

Preliminary Draft Results from the Updated WLAM

Basin Monitoring Program Task Force

Sept. 18, 2019



Does WLAM Indicate Potential for Degradation or Exceedances of Water Quality Objectives?

Management Zone	POTW(s)	TDS	TIN
Beaumont	Beaumont	OK	OK
San Timoteo	YVWD	OK	⚠
Bunker Hill-B	East Valley (SNRC)	⚠	OK
Colton	<i>All of the Above</i>	OK	⚠
Riverside-A	RIX & Rialto	⚠	⚠
Chino-South	Riverside	OK	OK
Upper Temescal Valley	EVMWD & EMWD	OK	⚠
Orange County	<i>All of the Above</i>	⚠	OK

Table 6-1. Predictive Scenario Results – Beaumont 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]			
TDS	330 ¹ /230 ²	290	40 ³	1-year	228	230	233	203	203	204
				5-year	196	198	200	175	176	176
				10-year	187	189	190	167	167	168
				20-year	185	186	187	166	166	166
TIN	5.0 ¹ /1.5 ²	2.9	2.1 ³	1-year	2.20	2.24	2.28	1.85	1.86	1.87
				5-year	1.82	1.85	1.89	1.52	1.52	1.53
				10-year	1.69	1.71	1.74	1.40	1.40	1.41
				20-year	1.62	1.65	1.67	1.36	1.37	1.37
Average Annual Streambed Recharge [acre-ft/yr]					1,261	1,260	1,259	1,479	1,478	1,478

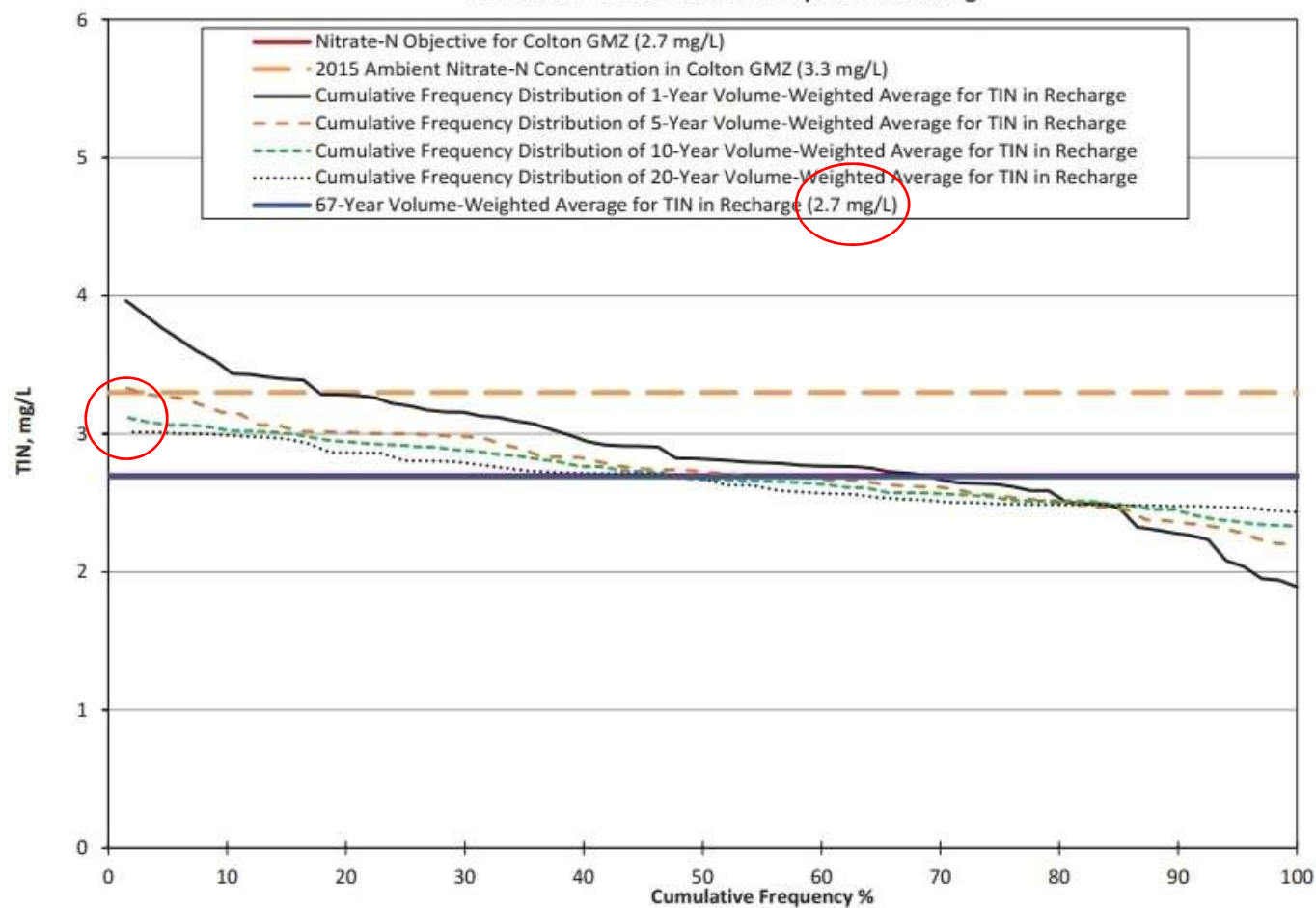
Table 6-2. Predictive Scenario Results – San Timoteo Management Zone

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]			
TDS	400 ¹ /300 ²	420	None	1-year	371	368	369	348	344	327
				5-year	355	353	352	305	302	286
				10-year	337	335	333	278	276	265
				20-year	306	304	302	251	249	238
TIN	5.0 ¹ /2.7 ²	2.0	3.0 ³	1-year	4.26	4.14	4.01	3.79	3.70	3.25
				5-year	4.07	3.94	3.80	3.26	3.17	2.84
				10-year	3.84	3.72	3.57	2.98	2.92	2.61
				20-year	3.47	3.36	3.22	2.67	2.61	2.32
Average Annual Streambed Recharge [acre-ft/yr]					6,473	6,386	6,337	7,945	7,872	7,716

Table 6-4. Predictive Scenario Results – Colton 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	410	480	none	1-year	399	307	260	346	356	293
				5-year	340	250	221	307	300	237
				10-year	317	246	217	290	281	233
				20-year	304	237	211	282	270	225
TIN	2.7	3.3	none	1-year	3.97	2.35	2.30	3.53	3.43	2.23
				5-year	3.33	1.99	1.81	3.02	2.76	1.85
				10-year	3.12	1.95	1.64	2.87	2.64	1.81
				20-year	3.01	1.84	1.56	2.81	2.58	1.72
Average Annual Streambed Recharge [acre-ft/yr]					2,709	2,147	2,003	3,224	2,960	2,409

**Estimated Cumulative Frequency Distribution of Volume-Weighted TIN Concentration
of Santa Ana River - Reach 4 Overlying Colton GMZ
Scenario A - 2020 Maximum Expected Discharge**



TIN Mass Balance in Reach 4 of the Santa Ana River overlying the Colton GMZ¹
(Water Year 2007 to 2016)

Water Year	Inflow						Outflow											
	Upstream Inflow			Surface Runoff from Precipitation			Streambed Percolation			Evapotranspiration			Downstream Outflow			Denitrification		
	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass
	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]
2007	2,101	1.5	4	2,240	0.8	3	848	1.3	2	255	0.0	0	3,238	1.2	5	NA	NA	0
2008	21,712	1.9	55	8,458	0.5	6	1,562	2.1	5	414	0.0	0	28,187	1.5	57	NA	NA	0
2009	13,775	1.8	34	5,625	0.5	4	1,175	1.7	3	315	0.0	0	17,902	1.4	34	NA	NA	0
2010	42,700	2.4	137	11,432	0.5	8	1,811	2.0	5	531	0.0	0	51,767	2.0	139	NA	NA	0
2011	117,877	2.7	434	27,656	0.7	27	2,634	2.5	9	573	0.0	0	142,261	2.3	451	NA	NA	0
2012	6,943	1.5	14	4,402	0.6	4	1,254	1.4	2	382	0.0	0	9,707	1.2	16	NA	NA	0
2013	5,990	1.3	10	3,228	0.7	3	1,107	1.5	2	348	0.0	0	7,760	1.1	11	NA	NA	0
2014	8,751	1.1	13	5,130	0.5	3	1,044	1.2	2	273	0.0	0	12,560	0.8	14	NA	NA	0
2015	8,949	0.9	10	6,143	0.5	4	1,204	1.2	2	292	0.0	0	13,591	0.7	12	NA	NA	0
2016	7,426	1.2	12	4,463	0.6	3	1,106	1.5	2	313	0.0	0	10,466	0.9	13	NA	NA	0
Annual Average	23,622	1.6	72	7,878	0.6	6	1,374	1.7	3	370	0.0	0	29,744	1.3	75	NA	NA	0

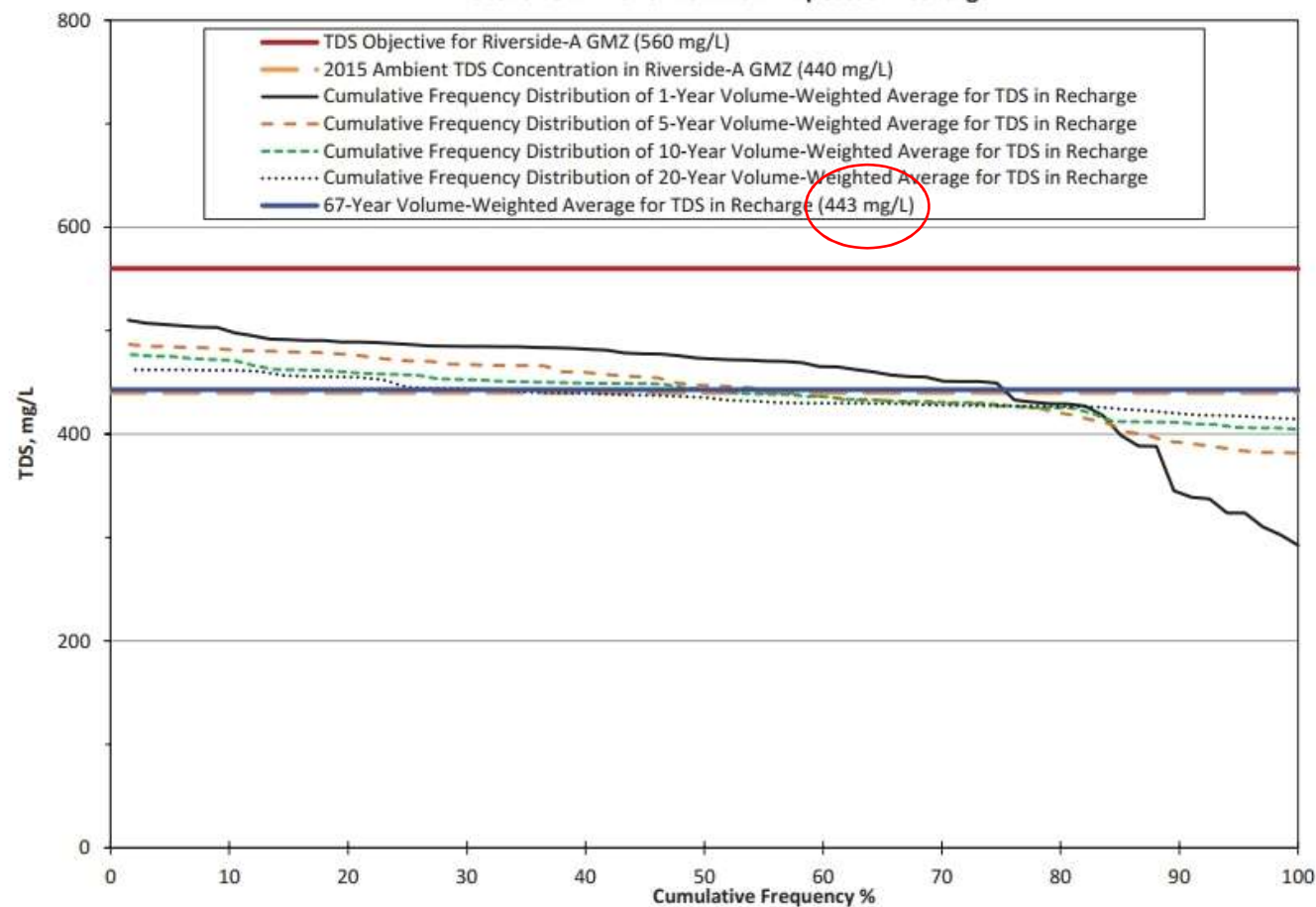
1. GMZ = Groundwater Management Zone

Table 6-5. Predictive Scenario Results – Riverside-A 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]		
TDS	560	440	120	1-year	510	487	486	492	477	471
				5-year	487	453	449	467	446	431
				10-year	477	440	436	457	434	417
				20-year	462	422	417	444	418	399
TIN	6.2	5.6	0.6	1-year	6.95	6.67	6.63	6.80	6.57	6.38
				5-year	6.59	6.15	6.09	6.42	6.09	5.78
				10-year	6.44	5.96	5.90	6.27	5.90	5.57
				20-year	6.20	5.65	5.58	6.05	5.65	5.28
Average Annual Streambed Recharge [acre-ft/yr]					51,690	37,522	35,841	55,882	45,632	37,579

*Note: Bold black values represent concentrations above ambient groundwater quality but below the objective. Bold red values represent

**Estimated Cumulative Frequency Distribution of Volume-Weighted TDS Concentration
of Santa Ana River - Reach 4 Overlying Riverside-A GMZ
Scenario A - 2020 Maximum Expected Discharge**



TDS Mass Balance in Reach 4 of the Santa Ana River overlying the Riverside-A GMZ¹ above Mission Blvd
(Water Year 2007 to 2016)

Water Year	Inflow															Outflow								
	Upstream Inflow			Surface Runoff from Precipitation			Colton WWTP			Rialto WWTP			RIX Facility			Streambed Percolation			Evapotranspiration			Downstream Outflow		
	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass
	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons
2007	3,238	192	846	2,364	203	654	0	0	0	7,654	478	4,976	44,537	489	29,627	46,243	465	29,232	157	0	0	11,352	444	6,847
2008	28,187	130	4,988	8,092	100	1,099	0	0	0	7,257	503	4,962	42,737	500	29,079	50,939	422	29,240	169	0	0	35,118	228	10,869
2009	17,902	128	3,110	6,329	109	934	0	0	0	6,958	487	4,604	40,214	474	25,925	47,368	423	27,266	147	0	0	23,840	225	7,285
2010	51,767	148	10,411	10,856	88	1,292	0	0	0	6,651	383	3,468	40,107	487	26,538	52,224	384	27,267	176	0	0	56,922	186	14,421
2011	142,261	165	31,847	20,234	67	1,855	0	0	0	6,829	222	2,057	39,333	491	26,261	60,112	336	27,484	204	0	0	148,262	171	34,535
2012	9,707	154	2,038	4,901	147	981	0	0	0	6,766	352	3,242	37,966	498	25,714	46,184	425	26,717	161	0	0	12,960	297	5,241
2013	7,760	155	1,636	4,359	151	896	0	0	0	6,649	361	3,261	35,391	506	24,337	43,846	436	25,985	150	0	0	10,130	299	4,121
2014	12,560	100	1,709	5,822	107	850	0	0	0	6,527	355	3,151	33,270	496	22,429	42,094	423	24,227	158	0	0	15,891	180	3,894
2015	13,591	109	2,007	7,613	104	1,078	0	0	0	6,285	386	3,300	31,641	505	21,730	41,830	419	23,834	150	0	0	17,116	183	4,266
2016	10,466	119	1,699	4,807	128	837	0	0	0	6,437	469	4,108	32,431	479	21,143	41,650	428	24,239	147	0	0	12,310	211	3,529
Annual Average	29,744	140	6,029	7,538	120	1,048	0	0	0	6,801	400	3,713	37,763	493	25,278	47,249	416	26,549	162	0	0	34,390	242	9,501

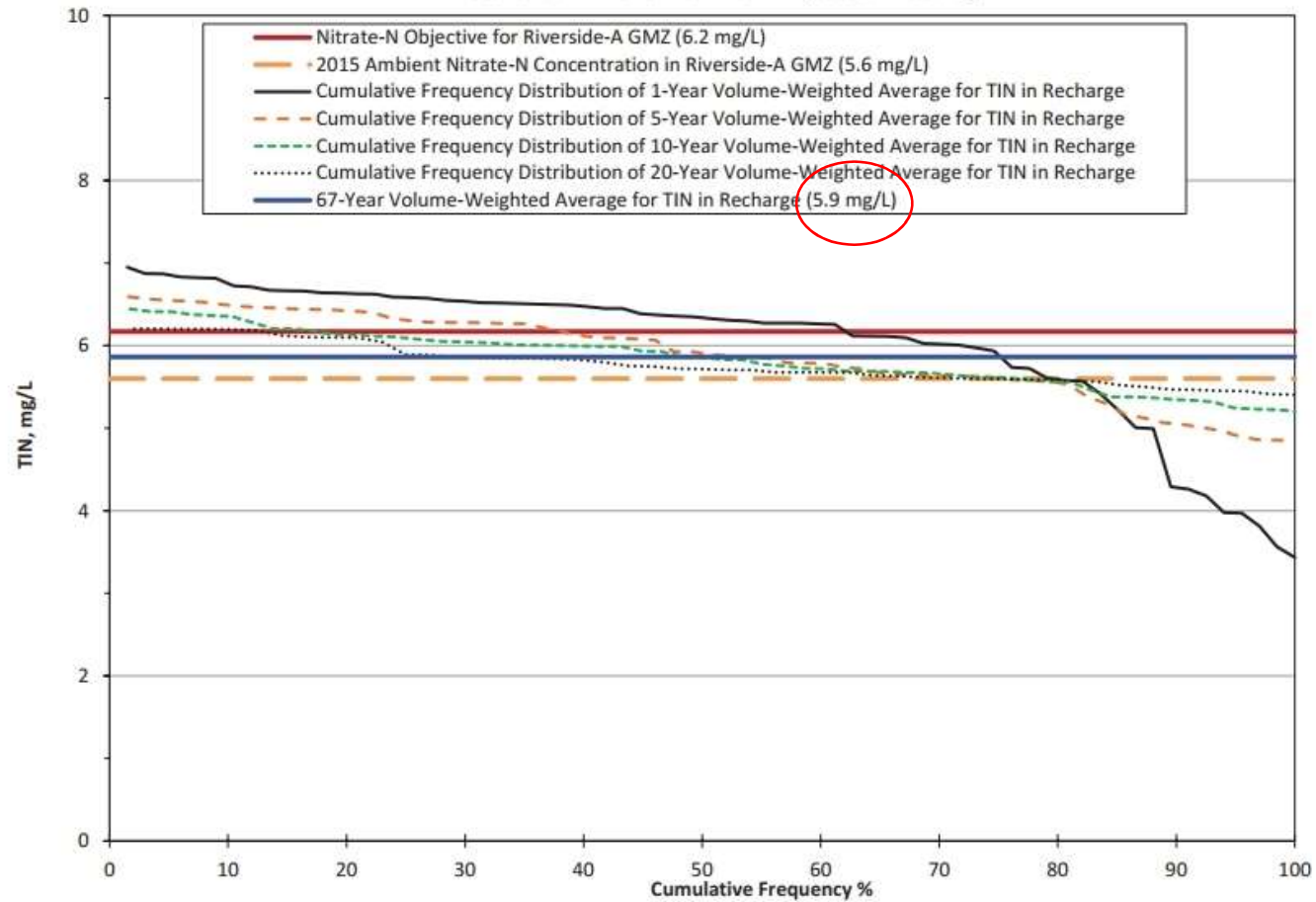
1. GMZ = Groundwater Management Zone

Table 6-5. Predictive Scenario Results – Riverside-A 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]		
TDS	560	440	120	1-year	510	487	486	492	477	471
				5-year	487	453	449	467	446	431
				10-year	477	440	436	457	434	417
				20-year	462	422	417	444	418	399
TIN	6.2	5.6	0.6	1-year	6.95	6.67	6.63	6.80	6.57	6.38
				5-year	6.59	6.15	6.09	6.42	6.09	5.78
				10-year	6.44	5.96	5.90	6.27	5.90	5.57
				20-year	6.20	5.65	5.58	6.05	5.65	5.28
Average Annual Streambed Recharge [acre-ft/yr]					51,690	37,522	35,841	55,882	45,632	37,579

*Note: Bold black values represent concentrations above ambient groundwater quality but below the objective. Bold red values represent

**Estimated Cumulative Frequency Distribution of Volume-Weighted TIN Concentration
of Santa Ana River - Reach 4 Overlying Riverside-A GMZ
Scenario A - 2020 Maximum Expected Discharge**



**TIN Mass Balance in Reach 4 of the Santa Ana River overlying the Riverside-A GMZ¹ above Mission Blvd
(Water Year 2007 to 2016)**

Water Year	Inflow															Outflow											
	Upstream Inflow			Surface Runoff from Precipitation			Colton WWTP			Rialto WWTP			RIX Facility			Streambed Percolation			Evapotranspiration			Downstream Outflow			Denitrification		
	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass	Flow	TIN Conc.	TIN Mass
	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons
2007	3,238	1.2	5	2,364	1.7	6	0	0.0	0	7,654	8.1	84	44,537	7.0	424	46,243	6.6	418	157	0.0	0	11,352	6.4	99	NA	NA	1
2008	28,187	1.5	57	8,092	0.7	8	0	0.0	0	7,257	8.2	81	42,737	7.2	421	50,939	6.0	416	169	0.0	0	35,118	3.1	148	NA	NA	1
2009	17,902	1.4	34	6,329	0.8	7	0	0.0	0	6,958	8.8	83	40,214	8.3	451	47,368	7.1	459	147	0.0	0	23,840	3.5	115	NA	NA	1
2010	51,767	2.0	139	10,856	0.6	9	0	0.0	0	6,651	8.8	79	40,107	7.3	397	52,224	5.8	410	176	0.0	0	56,922	2.7	213	NA	NA	1
2011	142,261	2.3	451	20,234	0.5	13	0	0.0	0	6,829	8.7	81	39,333	7.1	378	60,112	5.0	410	204	0.0	0	148,262	2.5	511	NA	NA	1
2012	9,707	1.2	16	4,901	1.2	8	0	0.0	0	6,766	9.5	87	37,966	7.2	370	46,184	6.4	404	161	0.0	0	12,960	4.2	74	NA	NA	1
2013	7,760	1.1	11	4,359	1.2	7	0	0.0	0	6,649	9.0	81	35,391	7.5	363	43,846	6.7	401	150	0.0	0	10,130	4.4	60	NA	NA	1
2014	12,560	0.8	14	5,822	0.9	7	0	0.0	0	6,527	9.1	81	33,270	9.2	414	42,094	7.9	451	158	0.0	0	15,891	2.9	63	NA	NA	1
2015	13,591	0.7	12	7,613	0.8	8	0	0.0	0	6,285	9.5	81	31,641	6.9	296	41,830	6.0	343	150	0.0	0	17,116	2.2	52	NA	NA	1
2016	10,466	0.9	13	4,807	1.0	7	0	0.0	0	6,437	9.3	81	32,431	7.9	347	41,650	7.0	397	147	0.0	0	12,310	3.0	50	NA	NA	1
Annual Average	29,744	1.3	75	7,538	0.9	8	0	0	0	6,801	8.9	82	37,763	7.5	386	47,249	6.5	411	162	0.0	0	34,390	3.5	139	NA	NA	1

1. GMZ = Groundwater Management Zone

Table 6-6. Predictive Scenario Results – Chino-South 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]		
TDS	680	940	none	1-year	629	644	646	599	618	624
				5-year	497	506	509	461	461	464
				10-year	458	466	468	413	419	422
				20-year	408	413	414	374	374	375
TIN	5.0 ¹	27.8	none	1-year	4.47	4.45	4.42	4.35	4.27	4.25
				5-year	3.48	3.47	3.45	3.29	3.12	3.11
				10-year	3.20	3.18	3.16	2.94	2.84	2.82
				20-year	2.86	2.83	2.80	2.66	2.55	2.52
Average Annual Streambed Recharge [acre-ft/yr]					49,785	47,672	47,022	58,387	53,897	52,898

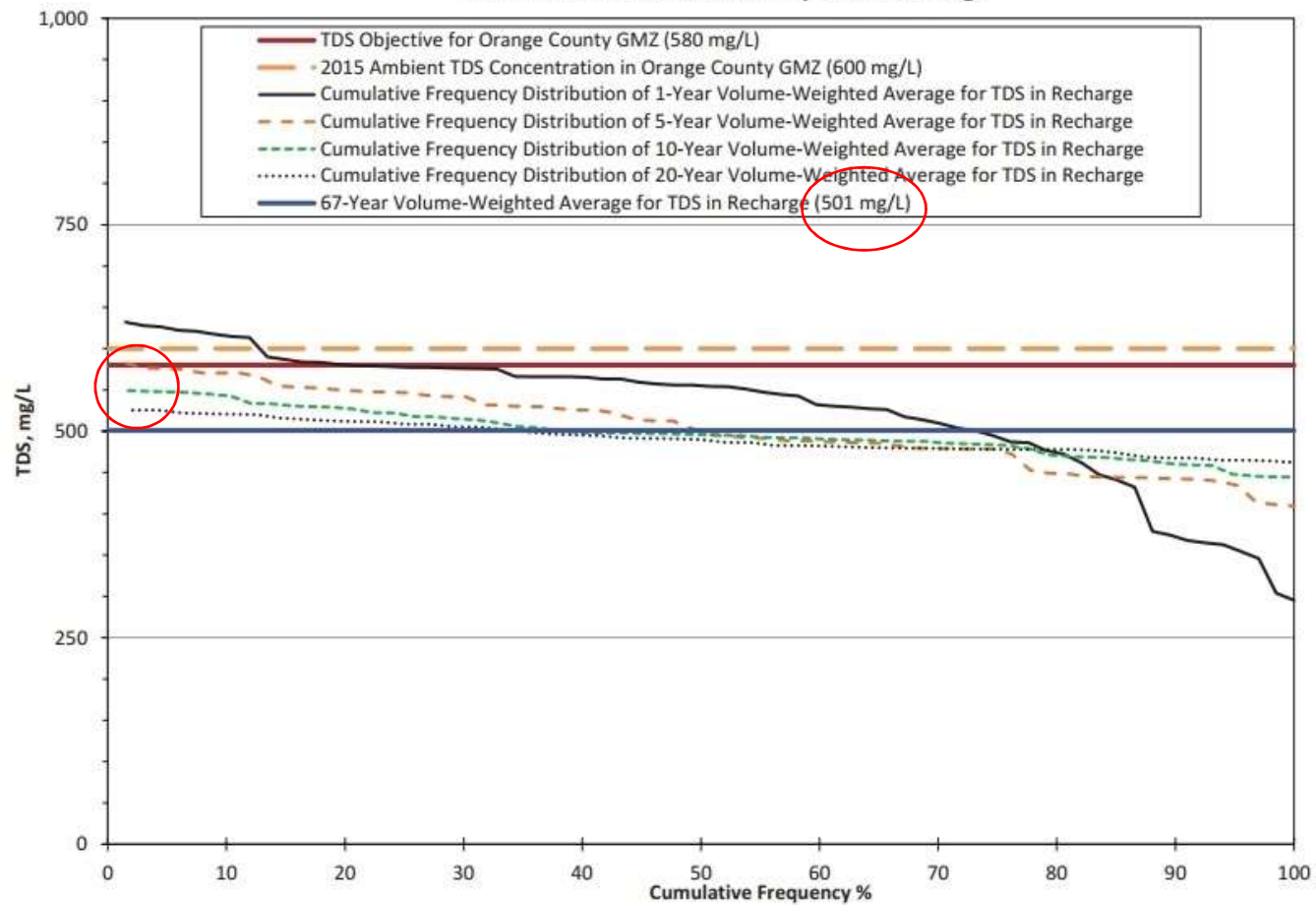
Table 6-7. Predictive Scenario Results – Upper Temescal Valley Management Zone

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]		
TDS	820 ¹	750 ²	70	1-year	657	404	317	645	431	378
				5-year	639	367	292	615	393	343
				10-year	629	354	279	604	374	327
				20-year	624	349	276	595	367	320
TIN	7.9 ¹	4.7 ²	3.2	1-year	7.03	4.48	3.44	6.88	4.80	4.17
				5-year	6.89	4.02	3.11	6.65	4.29	3.68
				10-year	6.80	3.84	2.92	6.50	4.04	3.44
				20-year	6.73	3.75	2.86	6.40	3.93	3.36
Average Annual Streambed Recharge [acre-ft/yr]					7,308	4,196	3,677	7,593	5,061	4,779

Table 6-9. Predictive Scenario Results – Orange County 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	580	600	none	1-year	632	679	732	588	684	726
				5-year	582	646	684	536	636	669
				10-year	549	610	634	500	590	611
				20-year	525	569	582	480	552	562
TIN	3.4	3.0	0.4	1-year	3.23	3.05	2.62	3.51	3.21	2.64
				5-year	2.97	2.92	2.47	3.25	2.99	2.48
				10-year	2.82	2.78	2.33	3.06	2.80	2.30
				20-year	2.72	2.63	2.20	2.94	2.66	2.17
Average Annual Streambed Recharge [acre-ft/yr]					105,044	78,187	64,313	115,060	82,997	69,213

Estimated Cumulative Frequency Distribution of Volume-Weighted TDS Concentration
of Santa Ana River - Reach 2 Overlying Orange County GMZ
Scenario A - 2020 Maximum Expected Discharge



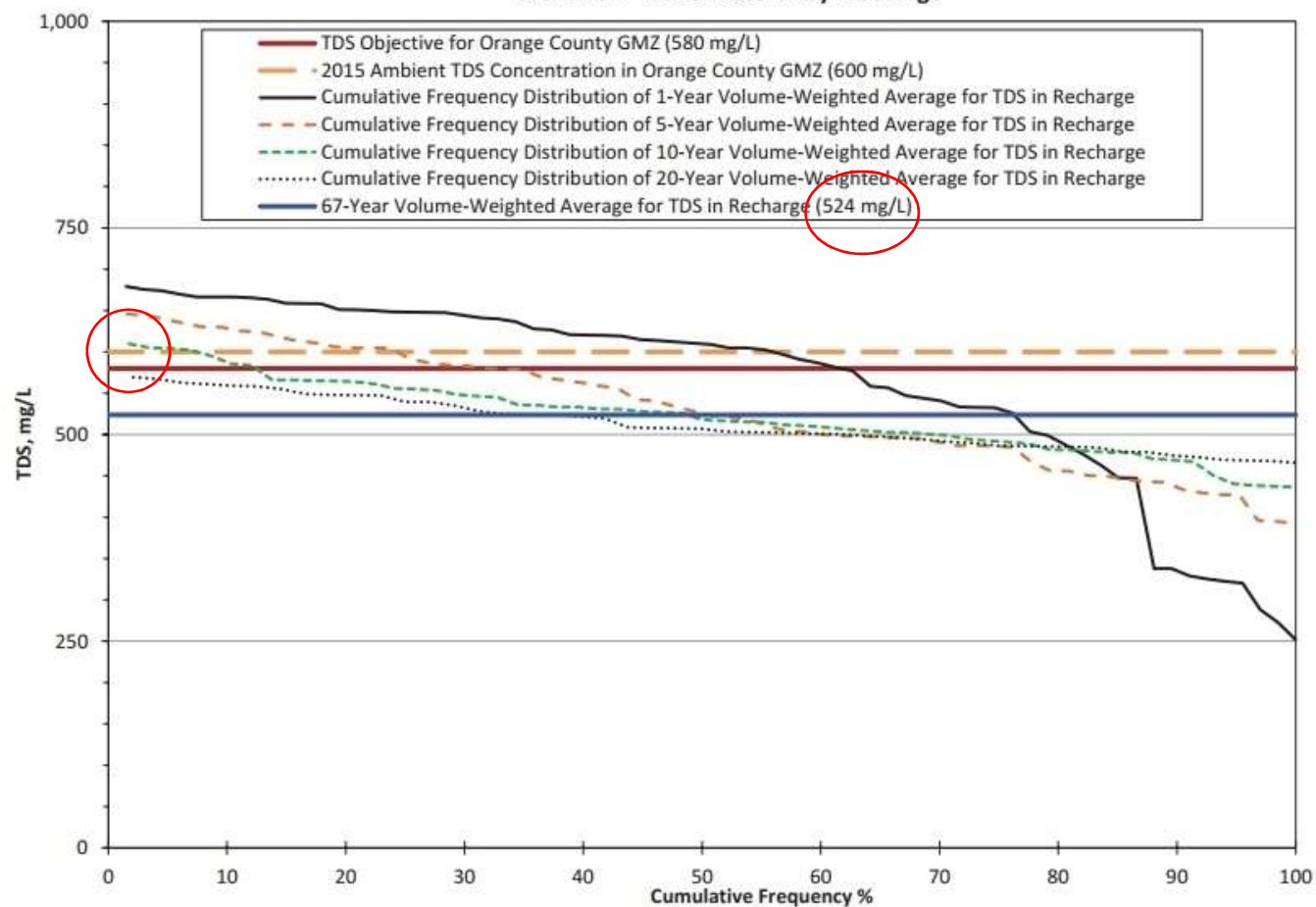
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GEOSCIENCE Support Services, Inc.

Appendix G

Estimated Cumulative Frequency Distribution of Volume-Weighted TDS Concentration
of Santa Ana River - Reach 2 Overlying Orange County GMZ
Scenario B - 2020 Most Likely Discharge



Estimated Cumulative Frequency Distribution of Volume-Weighted TDS Concentration
of Santa Ana River - Reach 2 Overlying Orange County GMZ
Scenario C - 2020 Minimum Expected Discharge

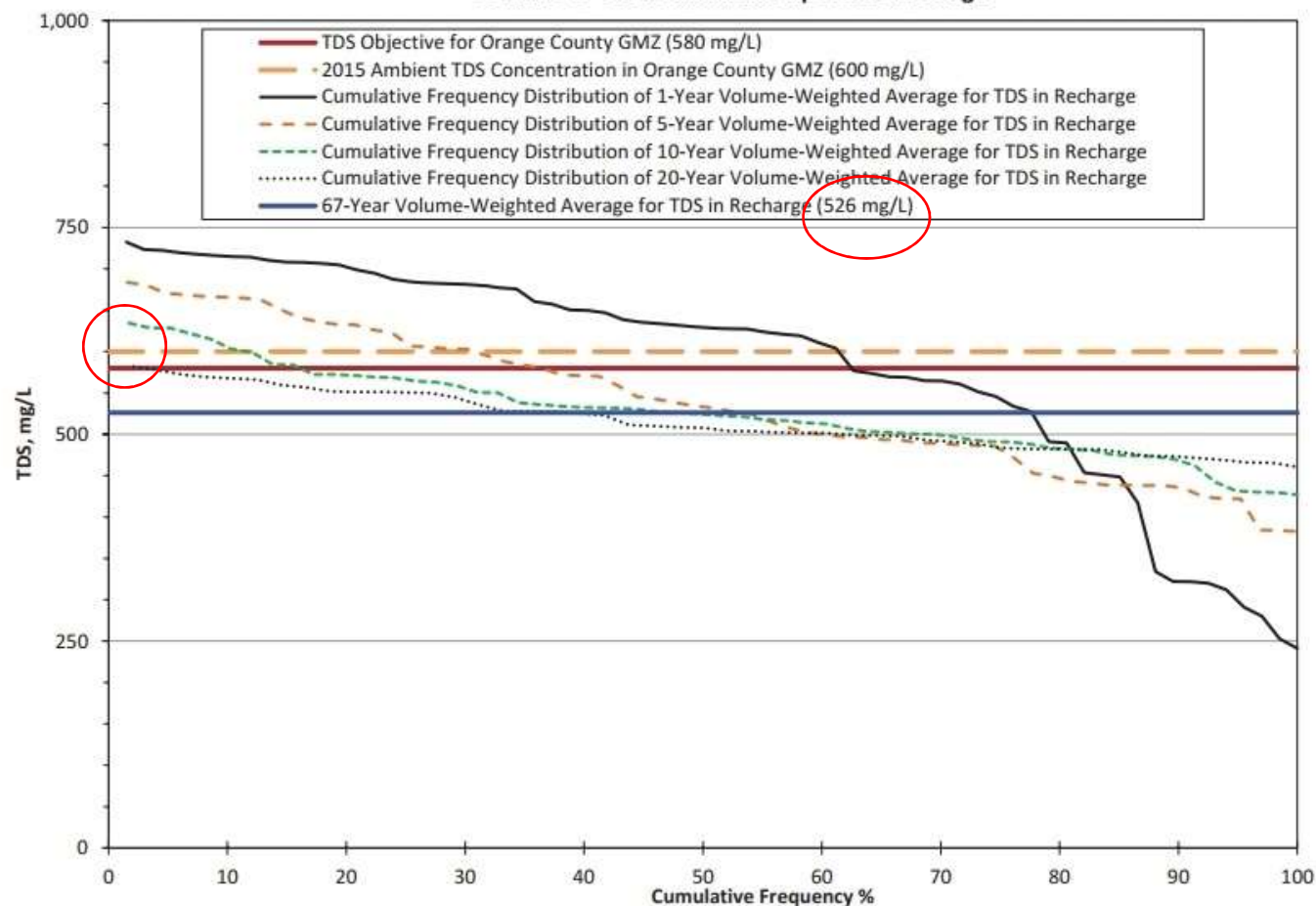


Table 6-10. Predictive Scenario Results – Santa Ana River below Prado Dam

Constituent	Objective	Ambient	Assimilative Capacity	Compliance Period	MAXIMUM VALUE FOR THE VOLUME-WEIGHTED STREAM CONCENTRATION					
					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	na	na ¹	August-Only ² (Reach 3)	616	722	746	615	721	736
	650 ³	na	na ¹	5-year moving average of the 1-year volume-weighted average (Reach 2)	523	481	445	522	464	421
TIN	10.0	na	na ¹	August-Only ² (Reach 3)	6.98	5.69	5.01	6.94	6.03	4.99
	na	na	na ¹	5-year moving average of the 1-year volume-weighted average (Reach 2)	5.77	4.14	3.17	5.86	4.16	3.06
Average Annual Discharge [acre-ft/yr]					278,902	171,456	141,033	345,816	194,402	162,466

**Estimated Cumulative Frequency Distribution of Volume-Weighted TDS Concentration
at Santa Ana River Below Prado Dam
Scenario B - 2020 Most Likely Discharge**

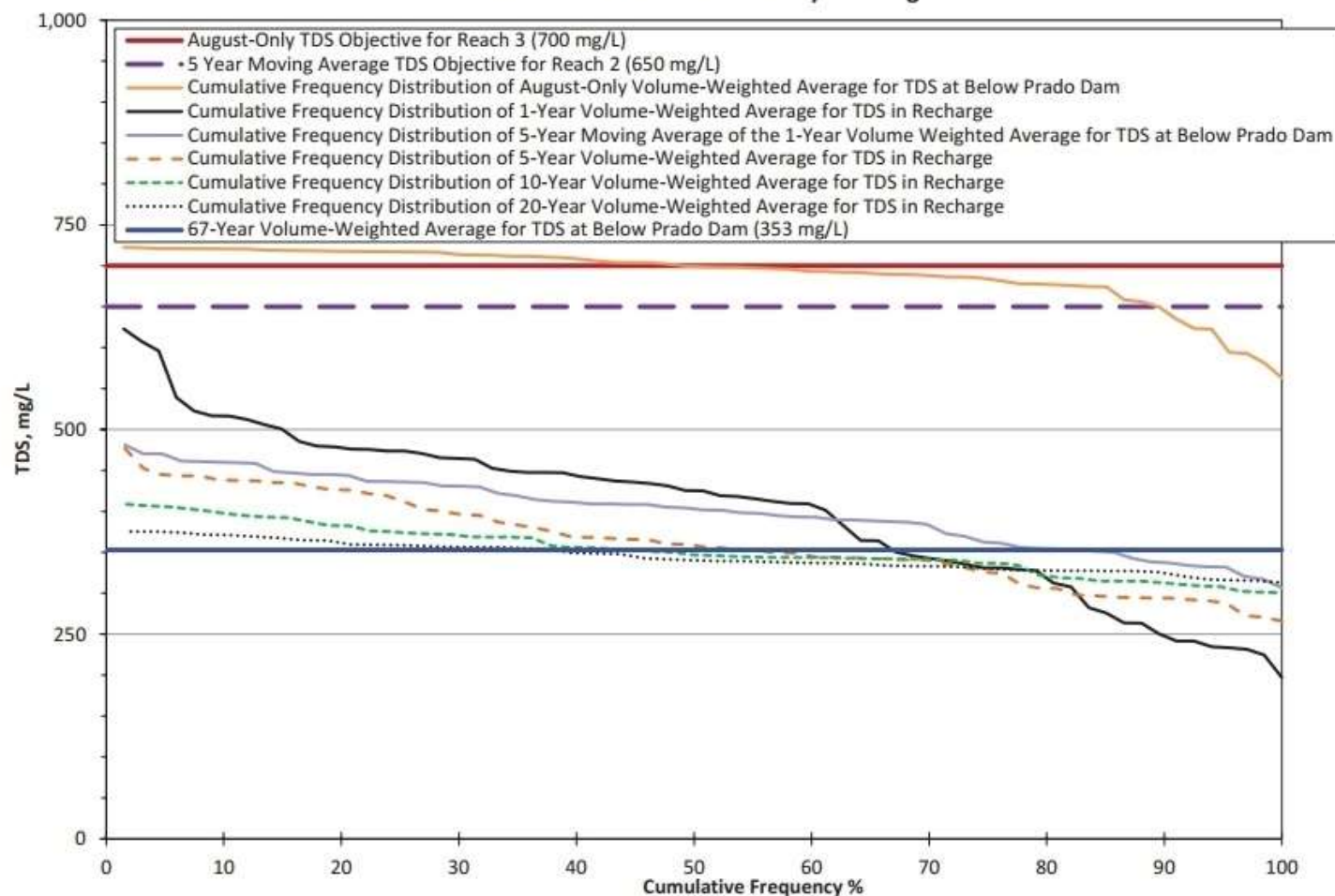


Table 6-8. Predictive Scenario Results – Prado Basin Management Zone

Constituent	Objective	Ambient	Assimilative Capacity	Compliance Period	MAXIMUM VALUE FOR THE VOLUME-WEIGHTED STREAM CONCENTRATION					
					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]			
TDS	550 - 700 ¹	na ²	na	1-year	652	662	666	636	650	654
				5-year	637	646	649	622	635	638
				10-year	630	638	640	616	627	629
				20-year	621	629	630	607	617	619
TIN	8.0 - 10.0 ¹	na ²	na	1-year	6.46	6.34	6.26	6.53	6.29	6.21
				5-year	6.30	6.18	6.09	6.38	6.13	6.05
				10-year	6.24	6.10	6.00	6.31	6.05	5.97
				20-year	6.16	6.02	5.92	6.24	5.97	5.88
Average Annual Streambed Recharge ³ [acre-ft/yr]					14,713	14,700	14,692	14,729	14,706	14,698

* Based on Prado Basin Management Zone Objectives presented in the Prado Basin Surface Water Management Zone Ordinance of the 2016

TDS Mass Balance in Reach 3 of the Santa Ana River overlying the Prado Basin GMZ¹
(Water Year 2007 to 2016)

Water Year	Inflow															Outflow											
	Upstream Inflow			Surface Runoff from Precipitation			Western Riverside County RWAP			Corona WWTP-1			Rising Water			Streambed Percolation			Evapotranspiration			OCWD Prado Wetland Diversion			Downstream Outflow		
	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass
	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons	acre-ft	mg/L	tons
2007	62,249	575	48,657	85,379	501	58,170	4,437	579	3,494	5,837	820	6,510	18,006	1,093	26,757	17,243	600	14,066	769	0	0	24,371	572	18,970	133,512	609	110,552
2008	90,351	422	51,868	110,532	374	56,187	6,002	560	4,566	3,512	715	3,412	17,664	1,038	24,933	17,302	581	13,659	762	0	0	27,665	511	19,222	182,301	436	108,083
2009	76,973	443	46,370	99,965	366	49,716	6,373	549	4,753	3,308	712	3,203	16,125	1,166	25,572	17,250	596	13,980	739	0	0	23,578	530	16,998	161,146	450	98,648
2010	119,863	327	53,323	133,380	271	49,226	6,404	532	4,630	1,708	699	1,624	17,668	1,097	26,359	17,264	539	12,654	705	0	0	29,681	466	18,808	231,300	330	103,698
2011	197,321	266	71,323	181,787	232	57,367	6,563	517	4,611	3,632	651	3,216	15,134	1,060	21,816	17,284	512	12,041	745	0	0	37,182	443	22,372	349,129	261	123,903
2012	64,828	490	43,219	73,421	357	35,599	6,435	518	4,536	3,139	658	2,808	14,881	1,066	21,567	17,290	576	13,530	809	0	0	23,881	503	16,318	120,705	475	77,888
2013	60,180	508	41,608	58,767	383	30,625	6,906	522	4,901	2,299	718	2,244	14,749	1,018	20,408	17,239	588	13,785	783	0	0	22,417	515	15,699	102,442	505	70,304
2014	57,531	479	37,500	46,914	381	24,310	7,114	532	5,143	1,822	693	1,717	14,749	1,017	20,388	17,235	596	13,973	827	0	0	18,990	529	13,665	91,057	496	61,422
2015	66,166	419	37,710	76,979	301	31,470	6,931	532	5,010	1,722	710	1,663	14,749	1,059	21,236	17,239	574	13,448	792	0	0	20,887	473	13,425	127,596	405	70,213
2016	57,759	469	36,868	67,482	334	30,638	7,601	524	5,410	6,530	682	6,056	14,802	1,009	20,315	17,285	586	13,768	771	0	0	19,448	513	13,577	116,643	454	71,937
Annual Average	85,322	440	46,844	93,461	350	42,331	6,477	536	4,705	3,351	706	3,245	15,853	1,062	22,935	17,263	575	13,490	770	0	0	24,810	506	16,905	161,583	442	89,665

1. GMZ = Groundwater Management Zone

TDS Mass Balance in Reach 2 of the Santa Ana River overlying the Orange County GMZ¹
(Water Year 2007 to 2016)

Water Year	Inflow						Outflow											
	Upstream Inflow			Surface Runoff from Precipitation			Streambed Percolation			Evapotranspiration			OCWD Recharge Facilities Diversion			Downstream Outflow		
	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass	Flow	TDS Conc.	TDS Mass
	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]	[acre-ft]	[mg/L]	[tons]
2007	133,512	609	110,552	9,537	201	2,611	1,111	251	379	1,452	0	0	140,370	591	112,783	72	118	11
2008	182,301	436	108,083	22,926	138	4,310	12,902	266	4,665	1,496	0	0	157,655	448	96,024	33,135	260	11,714
2009	161,146	450	98,648	25,821	141	4,938	12,948	313	5,517	1,475	0	0	139,275	444	84,130	33,252	308	13,913
2010	231,300	330	103,698	47,695	109	7,091	28,585	292	11,344	1,481	0	0	150,996	302	62,103	97,918	281	37,355
2011	349,129	261	123,903	64,214	105	9,141	57,820	256	20,115	1,575	0	0	178,456	215	52,187	175,386	255	60,732
2012	120,705	475	77,888	19,948	155	4,201	3,127	265	1,127	1,587	0	0	132,232	443	79,638	3,696	264	1,329
2013	102,442	505	70,304	12,969	189	3,339	1,589	219	473	1,484	0	0	112,269	479	73,160	44	151	9
2014	91,057	496	61,422	11,700	165	2,632	1,574	209	448	1,549	0	0	97,992	475	63,301	1,605	129	283
2015	127,596	405	70,213	24,438	127	4,234	4,931	281	1,885	1,551	0	0	136,799	372	69,197	8,725	284	3,371
2016	116,643	454	71,937	18,252	148	3,678	2,946	211	847	1,513	0	0	127,156	429	74,136	3,263	145	642
Annual Average	161,583	442	89,665	25,750	148	4,618	12,753	256	4,680	1,516	0	0	137,320	420	76,666	35,709	219	12,936

1. GMZ = Groundwater Management Zone

Difficulty Interpreting WLAM Results to Assess Compliance Status

SURFACE SEGMENT	METRIC	TDS	REFERENCE
PBMZ	5-year Annual Avg.	646 mg/L	Table 6-8
SAR-Reach 2	5-year Annual Avg.	646 mg/L	Table 6-9
SAR Below Prado	5-year Annual Avg.	481 mg/L	Table 6-20
SAR-R3 Baseflow	1-yr. Baseflow Avg.	722 mg/L	Table 6-9
PBMZ-Calib. ('07-'16)	10-yr. Annual Avg.	442 mg/L	Table 15
SAR-R2 Calib. ('07-'16)	10-yr. Annual Avg.	256 mg/L	Table 17