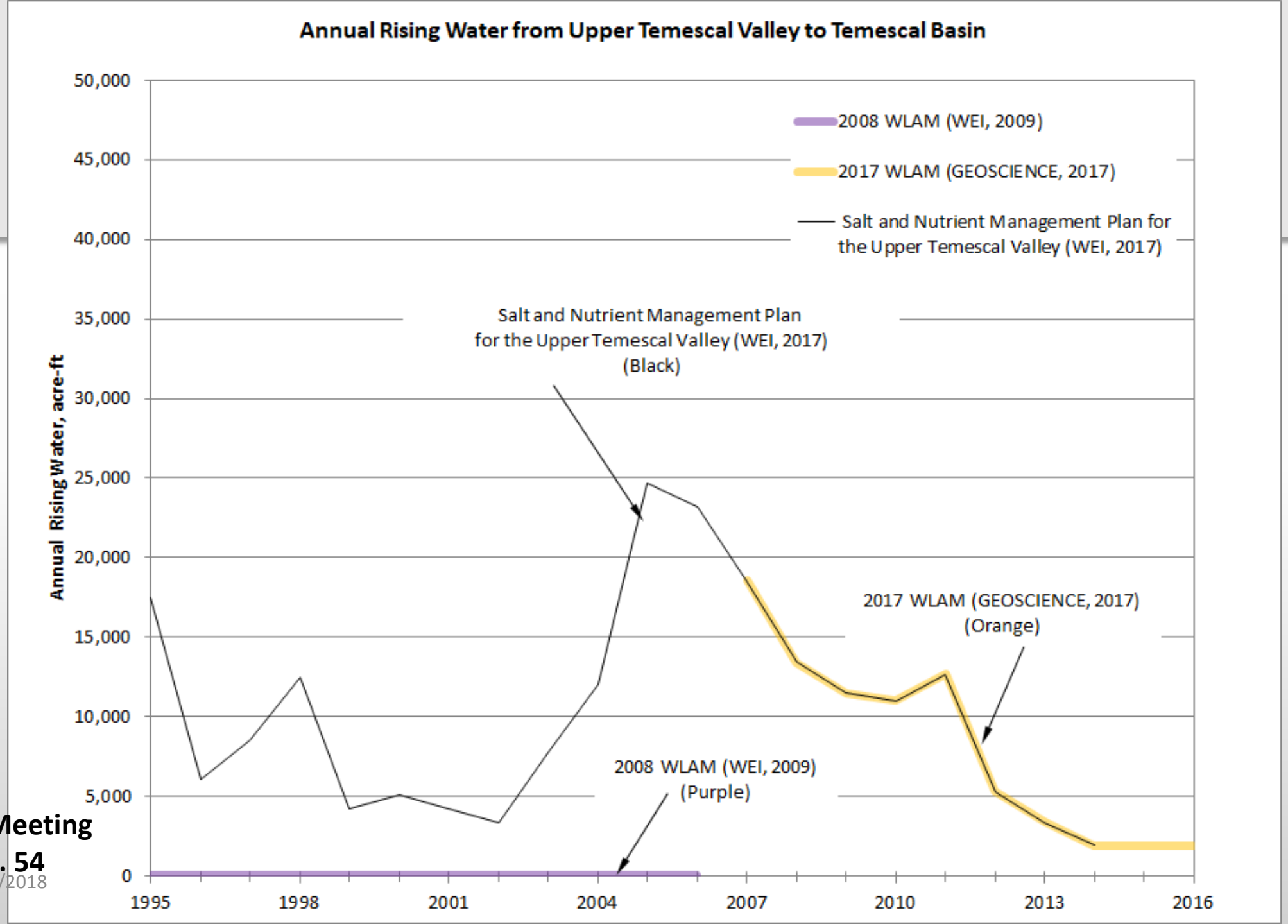
Rising Water Approach 2017 WLAM HSPF (Cont.)



Location of Rising Water



16-Nov-17 Meeting
Slide No. 84



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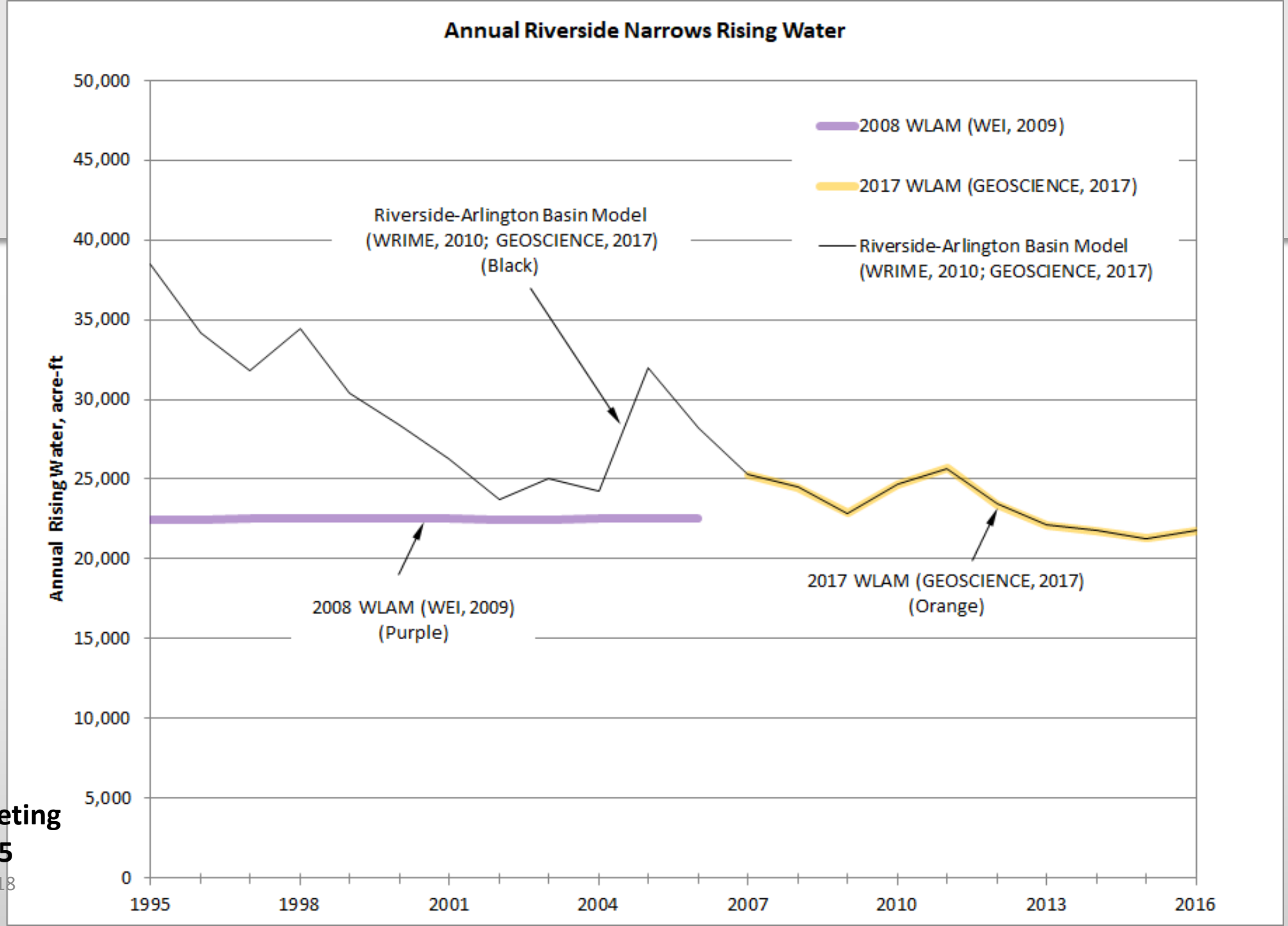

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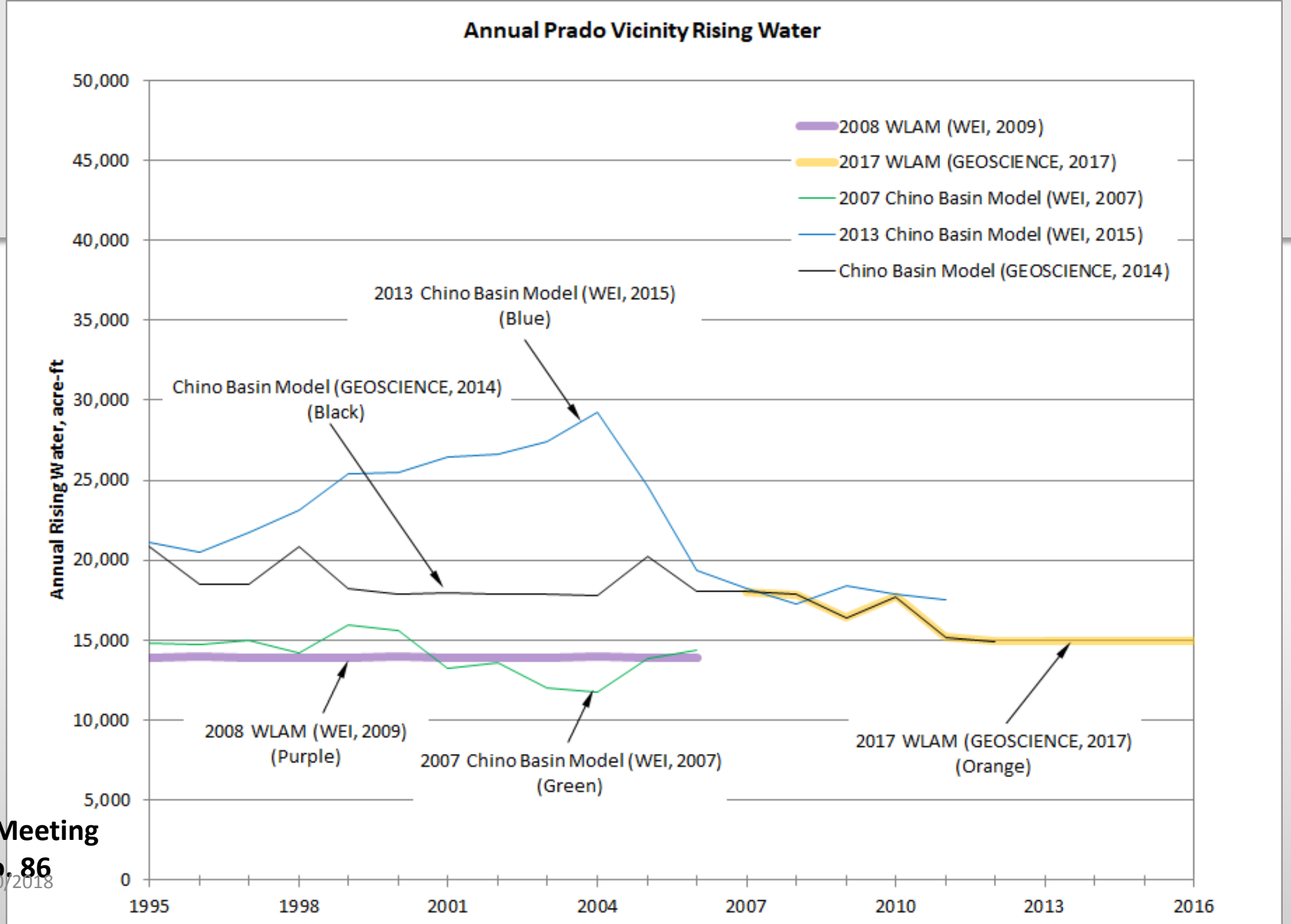

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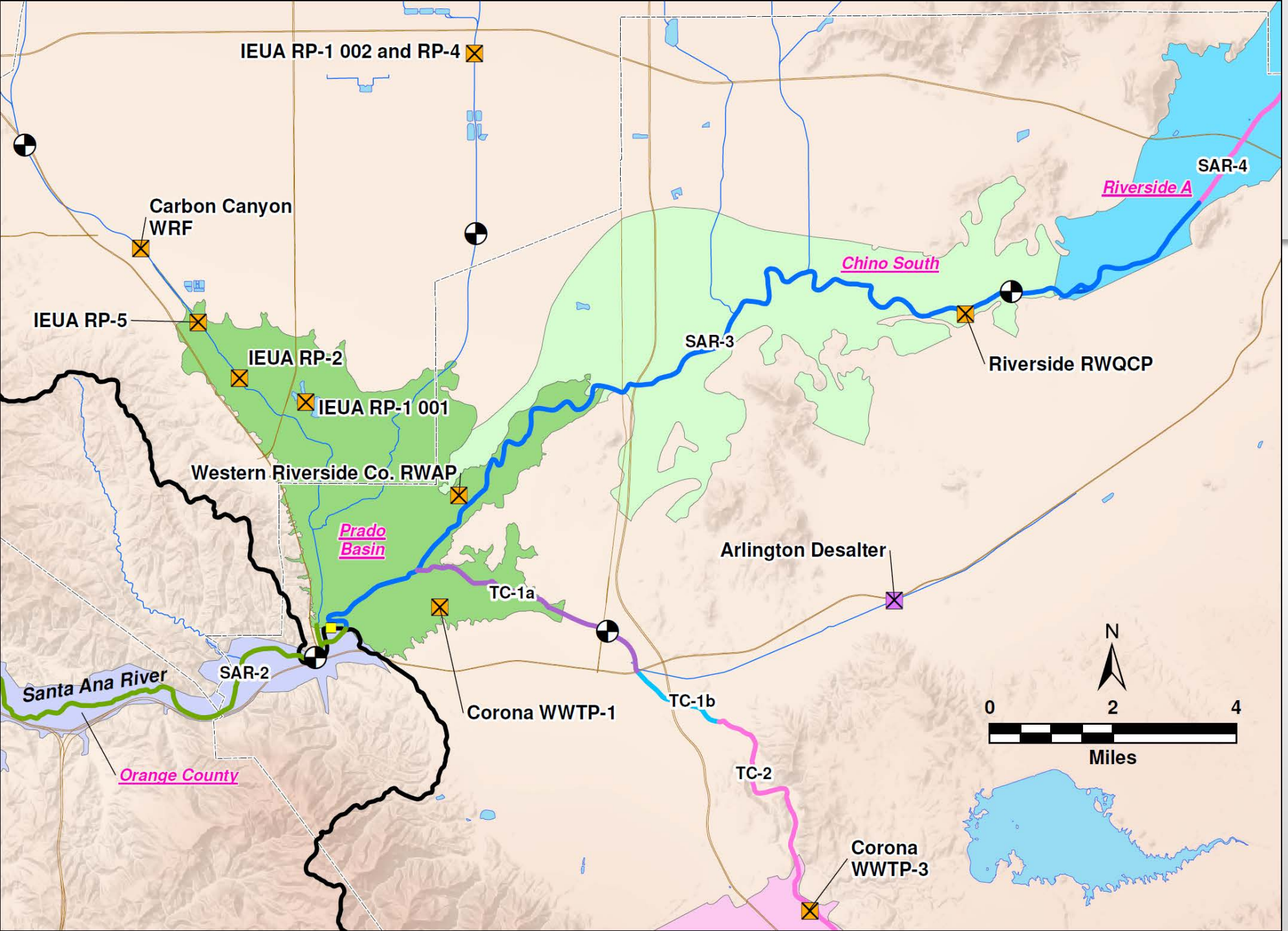


Differences in Chino-South GWM Prediction between 2008 WLAM and 2017 WLAM HSPF

Table 4
Summary of TDS Wasteload Allocation Model Results for Scenario 8

Reach	Underlying Management Zone	TDS Objective (mg/L)	Ambient TDS[1] (mg/L)	Assimilative Capacity (mg/L)	Compliance Metric	Model Results for TDS[2,3] (mg/L)					
						Scenario 8a *Low Discharge in 2015*	Scenario 8b *Intermediate Discharge in 2015*	Scenario 8c *High Discharge in 2015*	Scenario 8d *Low Discharge in 2020*	Scenario 8e *Intermediate Discharge in 2020*	Scenario 8f *High Discharge in 2020*
Groundwater											
San Timoteo Creek in the Beaumont MZ; Noble Creek below Beaumont DP 008; Unnamed tributary to Marshall Creek below Beaumont DP 007	Beaumont	330	290	40	Maximum of 10-year volume-weighted running average of TDS in recharge	211	211	225	214	252	258
San Timoteo Creek in the San Timoteo MZ; Cooper's Creek in the San Timoteo MZ	San Timoteo	400	410	none	Maximum of 10-year volume-weighted running average of TDS in recharge	***412***	***420***	***423***	385	***423***	***428***
Santa Ana River from the San Jacinto Fault to confluence with San Timoteo Creek; San Timoteo Creek overlying the Bunker Hill-B MZ	Bunker Hill B	330	280	50	Maximum of 10-year volume-weighted running average of TDS in recharge	215	227	233	197	239	251
Santa Ana River overlying the Colton MZ	Colton	410	440	none	Maximum of 10-year volume-weighted running average of TDS in recharge	164	165	165	159	161	161
Santa Ana River overlying the Riverside-A MZ	Riverside A	560	420	140	Maximum of 10-year volume-weighted running average of TDS in recharge	***457***	***460***	***460***	***455***	***457***	***458***
Santa Ana River overlying the Chino-South MZ	Chino South	680	990	none	Maximum of 10-year volume-weighted running average of TDS in recharge	620	613	622	624	619	619

Source: WEI, 2015

Discussion

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?	The 2008 WLAM assumes TDS of 725 mg/L for the period from May to November and 665 mg/L for the period from December to April. GEOSCIENCE will discuss with the Task Force to address this comment.

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?	This comment is the same as IEUA/CBWM Comment No. 2b. GEOSCIENCE will coordinate with the Task Force to address this comment.

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.	GEOSCIENCE will discuss this recommendation with the Task Force.

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.	GEOSCIENCE will discuss this recommendation with the Task Force.

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.	GEOSCIENCE will discuss this comment with the 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	This footnote is based on Basin Plan Chapter 4 Table 4-1. GEOSCIENCE will discuss this comment with the Task Force.

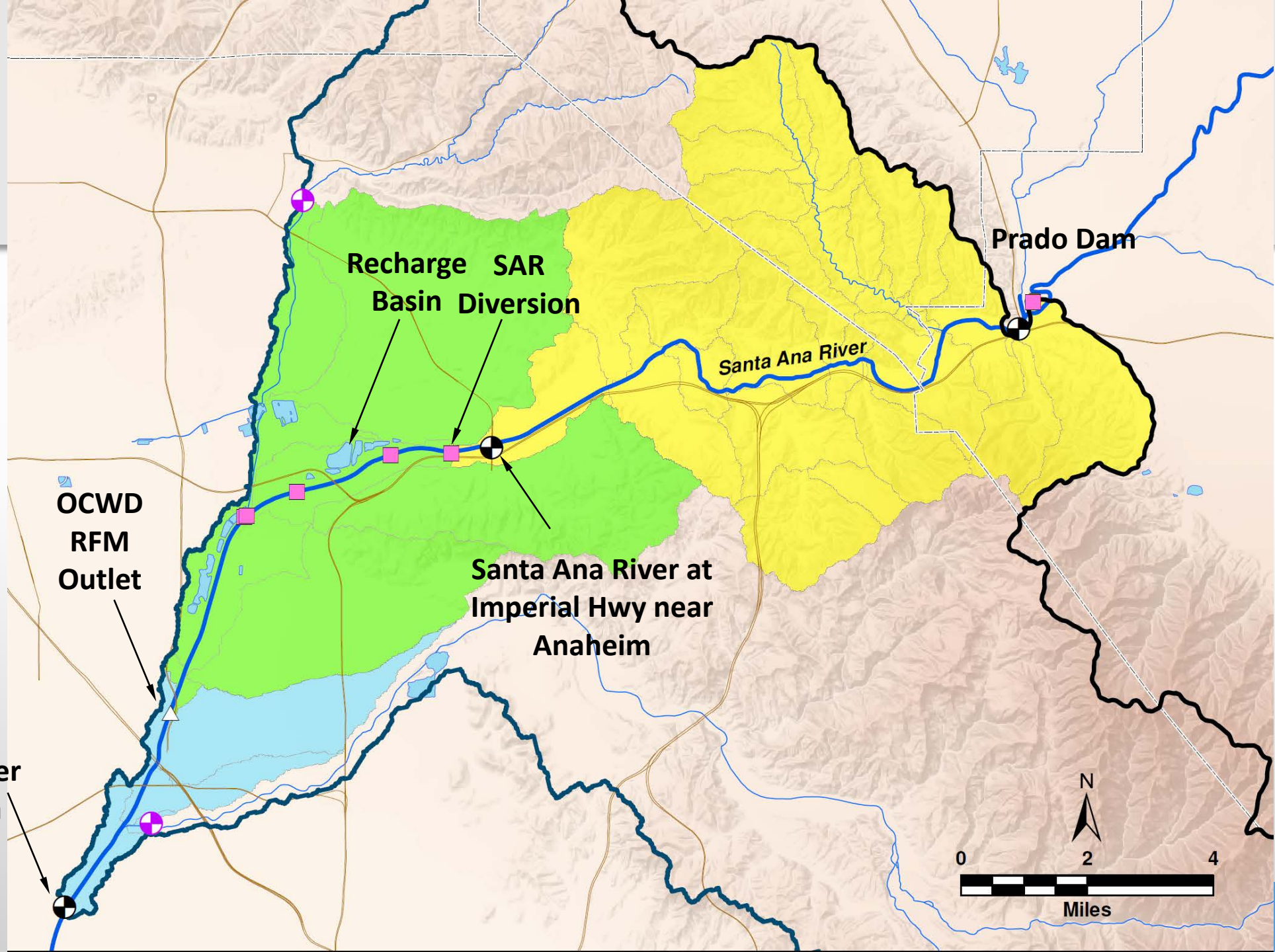
Table 3-8. Predictive Scenario Results – Prado Basin Management Zone

Constituent	Objective	Ambient	Assimilative Capacity	Compliance Period	MAXIMUM VALUE FOR THE VOLUME-WEIGHTED RECHARGE					
					2020 Conditions			2040 Conditions		
					Scen A (Max)	Scen B (Avg)	Scen C (Min)	Scen D (Max)	Scen E (Avg)	Scen F (Min)
	[mg/L]	[mg/L]	[mg/L]		[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]
TDS	700[1]	na[2]	none	1-year	647	634	641	664	674	669
				5-year	631	617	623	645	653	648
				10-year	623	610	614	637	643	639
				20-year	614	600	604	628	633	628
TIN	10.0[1]	na[2]	none	1-year	6.45	5.88	5.67	6.83	6.38	6.02
				5-year	6.29	5.73	5.52	6.64	6.18	5.83
				10-year	6.22	5.66	5.46	6.56	6.10	5.76
				20-year	6.14	5.59	5.39	6.48	6.02	5.69

[1] Chino Creek, Reach 1A, Chino Creek, 1B, Mill Creek (Prado Area) and Santa Ana River, Reach 3 TDS and TIN numeric objectives apply

[2] No Prado Basin ambient TDS or Nitrate as Nitrogen was computed after 1997

HSPF and OCWD Recharge Facilities Model (RFM)



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.	GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

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).	GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

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.	The current Table 3-10 does not include any mass generated from the OCWD's RFM. GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

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.	GEOSCIENCE will meet with OCWD and the Task Force to address this comment.

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.	GEOSCIENCE will meet with OCWD and the Task Force to address this comment.

Overview

- Review of Project Schedule
- Review Comments on Draft TM No. 3 – WLAM Predictive Scenario Runs
- **Next Steps**

Responses to Comments

Comments on Draft TM No. 3 from City of Corona – Comment No. 1

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	3.1.6	21	**Chino-South Management Zone (SAR Reach 3)** 1. Compared to the results of the prior WLAM update (Scenario 8), the predicted TDS concentrations in streambed recharge to Chino-South are about 200 mg/L less for the 10-year period. 2. Compared to the results of the prior WLAM update, the predicted TIN concentrations in streambed recharge to Chino-South are about 1.5 mg/L less for the 10-year period. 3. We also noted similar differences between the two WLAM efforts for TDS and TIN concentrations in streambed recharge to other management zones (e.g. Beaumont and San Timoteo management zones). Why?	Additional explanation will be added in Section 3.1.6.

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?	GEOSCIENCE will discuss with the Task Force to address this comment.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
3	3.2.1	26	**Santa Ana River below Prado Dam** 1. Compared to the results of the prior WLAM update (Scenario 8), the predicted TDS concentrations in Santa Ana River flow for the 5-year moving average is significantly lower in concentration (e.g. lower by up to 230 mg/L). 2. Compared to the results of the prior WLAM update, the predicted TIN concentrations in Santa Ana River flow for the 5-year moving average is significantly lower in concentration (e.g. lower by up to 4 mg/L). 3. We also noted large variability in TDS and TIN concentrations between the various current WLAM scenario results. In contrast, in the prior WLAM effort, the TDS and TIN concentrations in Santa Ana River discharge at below Prado Dam were similar for all model scenarios. Why?	GEOSCIENCE will check into the questions and provide explanation.

Comments on Draft TM No. 3 from City of Corona – Comment No. G-1-1

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-1-1	Table 1		**POTW Discharge Assumptions for Predictive Model Scenarios** Plant 1 discharge is incorrectly labeled as a discharge to Temescal Creek. Plant 1 effluent discharges directly into Prado Basin.	Table will be corrected .

Comments on Draft TM No. 3 from City of Corona – Comment No. G-1-2

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-1-2	Table 1		Some plants have design capacity and some do not. The original data request included design capacity for 2020 and 2040 and the revised data request did not. Appendix B includes a mix of the original data request and the revised data request. If the 2020 and 2040 design capacity are not needed this information should be removed from Table 1 and Appendix B should only include the revised data request from all agencies.	Appendix B contains the most up-to date submittals from the different agencies. Table 1 will be revised.

Comments on Draft TM No. 3 from City of Corona – Comment No. G-2-1

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-2-1	2.3.2	9	**Stormwater Recharge** This section talks about stormwater recharge for only the Chino Basin. Are there other basins in the model domain where stormwater diversions for recharge occur? If so, how were those diversions estimated in the WLAM scenarios?	Discussion of stormwater diversions for recharge in the San Bernardino Basin Area and Orange County will be added in Section 2.3.2.

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?	This comment is the same as IEUA/CBWM Comment No. 2b. GEOSCIENCE will coordinate with the Task Force to address this comment.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-3	2.3.1.2.2	7	**IEUA RPs and CCWRF** Using the plant capacity for assumed maximum discharge seems unrealistic, especially compared to the average current discharge. Is Table 3-8 calculated the same as the other basins?	Plant capacity was used for the maximum discharge scenario at the recommendation of the Task Force and based on values provided by IEUA. Table 3-8 calculated the same as the other basins. Additional explanation will be provided.

Comments on Draft TM No. 3 from City of Corona – Comment No. G-4

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-4	Table 2.2	8	**Periods of Maximum EVMWD Regional WWRF Discharge to Temescal Creek** Are the discharges in table 2.2 representative of actual flow to creek? These numbers seem high and the data request in Appendix B shows 7.5 and 10 max flow to creek.	Data in Table 2-2 are not the actual discharges to creek. During periods when Lake Elsinore is full, discharge from the Regional WRF is increased from 0.5 MGD to 12.0 MGD under 2020 conditions (Scenarios A-C), and to 16.8 MGD under 2040 conditions (Scenarios D-F). These assumptions were based on the projections submitted by EVMWD

Comments on Draft TM No. 3 from City of Corona – Comment No. G-5

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-5	2.3.5	10	**Rising Water** Which reach is the rising water in Temescal Creek upstream of the Main Street gage?	Rising water occurs in Reach 2 of Temescal Creek, at the boundary between the Upper Temescal Valley and Temescal GMZs. Additional explanation will be provided.

Comments on Draft TM No. 3 from City of Corona – Comment No. G-6

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-6		17	Page 17, second paragraph – there is a typo in the word useful	Typo will be corrected.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
1	1.2	2	This section mentions that the WLAM uses 67 year (1949-2016) hydrologic data. What hydrologic data is it referring about (precipitation, runoff measured in gage stations, etc)?. It would be great if this section could add couple of sentences to better describe hydrologic data, and perhaps to add a table to summarize the different points/layers of hydrologic data.	Additional discussion of hydrologic data will be added in Section 1.2.

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.	Based on conversations with EVMWD, the current scenario assumptions do not include Lake Elsinore spills since they have not occurred since the modifications in the 1990s. Additional discussion will be added in Section 2.3.1.2.4.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
3	2.3.5 2.4.2	10 13	For the Temescal Creek, it is mentioned that an assumed flow and associated TDS/TIN concentrations was estimated on the UTV SNMP (WEI, 2017). It is not clear how this rising water was incorporated into this new WLAM model.	Additional discussion will be added in Section 2.3.5 and Section 2.4.2.

Comments on Draft TM No. 3 from EVMWD – Comment No. 4

No.	Section	Pg.	Comment	GEOSCIENCE Response
4	3.1.7	22	Based on WEI, 2017 Table 6-B, Current ambient groundwater quality for Temescal Valley GMZ is 750 mg/L and 4.7 mg/L, respectively, for TDS and Nitrate. The values (822 mg/L and 7.9 mg/L, respectively, for TDS and Nitrate), which erroneously are reported in the TM3 as current ambient, correspond to calculated historical ambient concentrations for the period 1954-1973. Then, consequently, if Basin Plan Amendment is approved by the SWRQB, the basin has assimilative capacity for either constituent.	Table will be corrected.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-1	General	-	TM-3 should state the assumptions for all flow, TDS and nitrogen (N) assumptions for hydrologic inputs incorporated into the planning projections.	Assumptions for external sources flow, TDS and nitrogen (N) will be added in Section 2.3.1.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
G-2	General	-	If references to information from prior TMs are included, please provide specific citations to the location of the information including, TM name, report page, section number, and/or figures referenced.	Specific citations will be added.

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	EVMWD Regional WTP/Lake Elsinore Assumptions 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. • 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.	Table 4-6 of the 2008 WLAM report shows the projected periods for Lake Elsinore discharge . According to conversations with EVMWD, the lake has not spilled since modifications in the 1990s and spills are not anticipated in the future. Therefore, the current scenarios assume the lake will be too full for EVMWD discharges during hydrologic periods of historical high water levels or projected spill, but will not be actively spilling.

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	• 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.	During periods when Lake Elsinore was projected to spill to Temescal Wash from the 2008 WLAM, discharge from the Regional WWRF is increased in the 2017 WLAM HSPF predictive scenarios from 0.5 MGD to 12.0 MGD under 2020 conditions or 16.8 MGD under 2040 conditions (700 mg/L TDS, 10 mg/L TIN). Based on conversations with EVMWD regarding lake modifications in the 1990s, spills from Lake Elsinore are not currently assumed.

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	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. • Please expand to explain why the previously used methodology should be changed to this new methodology and obtain concurrence from the BMPTF.	According to conversations with EVMWD, Lake Elsinore hasn't spilled since modifications to the Lake in the 1990s, and is unlikely to spill in the future. As such, current predictive scenario assumptions do not include spills from the lake. Table 4-6 of the 2008 WLAM report shows the periods of projected Lake Elsinore discharge. However, due to modifications to the lake, spilling is not likely to happen even under the same hydrologic conditions.

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		The current Lake Elsinore agreement precludes EVMWD from discharging water into the lake when it reaches 1247 ft, which is 8 feet below the spill elevation (1255 ft). Under this condition, discharge from the Regional WWRF is increased from 0.5 MGD to 12.0 MGD under 2020 conditions, and to 16.8 MGD under 2040 conditions. The current scenarios assume the lake will be too full for EVMWD discharges during hydrologic periods of projected spill (shown in Table 4-6 of the 2008 WLAM), but will not be actively spilling. The 2.5-year period of maximum discharge from January 2005 through June 2007 also corresponds to high lake levels.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
2a	2.3.2	9	Watermaster does not have stormwater recharge "data" for the period before 2006 – diversions were not measured. It does have engineering estimates of stormwater diversions developed for modeling purposes. Please clarify what data was used.	GEOSCIENCE used information provided by IEUA/CBWM and information reported in WEI (2015). Explanation will be provided in the Section 2.3.2.

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.	GEOSCIENCE will discuss this recommendation with the Task Force.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
2c	2.3.2	9	Please have the model directly simulate the stormwater diversions since the TDS/TIN concentration of stream flows vary by storm, based on timing and magnitude. This will more accurately portray the changes of the mass of TDS/TIN entering the Santa Ana River and be consistent with past WLA investigations and allow the development of a stationary time series for specific points in time.	Comment noted.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
3	2.3.5 2.4.2	10	Please provide tables and/or figures that clearly show or summarize the volumes and TDS and N of rising groundwater that were assumed in the planning scenarios. Include information that shows whether constant values are applied for the 67-year hydrology or if the values are variable over time, what the assumed TDS/N values are and how these values may change in the future.	Tables to summarize the volumes and TDS and N of rising groundwater will be added in Sections 2.3.5 and 2.4.2.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 4a

No.	Section	Pg.	Comment	GEOSCIENCE Response
4a	2.3.5	10	Given the recent work to create the Integrated Santa Ana River Model and that that model is about to be used for planning simulations, is the use of the WRIME model to estimate rising water near the Riverside Narrows and the 2014 Geoscience model for the rising water near Prado appropriate?	Predictive model results from the Integrated SAR Model are not ready yet.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 4b

No.	Section	Pg.	Comment	GEOSCIENCE Response
4b	2.3.5	10	Explain what is meant by the statement: "the method used for the 2017 WLAM HSPF was chosen for the flexibility it affords," and clarify if there are challenges with this new approach.	The 2017 WLAM HSPF approach for modeling rising water allows the amount of rising water to reflect changes in hydrologic conditions without recalibrating the model. Additional explanation will be added.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 4c

No.	Section	Pg.	Comment	GEOSCIENCE Response
4c	2.3.5	10	The second highlighted block of text states that the method is to "artificially reduces streambed percolation (not reflective of actual hydraulic conductivity of streambed sediments in these locations), little percolation tends to occur in areas of rising water given the gaining stream conditions that are typically present." Why would we want to reduce streambed percolation? Doing so changes the mass of TDS/TIN in surface water flow. One of the purposes of the WLAM effort is to estimate the streambed percolation so the loss of TDS/TIN mass can be accounted. Thus, the estimates of streambed recharge and associated TDS and TIN concentrations produced in the planning scenarios are not accurate. The calibration effort is not an exercise in demonstrating that we can match streamflow at gaging stations; it is a process where the critical processes for which the model is being used are accurately determined.	Explanation will be added in Section 2.3.5.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 4d

No.	Section	Pg.	Comment	GEOSCIENCE Response
4d	2.3.5	10	The rising water responses at the Riverside Narrows and at Prado basin to precipitation are far more complex than suggested by the second section of text above. Increases in rising water due to wet and dry periods often lag those periods. Groundwater pumping and other groundwater management actions affect the rising water and these affects play out over time. The adjustment of streambed percolation rates indicated in the text cannot account for the observed lagged response and changes in groundwater pumping patterns. We request that sufficient explanation is provided to substantiate the statements cited above.	Explanation will be provided in Section 2.3.5.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 5

No.	Section	Pg.	Comment	GEOSCIENCE Response
5	2.4.1.2.6	11	This section is missing text. It is only a title.	This section will be removed.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 6

No.	Section	Pg.	Comment	GEOSCIENCE Response
6	3.1.6	21	We are interested to understand why the TIN concentration percolating in Chino-South is much lower than was predicted in Scenario 8. Is it due to changes in the model? Changes in planning data or assumptions?	Additional analysis will be conducted to address this question.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 7

No.	Section	Pg.	Comment	GEOSCIENCE Response
7	3.1.8	23	An assessment of “recharge” to PBMZ has not been performed in prior WLA analyses because there is no groundwater objective for PBMZ.	Results for the Santa Ana River overlying the Prado Basin MZ is required by the RFP.

Comments on Draft TM No. 3 from IEUA/CBWM – Comment No. 8

No.	Section	Pg.	Comment	GEOSCIENCE Response
8	3.2.1	26	The use of the regulatory terms ambient water quality and assimilative capacity do not apply to surface water. Do not think that data for surface water results should be presented in the same way as groundwater.	Text will be revised.

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.	GEOSCIENCE will discuss this recommendation with the Task Force.

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
2	2.3.1.3	9	Please provide more description of how Seven Oaks Dam discharges are estimated in the modeling of future conditions.	Additional discussion of assumptions for the Seven Oaks Dam discharge will be provided in Section 2.3.1.3

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

No.	Section	Pg.	Comment	GEOSCIENCE Response
3	2.3.4	10	The draft memo says "As with the 2017 WLAM HSPF calibration, the OCWD Recharge Facilities Model (RFM) was used in the predictive scenarios as an accounting tool to track diversions from the SAR, but does not estimate runoff from adjacent land areas." The RFM estimates runoff from some of the adjacent land areas, but not all those needed for the updated WLAM. Suggest rewording this sentence to something like "As with the 2017 WLAM HSPF calibration, the OCWD Recharge Facilities Model (RFM) was used in the predictive scenarios as an accounting tool to track diversions from the SAR. Since the RFM does not estimate runoff from all of the adjacent land areas modeled in the updated WLA model, the RFM was used as an accounting tool to track diversions from the SAR but the runoff estimates in the RFM were not used. Runoff estimates for areas downstream of Prado Dam were provided by HSPF."	Text will be revised to reflect the suggested language.

Comments on Draft TM No. 3 from OCWD – Comment No. 4

No.	Section	Pg.	Comment	GEOSCIENCE Response
4	2.3.4	10	The draft memo says "The RFM was then run separately for WY 1950 through WY 1971, WY 1972 through WY 1993, WY 1994 through WY 2015, and WY 2016." Please provide additional information or clarification regarding why the RFM was run in this manner (as opposed to running the model from WY 1950 through WY 2016).	The current version of the RFM does not allow the model simulation period to be expanded without a license. Therefore, multiple runs were made. Explanation will be added in Section 2.3.4.

Comments on Draft TM No. 3 from OCWD – Comment No. 5

No.	Section	Pg.	Comment	GEOSCIENCE Response
5	2.4.2	13	It would be helpful to add one table that lists the TDS and TIN concentrations for each source of rising groundwater and other non-POTW discharges and the flow rate of each rising groundwater and non-POTW discharges (include all discharges that are specified that are not POTWs).	Tables to summarize the volumes and TDS and N of non-POTW discharges will be added in Section 2.4.2.

Comments on Draft TM No. 3 from OCWD – Comment No. 6

No.	Section	Pg.	Comment	GEOSCIENCE Response
6	3.1.3	17	The draft memo says "…calculated for Temescal Creek Reach One…" but should be San Timoteo Creek Reach 1?	Text will be corrected.

Comments on Draft TM No. 3 from OCWD – Comment No. 7

No.	Section	Pg.	Comment	GEOSCIENCE Response
7	Tables		For Tables 3-1, 3-2, and 3-3 and other similar tables, please add text to the table indicating which surface water body (or bodies) recharge is calculated for; also suggest separate tables if there is more than one surface water body under consideration for a management zone.	Tables will be revised.

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.	GEOSCIENCE will discuss this with the Task Force.

Comments on Draft TM No. 3 from OCWD – Comment No. 9

No.	Section	Pg.	Comment	GEOSCIENCE Response
9	3.1.8	23	The draft memo says "POTW discharge that affect Prado Basin GMZ comes from upstream discharges, Carbon Canyon WRF, Western Riverside Co. RWAP, Corona WWTP-1, and IEUA RP-1 001, RP-1 002, RP-2, RP-4, and RP-5." This sentence should be modified to reflect that discharges to the SAR upstream of Prado Dam and discharges to Temescal Creek also affect the Prado Basin GMZ.	Text will be revised.

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	This footnote is based on Basin Plan Chapter 4 Table 4-1. GEOSCIENCE will discuss this comment with the Task Force.

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.	GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

Comments on Draft TM No. 3 from OCWD – Comment No. 12

No.	Section	Pg.	Comment	GEOSCIENCE Response
12	3.2.1	26	The draft memo says “There are currently no objectives or ambient surface water concentrations for Reach 2.” This sentence should be revised since there is a TDS objective for SAR Reach 2 (5-year moving average TDS objective).	Text will be revised.

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).	GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

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.	The current Table 3-10 does not include any mass generated from the OCWD's RFM. GEOSCIENCE will update the calculation per the decision from OCWD and the Task Force.

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.	GEOSCIENCE will meet with OCWD and the Task Force to address this comment.

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.	GEOSCIENCE will meet with OCWD and the Task Force to address this comment.

Comments on Draft TM No. 3 from OCWD – Comment No. 17

No.	Section	Pg.	Comment	GEOSCIENCE Response
17	Table 3-10	27	The ambient TDS and TIN concentrations for SAR Reach 3 in Table 3-10 should be replaced with the value from the most recent SAWPA SAR water quality report (the SAWPA report published in September 2018). The SAR Reach 2 5-year moving average ambient TDS value should also be updated per the September 2018 SAWPA report.	Ambient concentrations in Table 3-10 will be updated.

Comments on Draft TM No. 3 from OCWD – Comment No. 18

No.	Section	Pg.	Comment	GEOSCIENCE Response
18	3.2.2	28	The draft memo says “There are currently no objectives or ambient surface water concentrations for Reach 2.” This sentence should be revised since there is a TDS objective for SAR Reach 2 (5-year moving average TDS objective).	Text will be revised.

Comments on Draft TM No. 3 from OCWD – Comment No. 19

No.	Section	Pg.	Comment	GEOSCIENCE Response
19	4.0	29	The draft memo says "The 5-year moving average of the 1-year volume-weighted average TDS and TIN concentrations at Santa Ana do not exceed surface water objectives in Reach 2 of the SAR." Please review this sentence and review as appropriate. There is no 5-year moving average TIN objective for SAR Reach 2.	Text will be revised.