Santa Ana River
Wasteload Allocation Model Update

June 18, 2019

Overview

- Major Assumptions of Waste Load Allocation Scenarios
- Results from Waste Load Allocation Scenarios
- Next Steps

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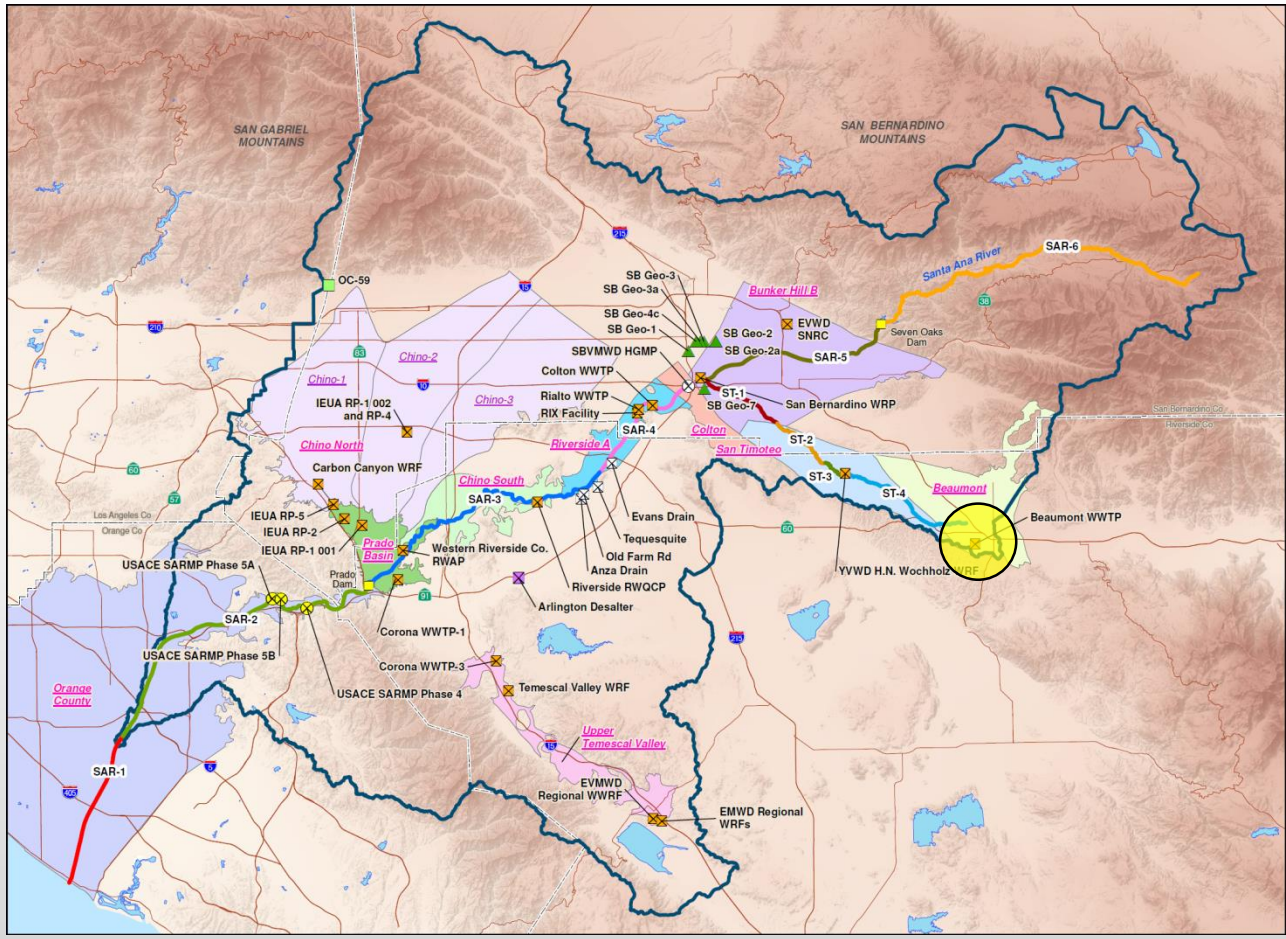
Major Assumptions for Waste Load Allocation Scenarios

Scenario	Hydrology	Land Use	Recycled Water Discharge to Surface Water			TDS	TIN
			Maximum Expected Discharge	Average Expected Discharge	Minimum Expected Discharge	Permit TDS	Permit TIN
A	WY 1950-2016	2020 Conditions (2012 Land Use)	X			X	X
B				X		X	X
C					X	X	X
D		2040 Conditions (General Plan, 2040)	X			X	X
E				X		X	X
F					X	X	X

City of Beaumont - Beaumont Wastewater Treatment Plant

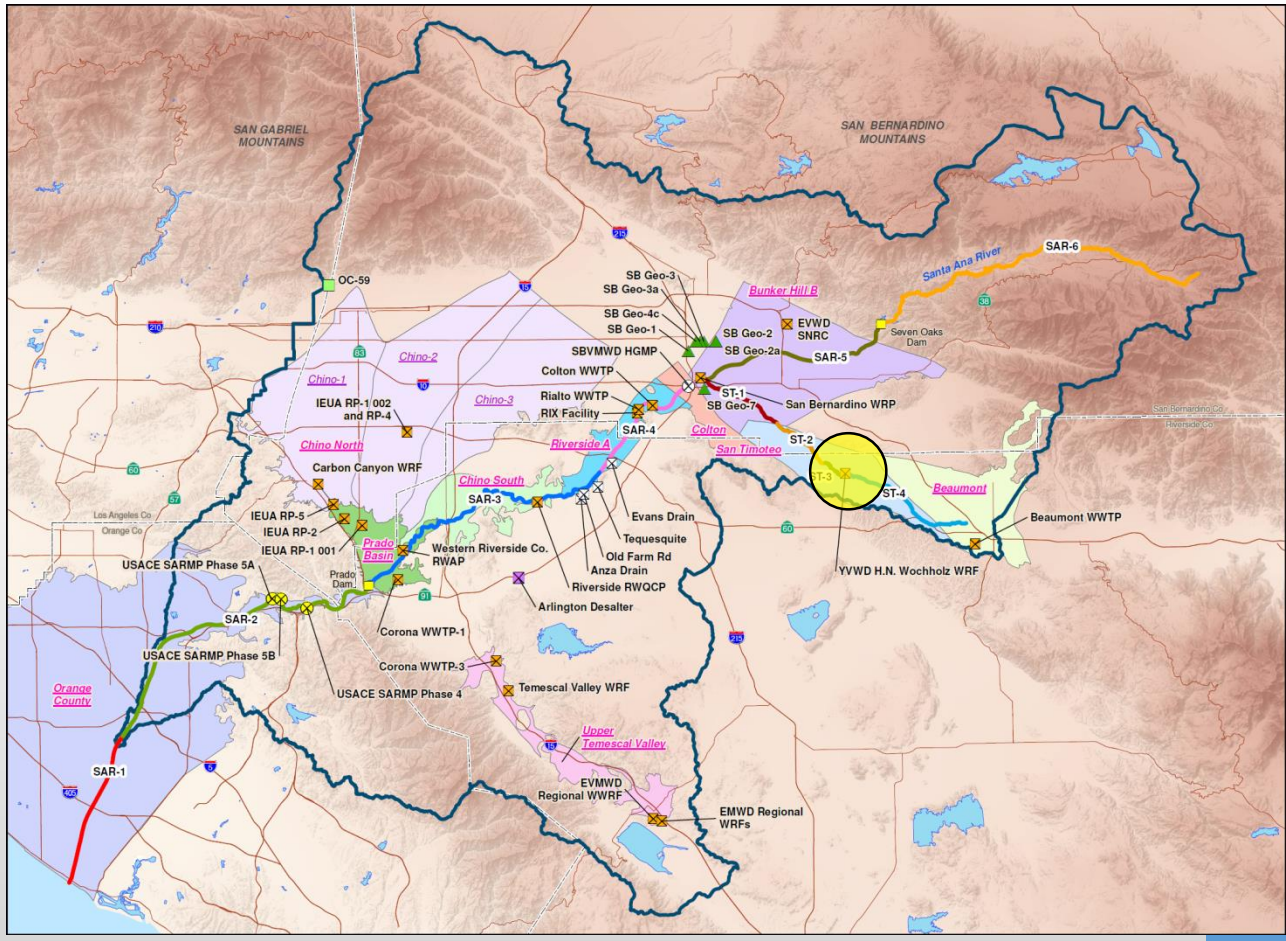
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	3.8	400 / 300[A]	6 / 3.6[A]
Scenario B	3.5	400 / 300[A]	6 / 3.6[A]
Scenario C	3.2	400 / 300[A]	6 / 3.6[A]
Scenario D	6.3	400 / 300[A]	6 / 3.6[A]
Scenario E	6.1	400 / 300[A]	6 / 3.6[A]
Scenario F	5.9	400 / 300[A]	6 / 3.6[A]



Note:
A. Discharge requirements on the initial 1.8 MGD of flow have higher allowable TDS and TIN concentrations (400 mg/L and 6 mg/L, respectively) than any additional flow (300 mg/L for TDS and 3.6 mg/L for TIN).

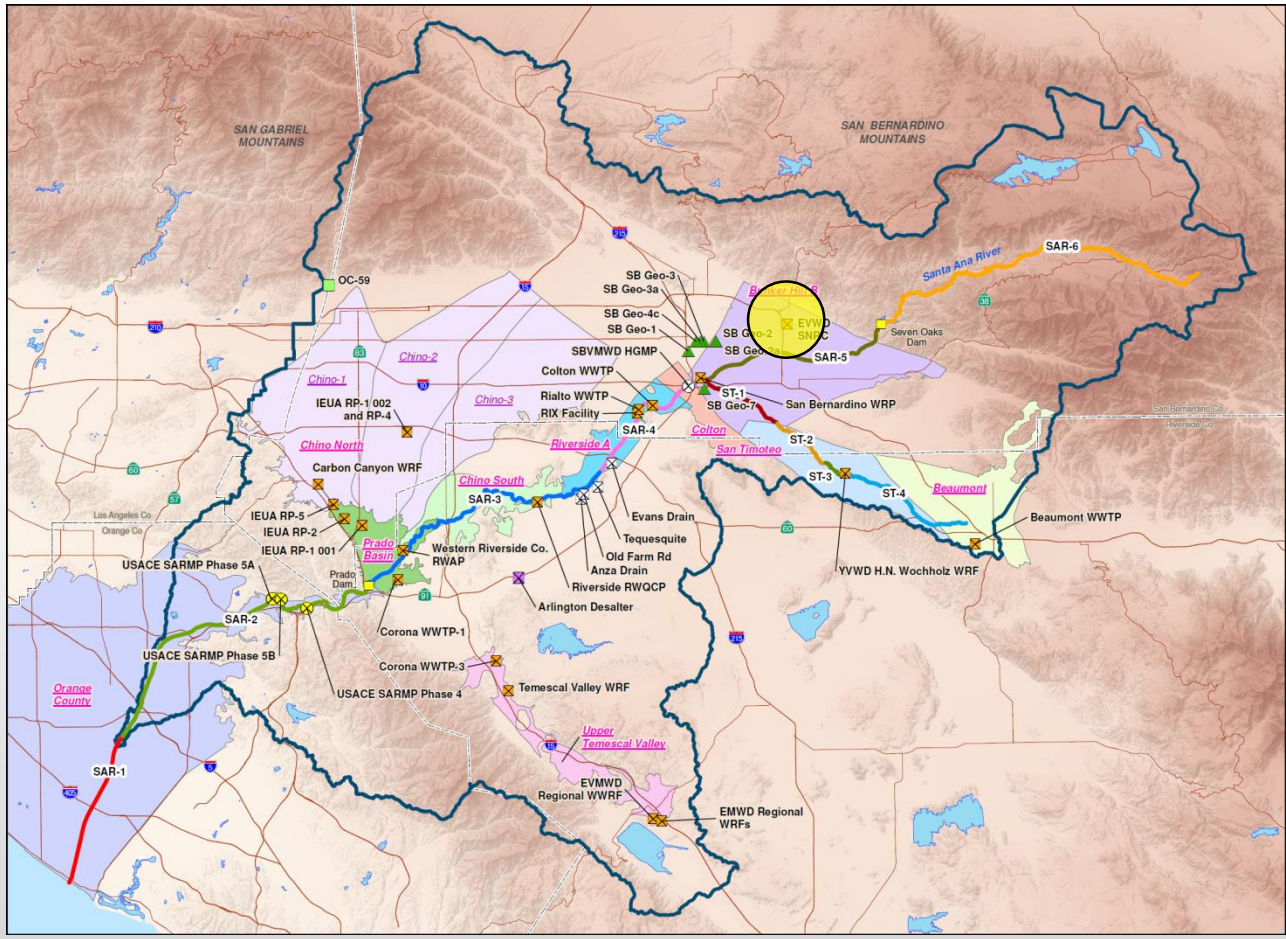
Yucaipa Valley Water District - H.N. Wochholz Water Recycling Facility

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	8.0	400	6.7
Scenario B	3.8	400	6.7
Scenario C	1.6	400	6.7
Scenario D	8.0	400	6.7
Scenario E	6.0	400	6.7
Scenario F	1.6	400	6.7



East Valley Water District - Sterling Natural Resource Center (SNRC)[B]

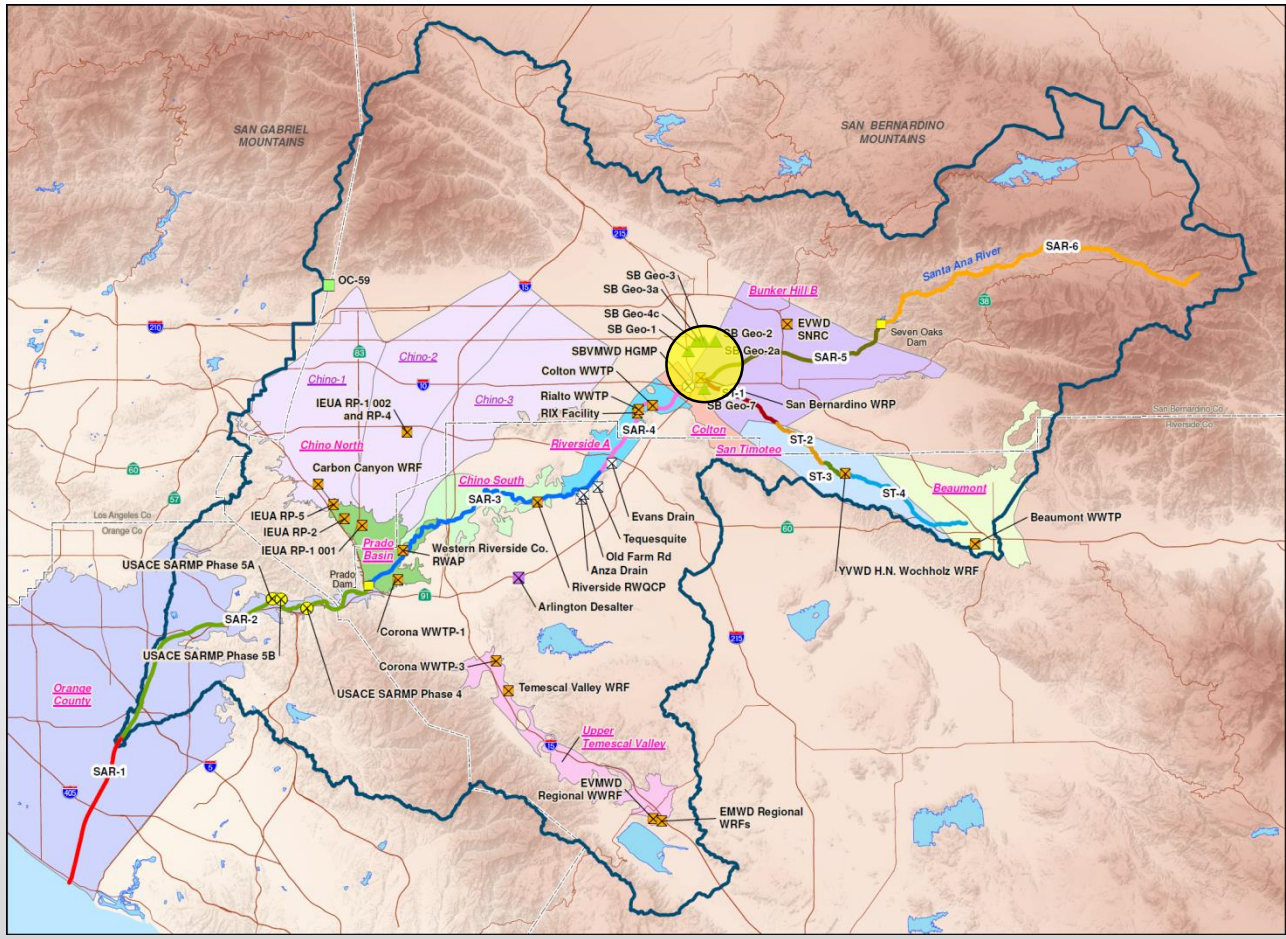
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	8	500	6[C]
Scenario B	6.8	500	6[C]
Scenario C	0.0	500	6[C]
Scenario D	10.0	500	6[C]
Scenario E	8.5	500	6[C]
Scenario F	0.0	500	6[C]



Note:
B. SNRC will be online as early as 2021, but was simulated under 2020 conditions.
C. Estimated 12-Month Volume-Weighted Rolling Average in 2040 (mg/L).

City of San Bernardino - San Bernardino Geothermal Plant

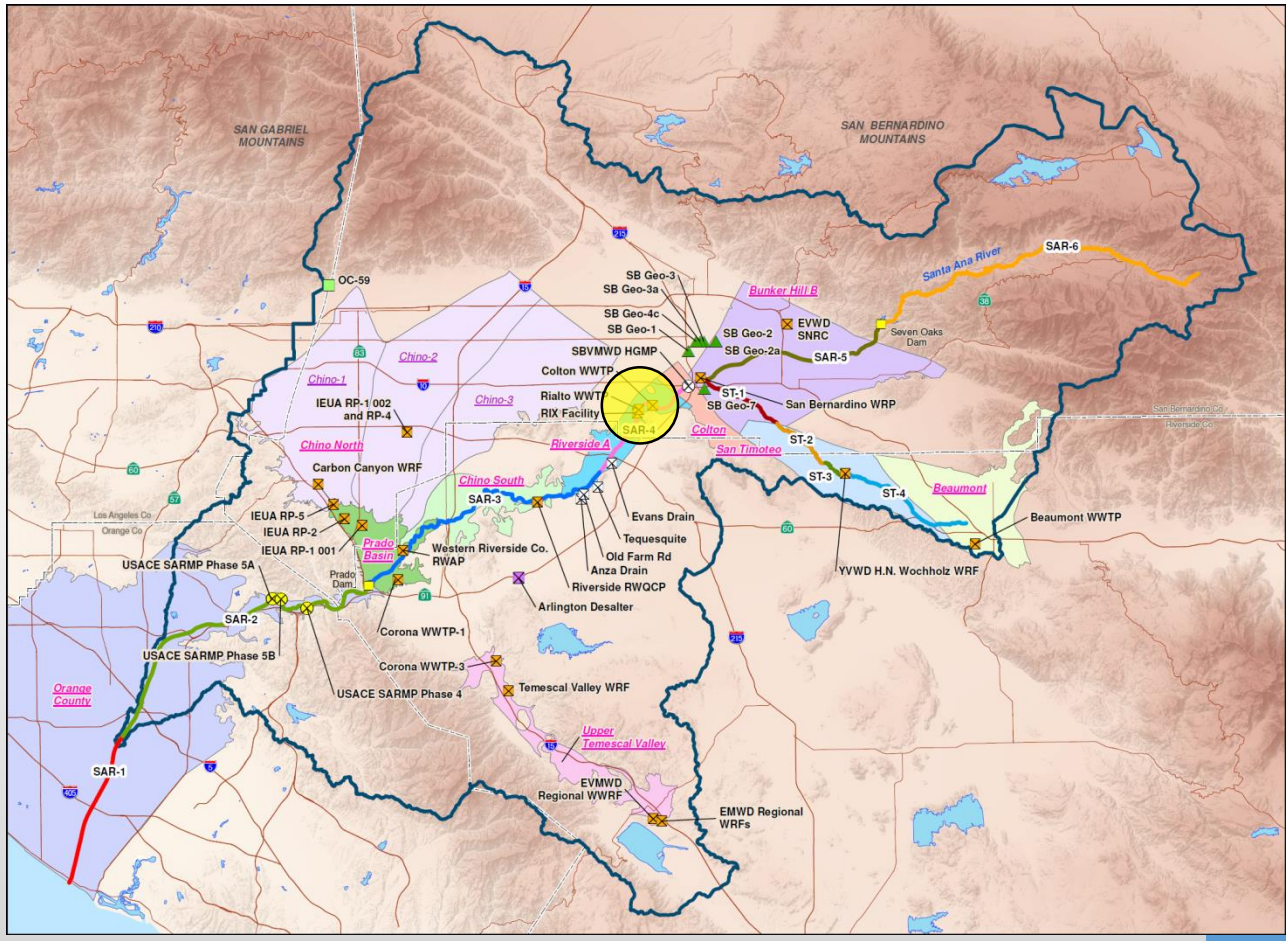
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	1.0[D]	264[D]	0.7[D]
Scenario B	1.0[D]	264[D]	0.7[D]
Scenario C	1.0[D]	264[D]	0.7[D]
Scenario D	1.0[D]	264[D]	0.7[D]
Scenario E	1.0[D]	264[D]	0.7[D]
Scenario F	1.0[D]	264[D]	0.7[D]



Note:
D. No discharge projection form (Appendix B) was provided. Discharge assumptions were based on average of last 5 years (WY 2012-2016).

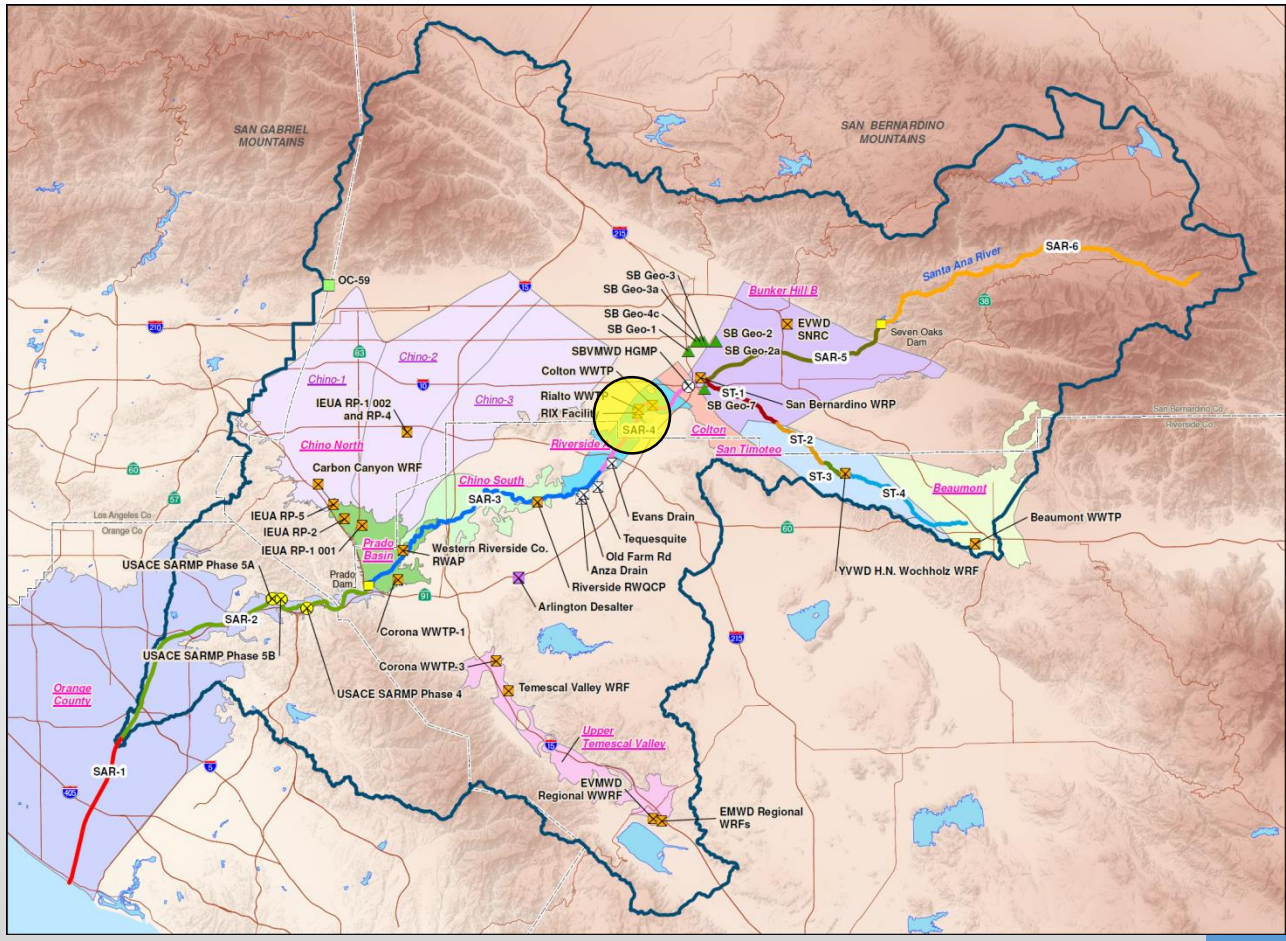
City of Rialto- Rialto Wastewater Treatment Plant

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	7.2	490	10.0
Scenario B	6.4	490	10.0
Scenario C	5.8	490	10.0
Scenario D	18.0	490	10.0
Scenario E	11.7	490	10.0
Scenario F	5.0	490	10.0



Colton/San Bernardino - Rapid Infiltration and Extraction (RIX) facility

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	34.5	550	10.0
Scenario B	17.8	550	10.0
Scenario C	16.9	550	10.0
Scenario D	30.1	550	10.0
Scenario E	18.4	550	10.0
Scenario F	17.3	550	10.0



City of Riverside - Riverside Regional Water Quality Control Plant (RWQCP)

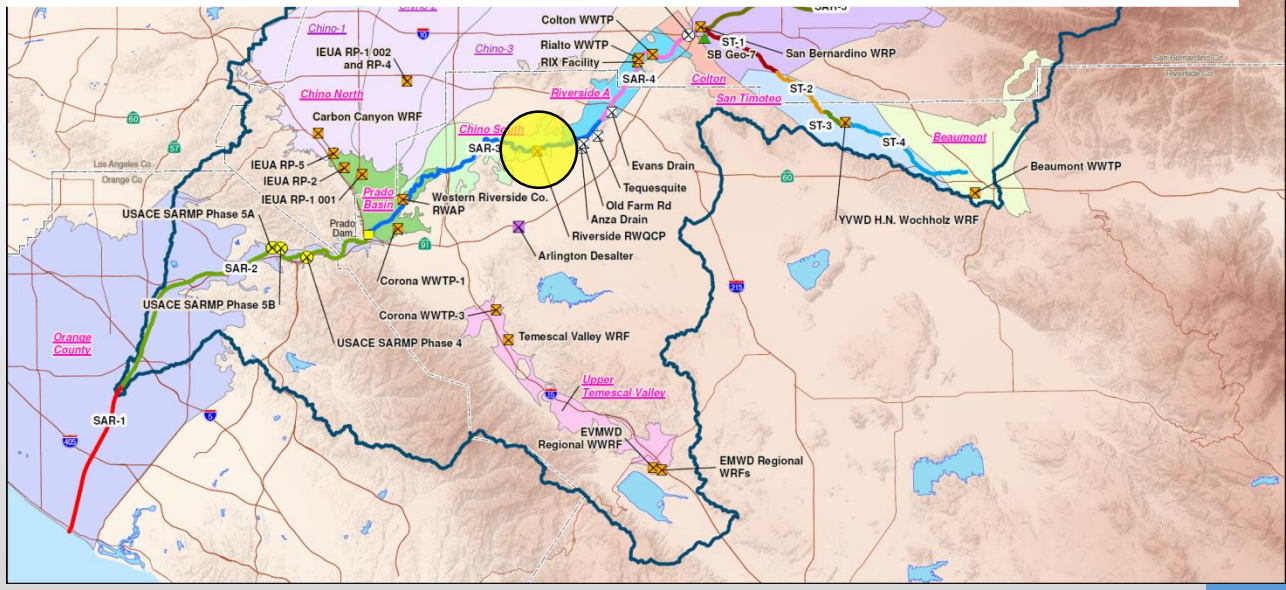
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	33.8	650	10.0
Scenario B	25.0	650	10.0
Scenario C	18.1[E]	650	10.0
Scenario D	46.0	650	10.0
Scenario E	22.5[F]	650	10.0
Scenario F	18.1[E]	650	10.0

Note:

E. A portion of the plant's discharge will be piped to upstream tributary locations to provide Santa Ana Sucker habitat as part of a regional project with Valley District and the Upper SAR HCP. Discharge quantities and locations are described below. Supplemental discharges to Riverside-A have not yet been permitted.

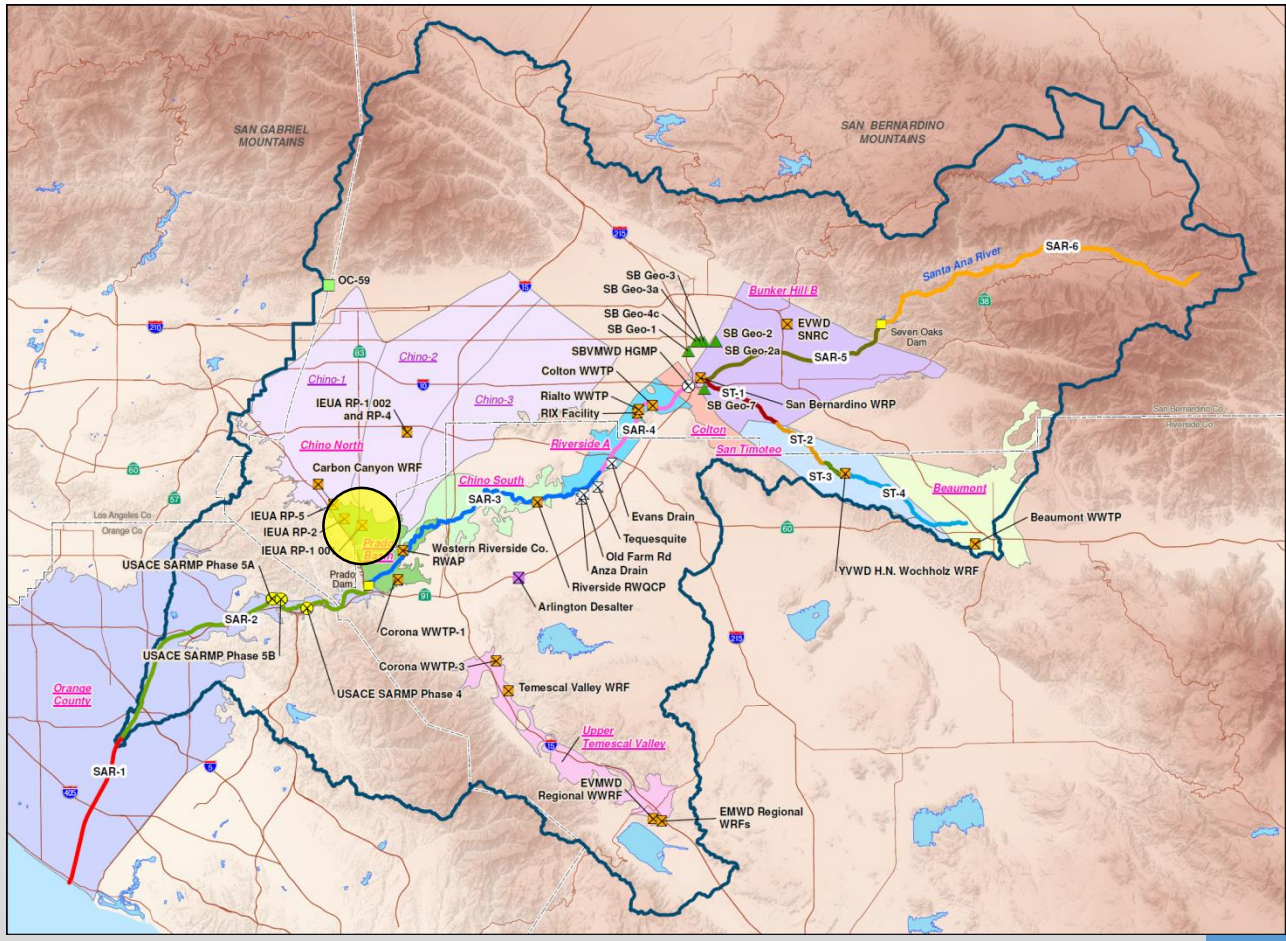
* Plant Discharge: 13.7 MGD
* Anza Drain (33.966, -117.415): 0.6 MGD
* Old Farm Rd (33.970, -117.412): 1.3 MGD
* Tequesquite (33.976, -117.397): 0.6 MGD
* Evans Drain (33.997, -117.382): 1.9 MGD

F. Anza Drain, Old Farm Rd, Tequesquite, and Evans Drain discharges are the same as in Note E. Plant discharge is 18.1 MGD.



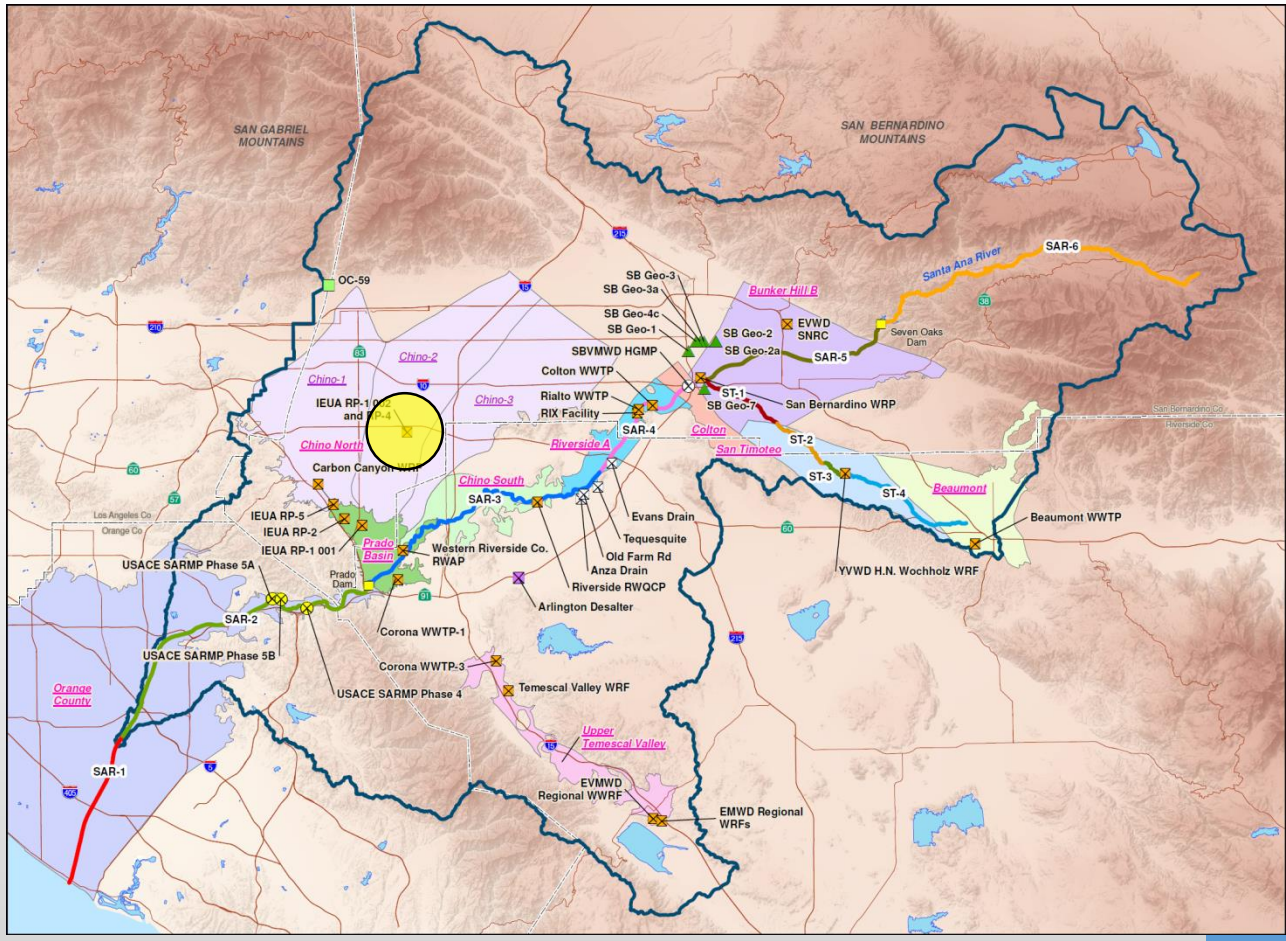
Inland Empire Utilities Agency - Regional Plant (RP) 1 - Discharge Point (DP) 001

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	44.0	550	8.0
Scenario B	1.4 (Monthly Variations)	550	8.0
Scenario C	0.0	550	8.0
Scenario D	44.0	550	8.0
Scenario E	1.4 (Monthly Variations)	550	8.0
Scenario F	0.0	550	8.0



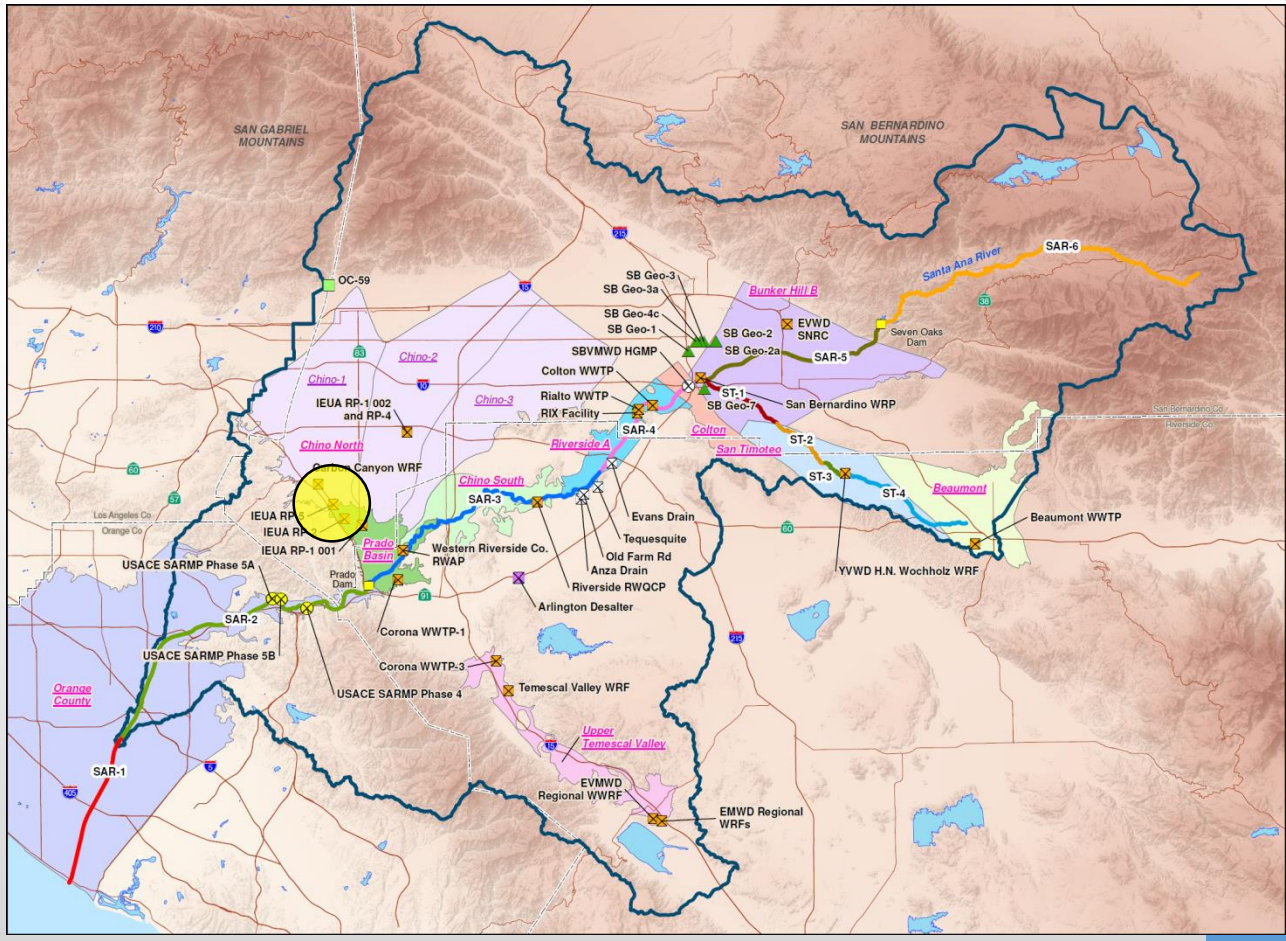
Inland Empire Utilities Agency - RP 1 - DP 002 and RP 4

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	14.0	550	8.0
Scenario B	8.1 (Monthly Variations)	550	8.0
Scenario C	0.2	550	8.0
Scenario D	21.0	550	8.0
Scenario E	8.1 (Monthly Variations)	550	8.0
Scenario F	0.2	550	8.0



Inland Empire Utilities Agency - RP-5

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	15.0	550	8.0
Scenario B	2.5 (Monthly Variations)	550	8.0
Scenario C	0.0	550	8.0
Scenario D	30.0	550	8.0
Scenario E	2.5 (Monthly Variations)	550	8.0
Scenario F	0.0	550	8.0



Inland Empire Utilities Agency - Carbon Canyon Water Recycling Facility

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	12.0	550	8.0
Scenario B	3.2 (Monthly Variations)	550	8.0
Scenario C	0.3	550	8.0
Scenario D	12.0	550	8.0
Scenario E	3.2 (Monthly Variations)	550	8.0
Scenario F	0.3	550	8.0

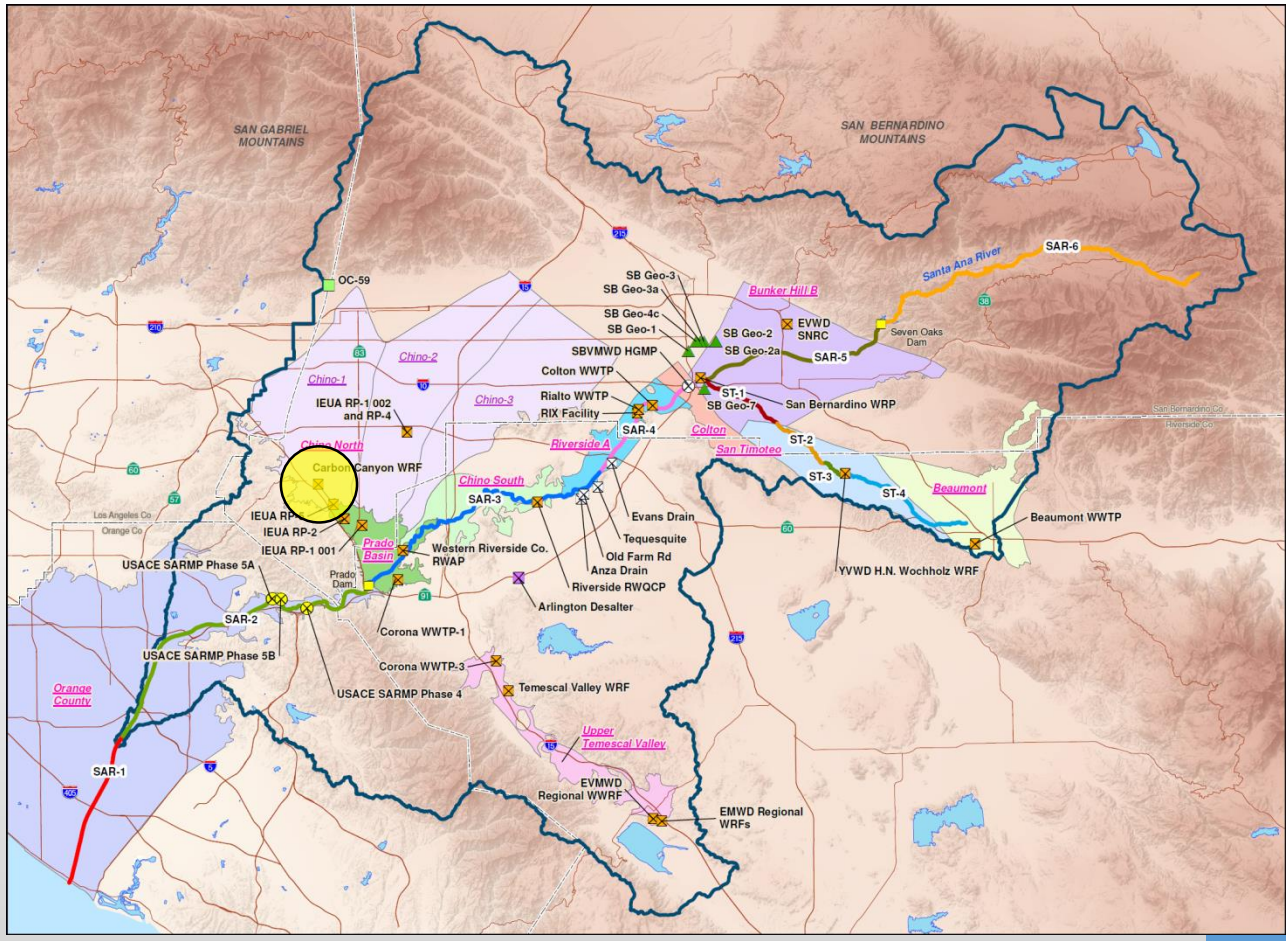


Exhibit 1 - Revised Assumptions for IEUA Discharges for Use in Scenarios B and D for the 2017 WLAM

Table A - Projected Aggregate Monthly Discharge - All IEUA DPs - Breakdown by Plant in tables B through E

	July	August	September	October	November	December	January	February	March	April	May	June	Total
2020 af	687	592	803	1,211	1,592	2,536	2,521	2,066	1,887	1,312	1,217	602	17,026
2020 mgd	7.2	6.2	8.7	12.7	17.3	26.7	26.5	24.0	19.8	14.2	12.8	6.5	15.2
2040 af	687	592	803	1,211	1,592	2,536	2,521	2,066	1,887	1,312	1,217	602	17,026
2040 mgd	7.2	6.2	8.7	12.7	17.3	26.7	26.5	24.0	19.8	14.2	12.8	6.5	15.2

Table B - Projected Monthly Discharge for RP1 - 001 (Prado)

	July	August	September	October	November	December	January	February	March	April	May	June	Total
2020 af	106	119	136	132	153	176	154	150	110	106	110	116	1,568
2020 mgd	1.1	1.3	1.5	1.4	1.7	1.8	1.6	1.7	1.2	1.1	1.2	1.3	1.4
2040 af	106	119	136	132	153	176	154	150	110	106	110	116	1,568
2040 mgd	1.1	1.3	1.5	1.4	1.7	1.8	1.6	1.7	1.2	1.1	1.2	1.3	1.4

Table C - Projected Aggregate Monthly Discharge for RP1/RP4 - 002 (Cucamonga Creek)

	July	August	September	October	November	December	January	February	March	April	May	June	Total
2020 af	281	237	451	719	947	1,688	1,473	1,049	1,007	521	542	157	9,073
2020 mgd	3.0	2.5	4.9	7.6	10.3	17.7	15.5	12.2	10.6	5.7	5.7	1.7	8.1
2040 af	281	237	451	719	947	1,688	1,473	1,049	1,007	521	542	157	9,073
2040 mgd	3.0	2.5	4.9	7.6	10.3	17.7	15.5	12.2	10.6	5.7	5.7	1.7	8.1

Table D - Projected Aggregate Monthly Discharge for RP5

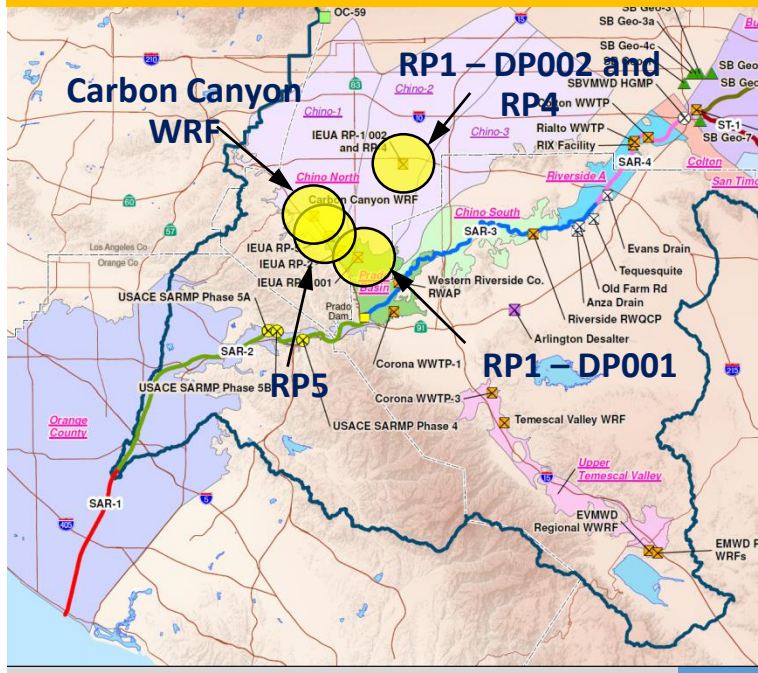
	July	August	September	October	November	December	January	February	March	April	May	June	Total
2020 af	28	26	50	187	290	426	513	434	319	215	235	79	2,800
2020 mgd	0.3	0.3	0.5	2.0	3.1	4.5	5.4	5.0	3.3	2.3	2.5	0.9	2.5
2040 af	28	26	50	187	290	426	513	434	319	215	235	79	2,800
2040 mgd	0.3	0.3	0.5	2.0	3.1	4.5	5.4	5.0	3.3	2.3	2.5	0.9	2.5

Table E - Projected Aggregate Monthly Discharge for Carbon Canyon WRP

	July	August	September	October	November	December	January	February	March	April	May	June	Total
2020 af	350	238	149	112	108	123	313	424	532	594	358	282	3,584
2020 mgd	3.7	2.5	1.6	1.2	1.2	1.3	3.3	4.9	5.6	6.5	3.8	3.1	3.2
2040 af	350	238	149	112	108	123	313	424	532	594	358	282	3,584
2040 mgd	3.7	2.5	1.6	1.2	1.2	1.3	3.3	4.9	5.6	6.5	3.8	3.1	3.2

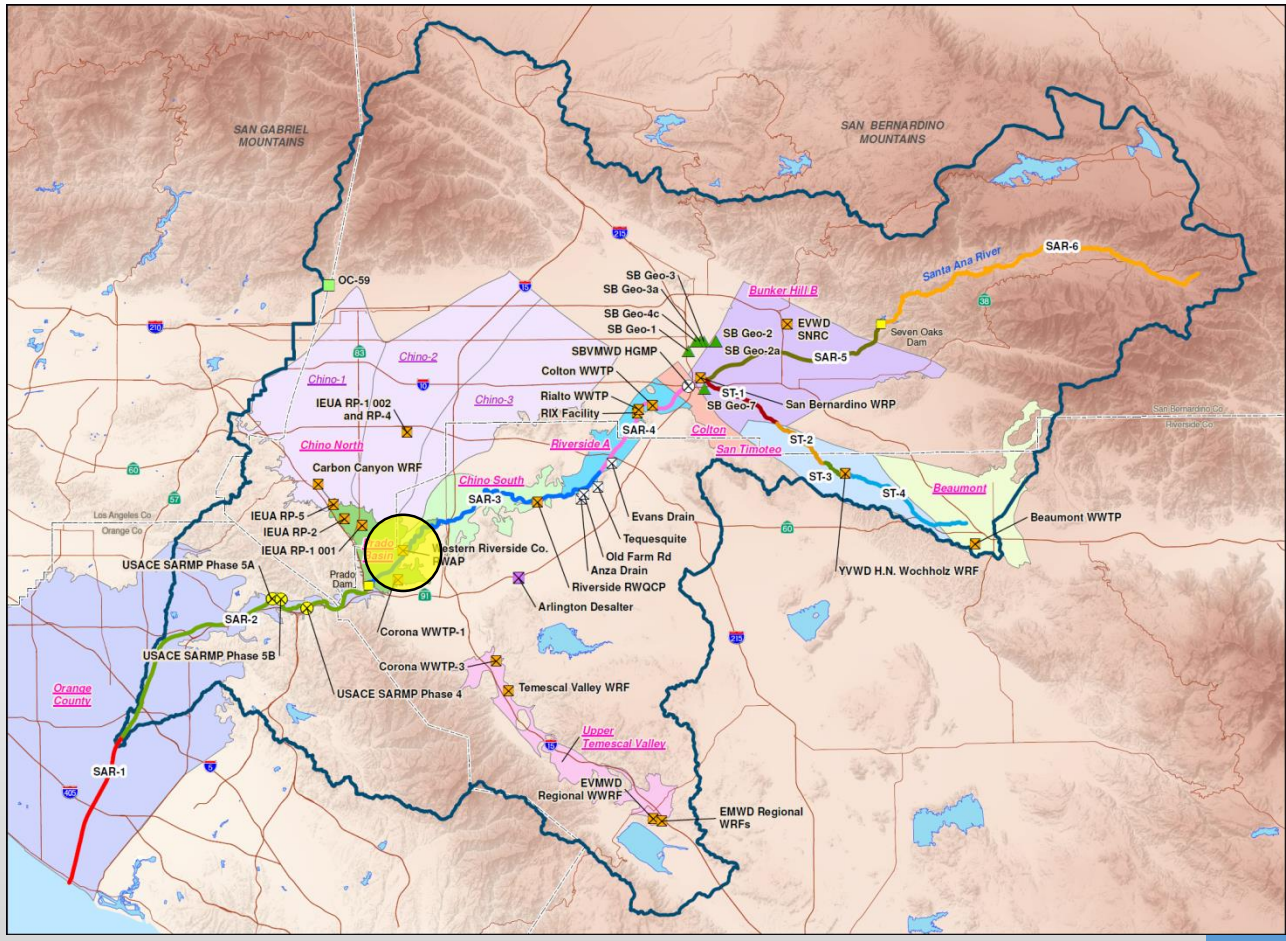
Updated IEUA POTW Discharge

- Projected discharge (varied monthly) was provided by IEUA/Chino Basin Watermaster



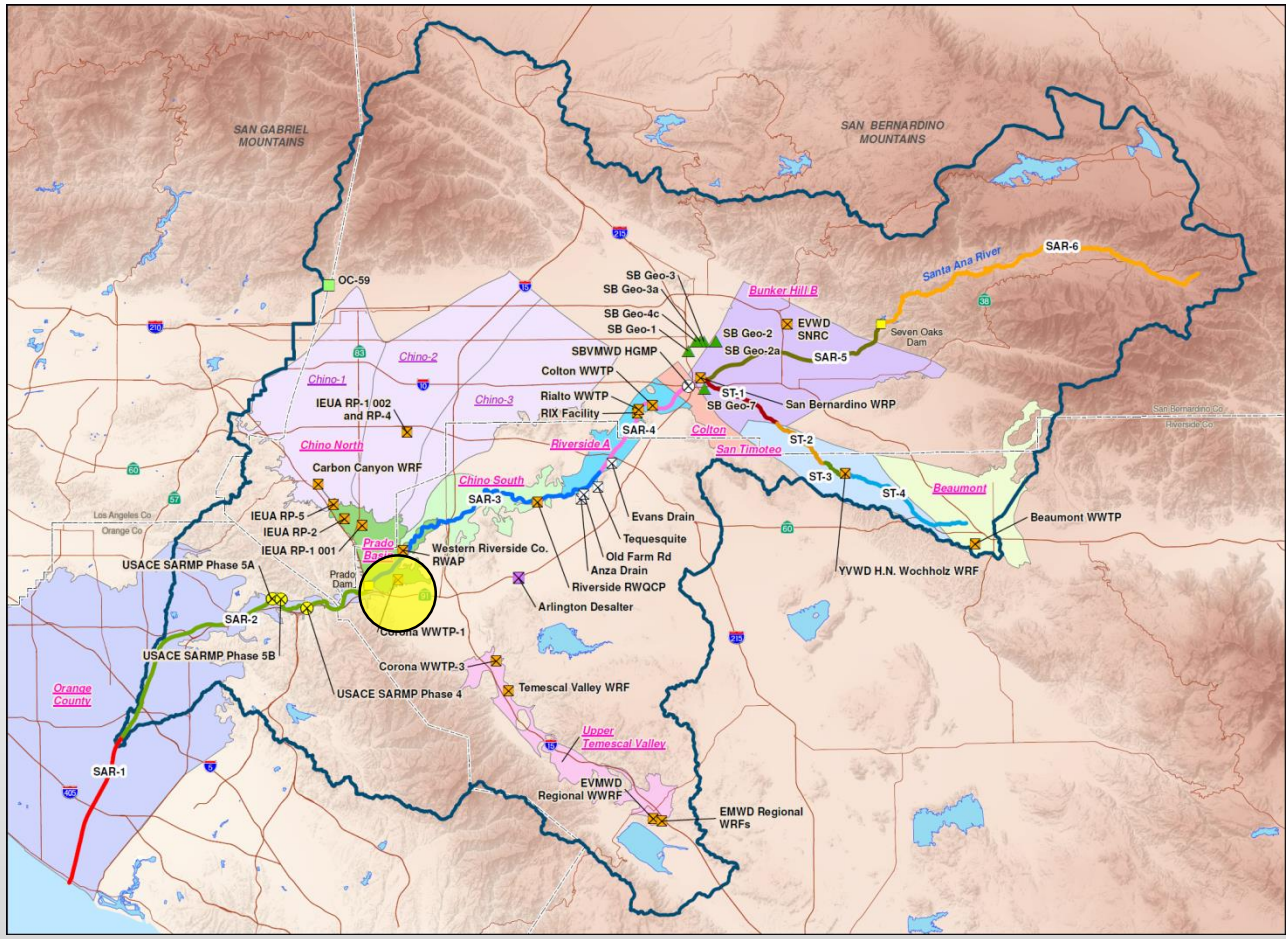
Western Municipal Water District - Western Riverside County Regional Wastewater Authority Plant

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	12.0	625	10.0
Scenario B	9.0	625	10.0
Scenario C	7.5	625	10.0
Scenario D	15.3	625	10.0
Scenario E	12.5	625	10.0
Scenario F	10.5	625	10.0



City of Corona - Corona Wastewater Treatment Plant -1

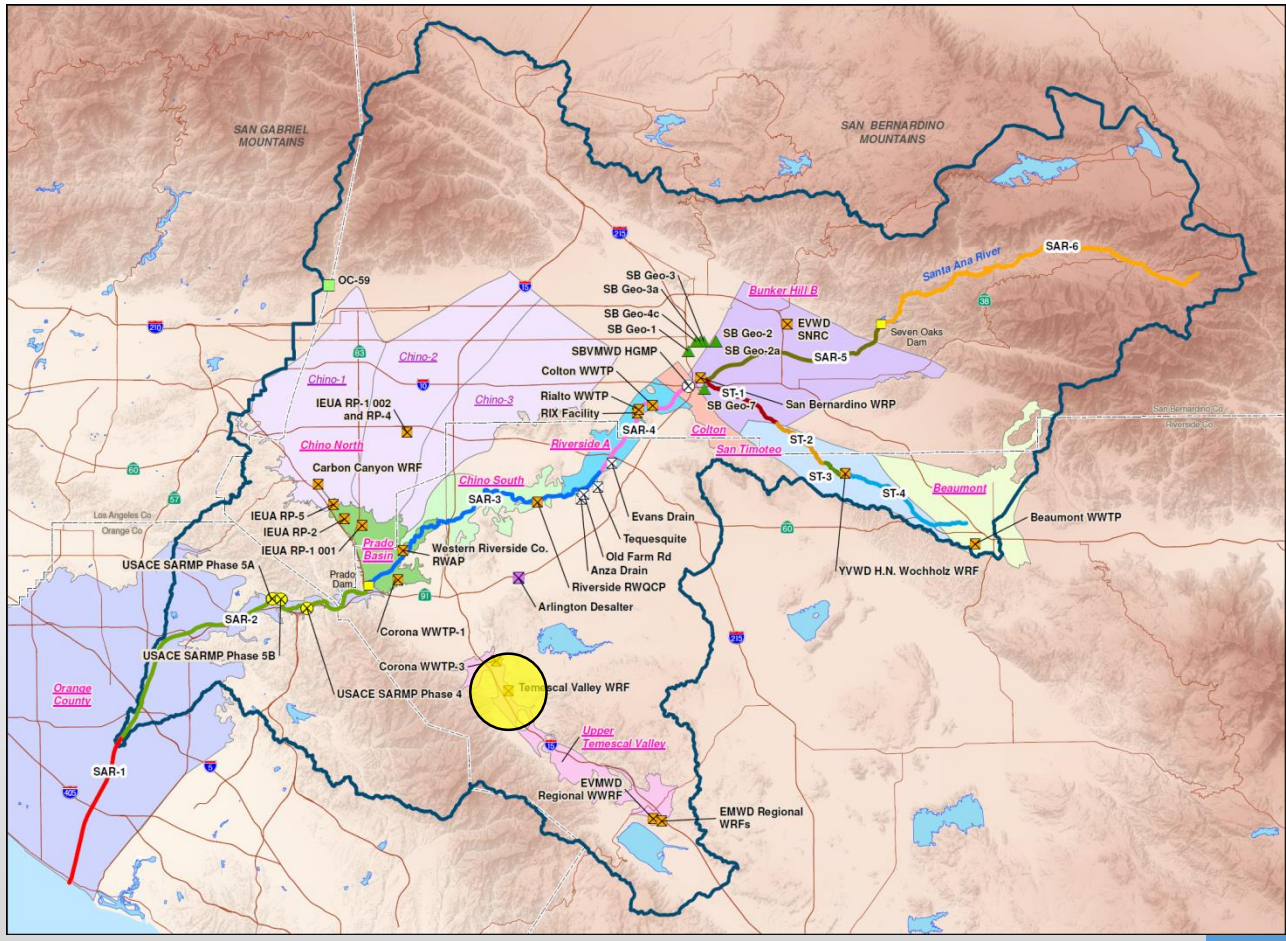
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	11.5	700[G]	10.0
Scenario B	4.6	700[G]	10.0
Scenario C	1.5	700[G]	10.0
Scenario D	15.0	700[G]	10.0
Scenario E	8.5	700[G]	10.0
Scenario F	1.5	700[G]	10.0



Note:
G. A TDS concentration of 665 mg/L was applied in wetter months (December through April) while a concentration of 725 mg/L was applied in drier months (May through November). The average TDS concentration is 700 mg/L.

Temescal Valley Water District - Temescal Valley Water Reclamation Facility

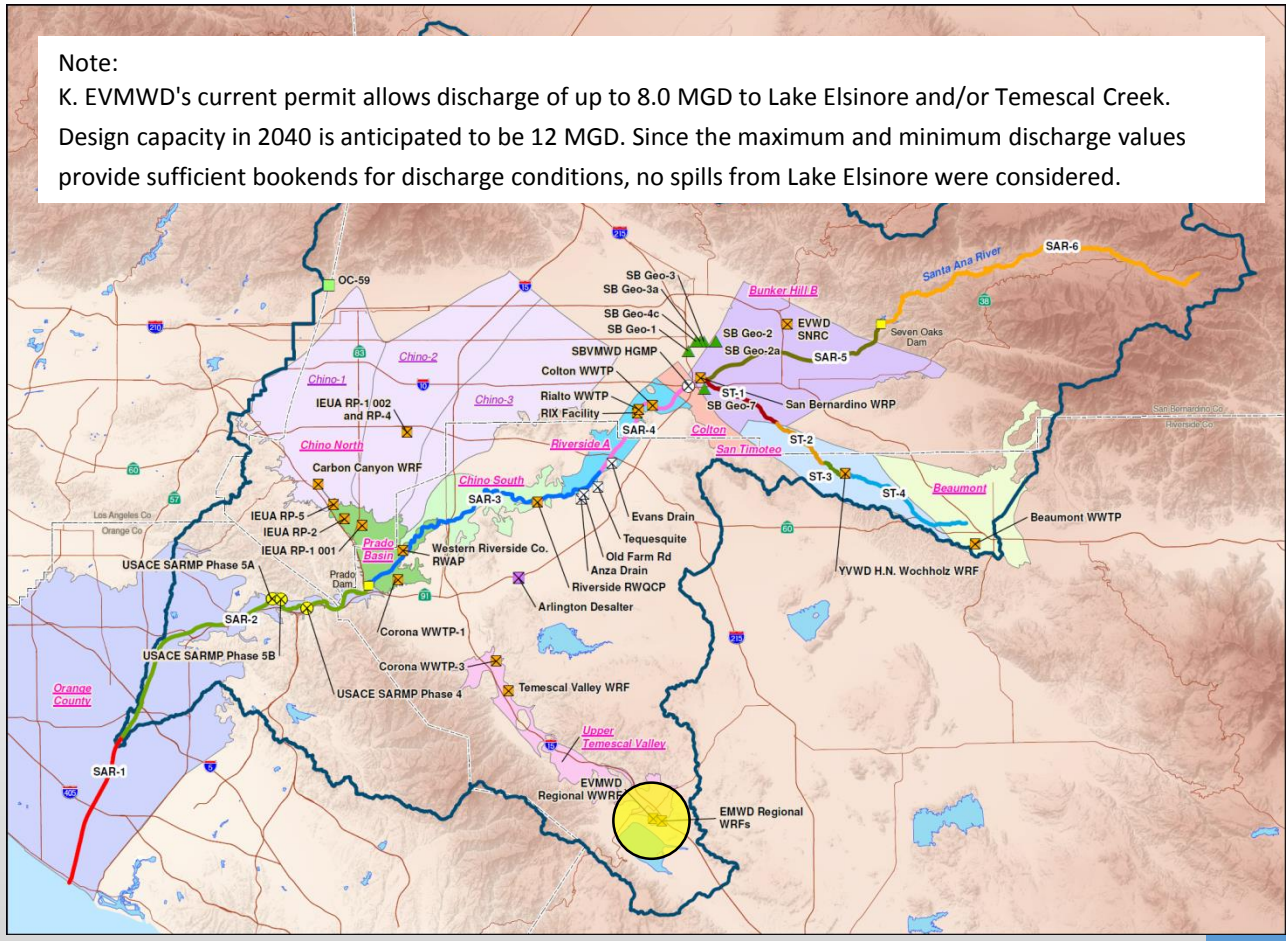
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	2.3	650	10.0
Scenario B	1.2	650	10.0
Scenario C	1.0	650	10.0
Scenario D	2.3	650	10.0
Scenario E	2.3	650	10.0
Scenario F	1.9	650	10.0



Elsinore Valley Municipal Water District - Regional WWRF - DP001 (Temescal Wash)

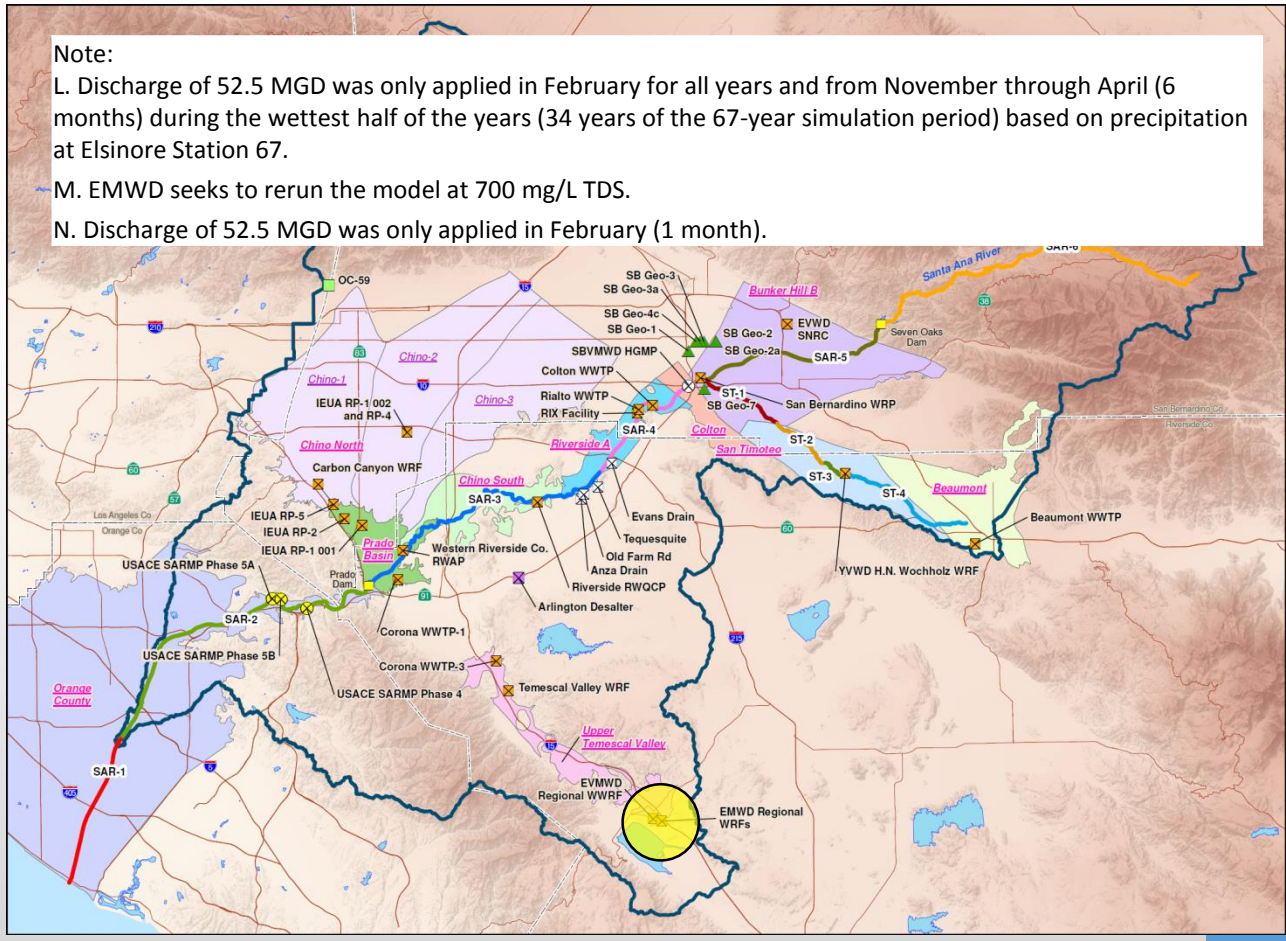
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	8.0[K]	700	10.0
Scenario B	0.5	700	10.0
Scenario C	0.5	700	10.0
Scenario D	12.0[K]	700	10.0
Scenario E	0.5	700	10.0
Scenario F	0.5	700	10.0

Note:
K. EVMWD's current permit allows discharge of up to 8.0 MGD to Lake Elsinore and/or Temescal Creek. Design capacity in 2040 is anticipated to be 12 MGD. Since the maximum and minimum discharge values provide sufficient bookends for discharge conditions, no spills from Lake Elsinore were considered.



Eastern Municipal Water District- EMWD Regional Water Reclamation Facilities

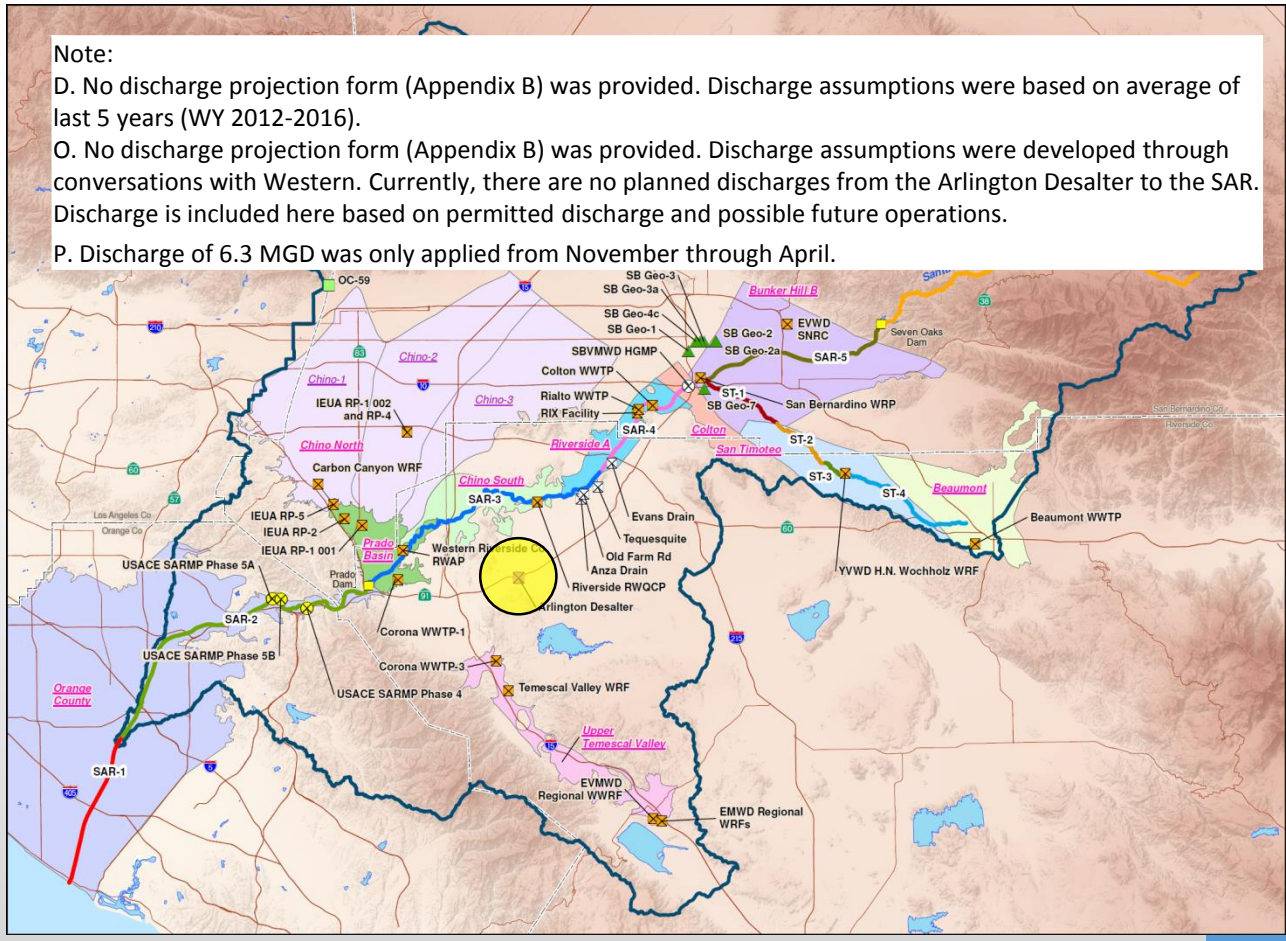
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	0.0 / 52.5[L]	650[M]	10.0
Scenario B	0.0 / 52.5[N]	650[M]	10.0
Scenario C	0.0	650[M]	10.0
Scenario D	0.0 / 52.5[L]	650[M]	10.0
Scenario E	0.0 / 52.5[N]	650[M]	10.0
Scenario F	0.0	650[M]	10.0



Western Municipal Water District - Arlington Desalter[O]

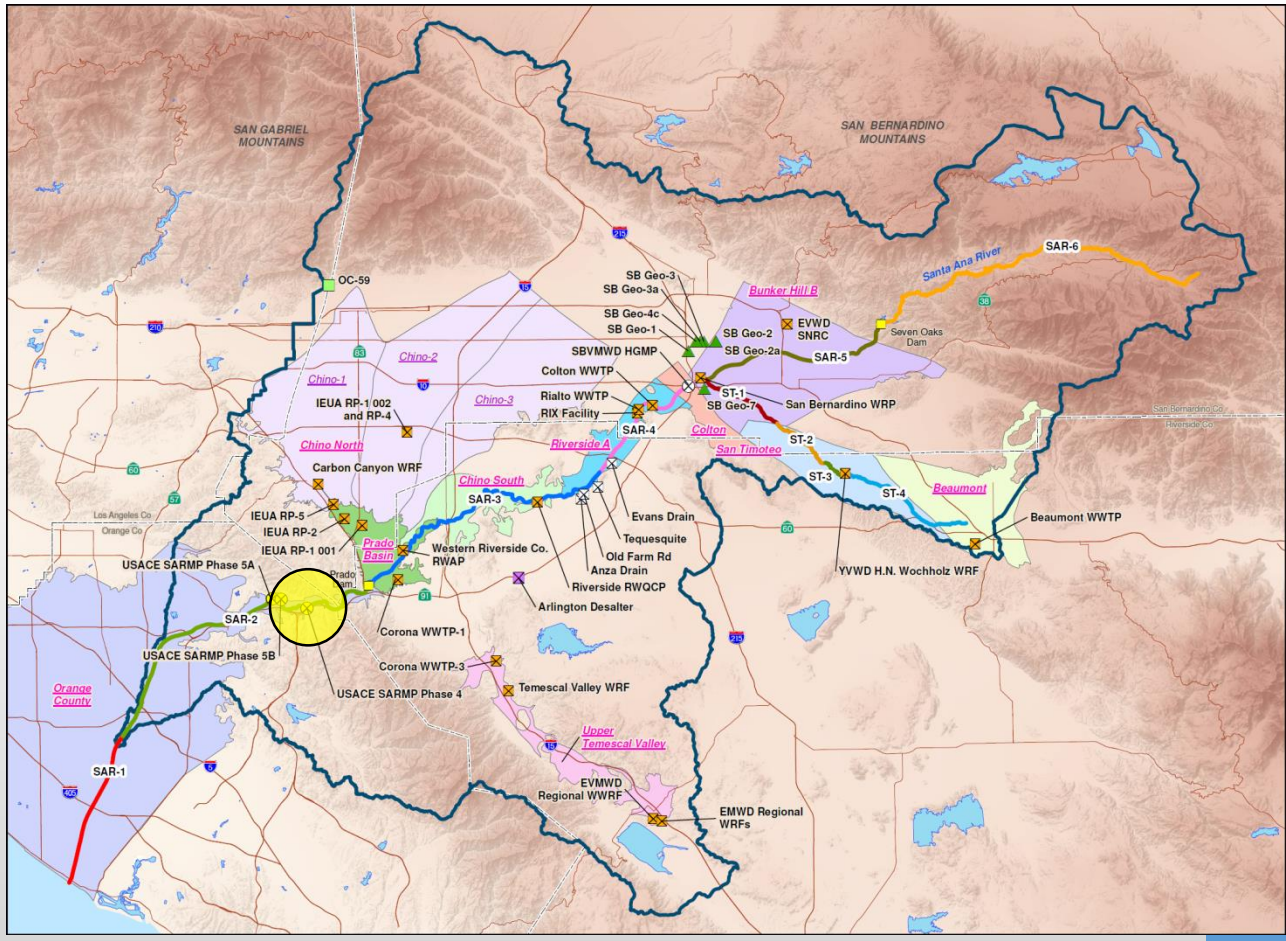
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	7.25	260[D]	4.4[D]
Scenario B	6.3[P]	260[D]	4.4[D]
Scenario C	0.0	260[D]	4.4[D]
Scenario D	7.25	260[D]	4.4[D]
Scenario E	6.3[P]	260[D]	4.4[D]
Scenario F	0.0	260[D]	4.4[D]

Note:
D. No discharge projection form (Appendix B) was provided. Discharge assumptions were based on average of last 5 years (WY 2012-2016).
O. No discharge projection form (Appendix B) was provided. Discharge assumptions were developed through conversations with Western. Currently, there are no planned discharges from the Arlington Desalter to the SAR. Discharge is included here based on permitted discharge and possible future operations.
P. Discharge of 6.3 MGD was only applied from November through April.



US Army Corps of Engineers – Santa Ana River Mainstem Project (SARMP)[H] Dewatering Phase 4

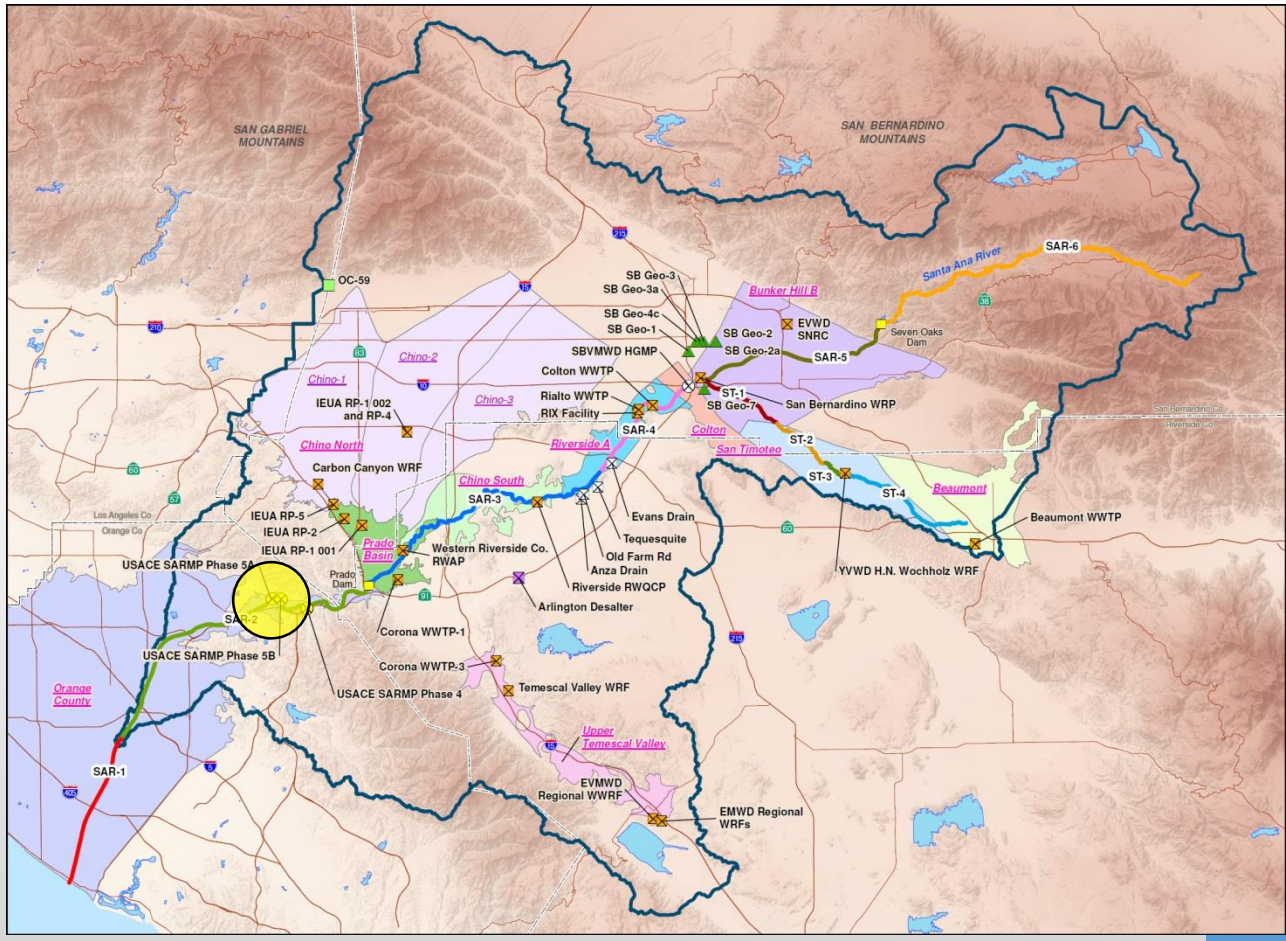
Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	6.8[I]	985[I]	1.0[I]
Scenario B	0.0	-	-
Scenario C	0.0	-	-
Scenario D	0.0	-	-
Scenario E	0.0	-	-
Scenario F	0.0	-	-



Note:
H. De minimis discharge project that is only anticipated to operate for approximately 3 years.
I. No data available for Phase 4. Value represents the average of observed discharges or concentrations from Phase 5A and 5B monthly monitoring reports.

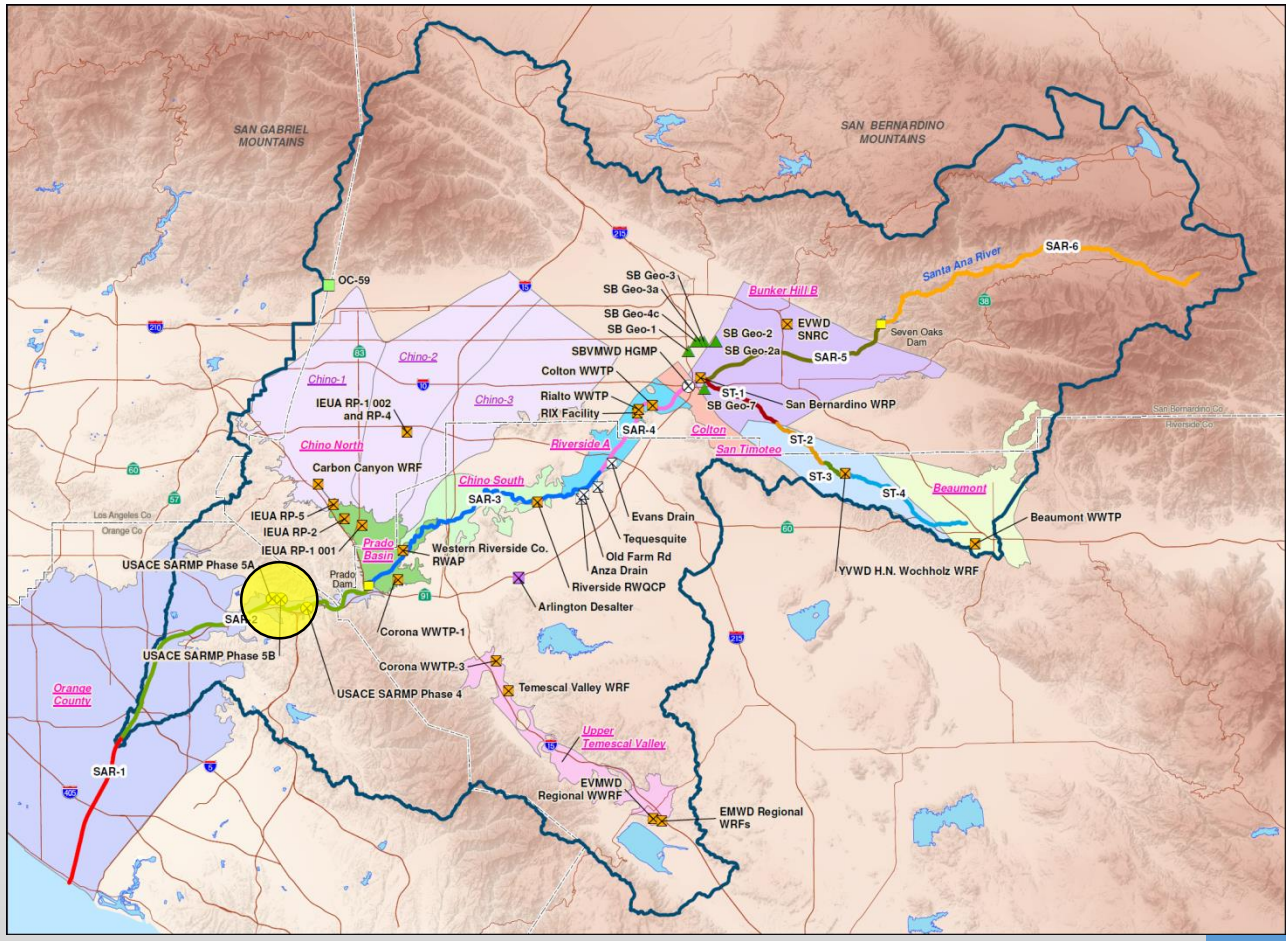
US Army Corps of Engineers – SARMP Dewatering Phase 5A

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	5.8	950	1.0
Scenario B	0.0	-	-
Scenario C	0.0	-	-
Scenario D	0.0	-	-
Scenario E	0.0	-	-
Scenario F	0.0	-	-



US Army Corps of Engineers – SARMP Dewatering Phase 5B

Predictive Scenario	Discharge to Surface Water	Permit TDS	Permit TIN
	[MGD]	[mg/L]	[mg/L]
Scenario A	7.7	1,020	1.0
Scenario B	0.0	-	-
Scenario C	0.0	-	-
Scenario D	0.0	-	-
Scenario E	0.0	-	-
Scenario F	0.0	-	-



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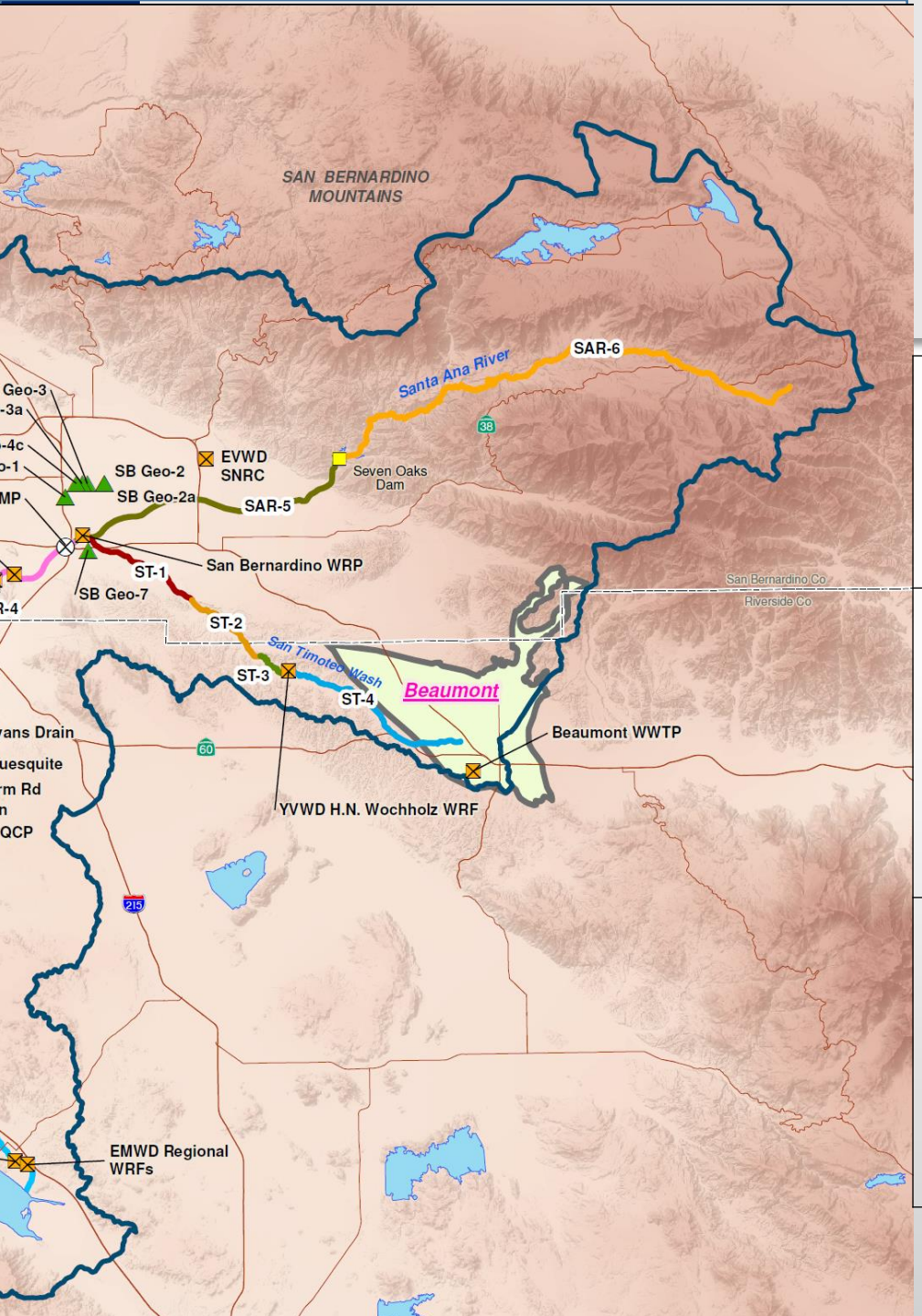
- Results from Waste Load Allocation Scenarios
- Next Steps

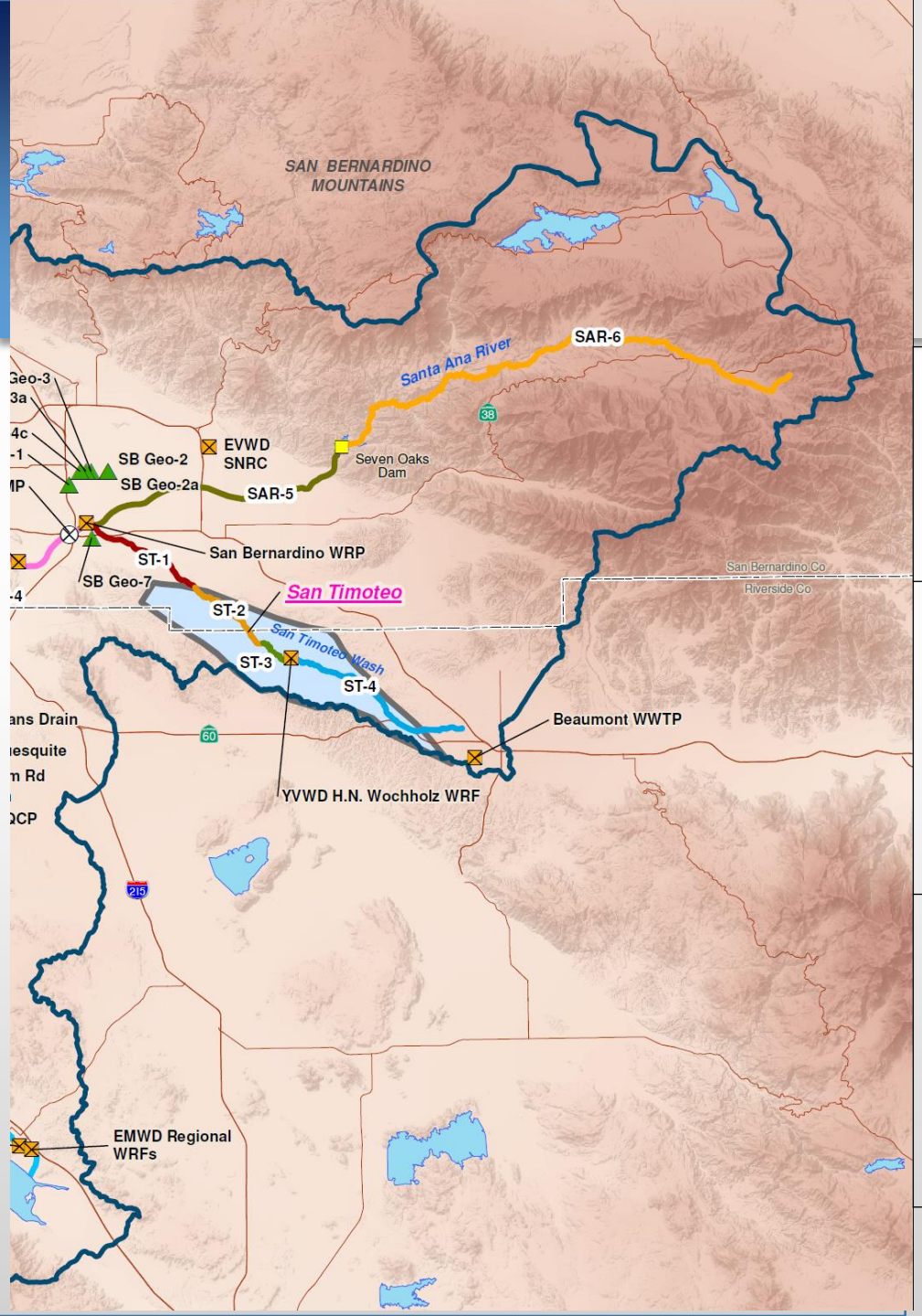
San Timoteo Creek – Reach 4 Overlying Beaumont GMZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)



	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	330	290	40	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	2.9	2.1	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

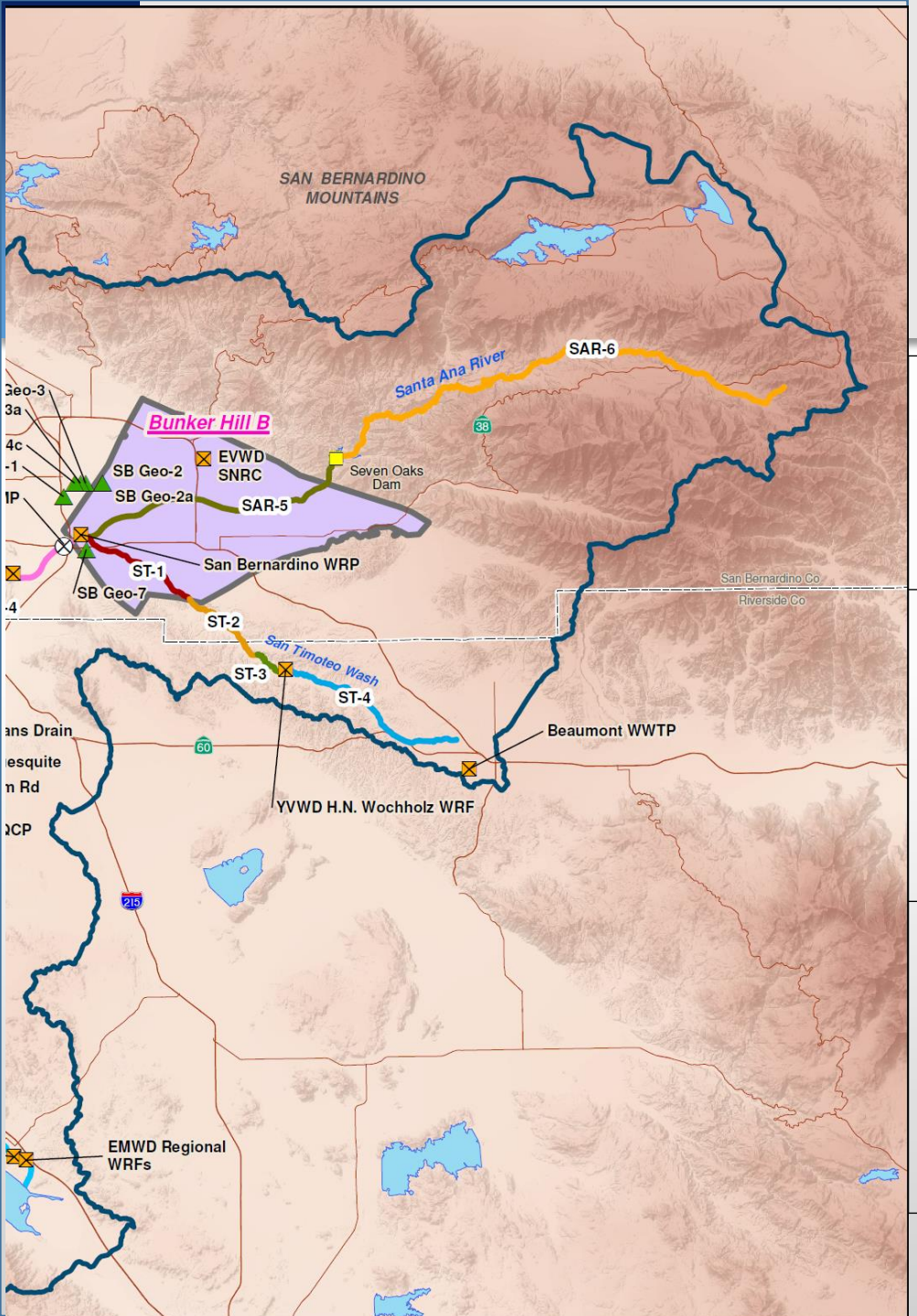
San Timoteo Creek – Reach 2, 3, and 4 Overlying San Timoteo GMZ



Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	400	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	2.0	3.0	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***

Bold black values represent concentrations above ambient, but below objective.

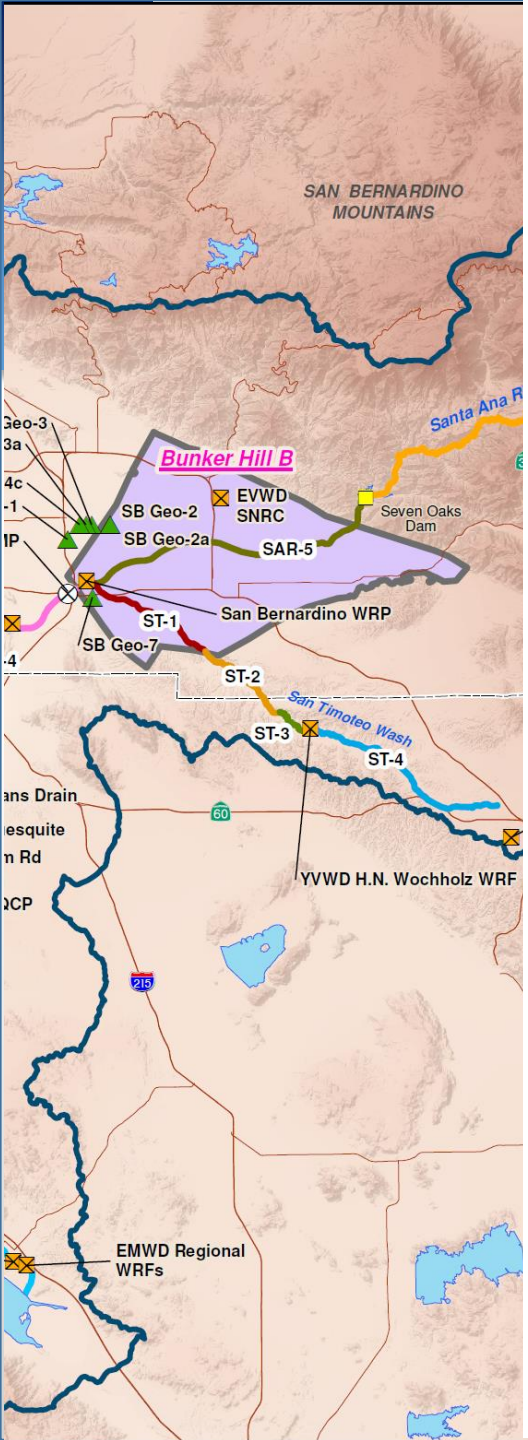


San Timoteo Creek – Reach 1; Santa Ana River - Reach 5 Overlying Bunker Hill-B GMZ

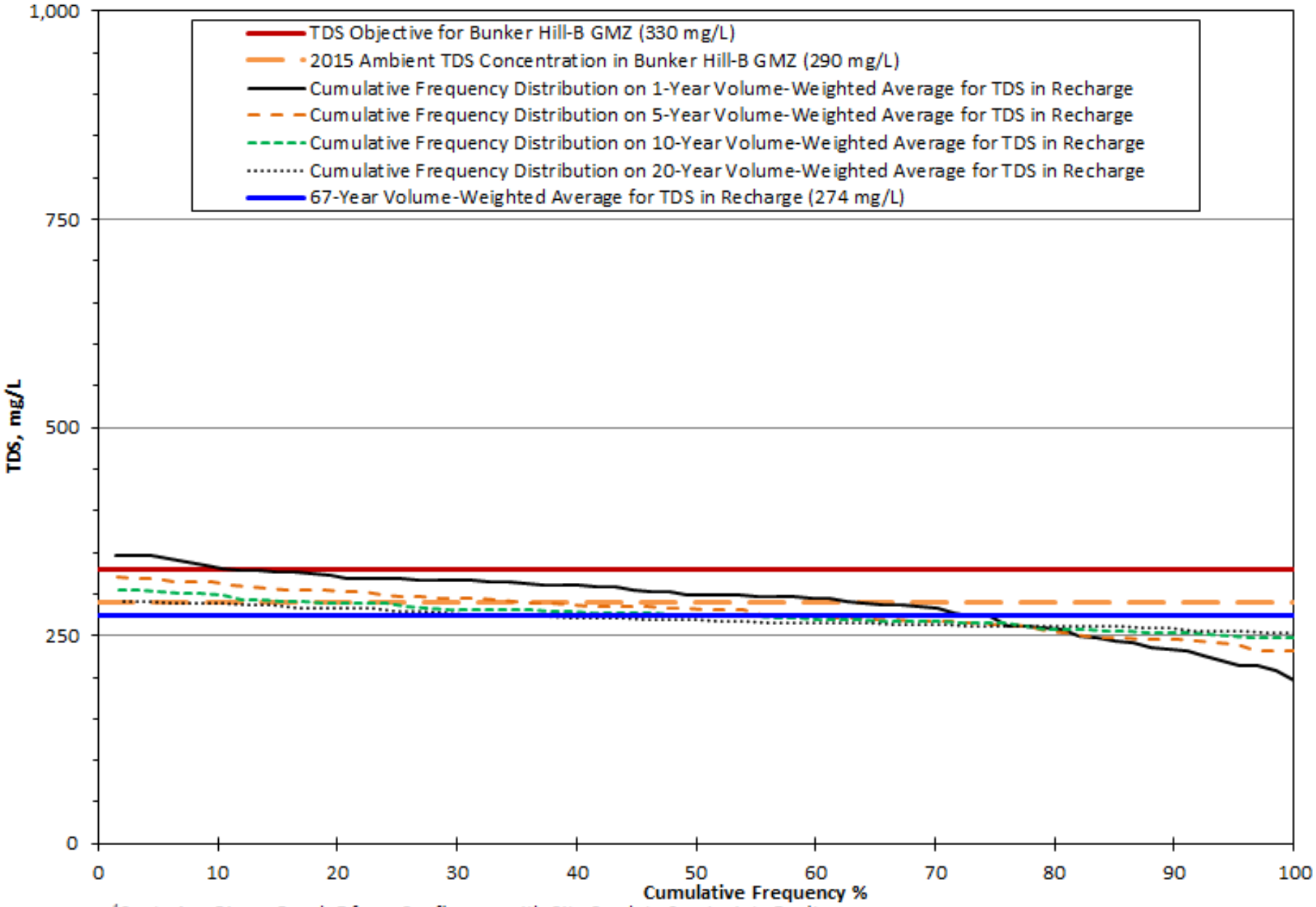
Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	330	290	40	1-year	***346***	***316***	245	***324***	***315***	278
				5-year	***320***	278	217	***294***	283	235
				10-year	***305***	263	212	281	269	225
				20-year	***291***	248	207	269	255	216
TIN	7.3	5.8	1.5	1-year	3.86	3.13	2.33	3.51	3.32	2.43
				5-year	3.50	2.72	2.04	3.10	2.90	2.09
				10-year	3.34	2.62	1.99	2.96	2.75	2.04
				20-year	3.17	2.50	1.91	2.82	2.63	1.98

Bold black values represent concentrations above ambient, but below objective.
Bold red values represent concentrations above basin objective.



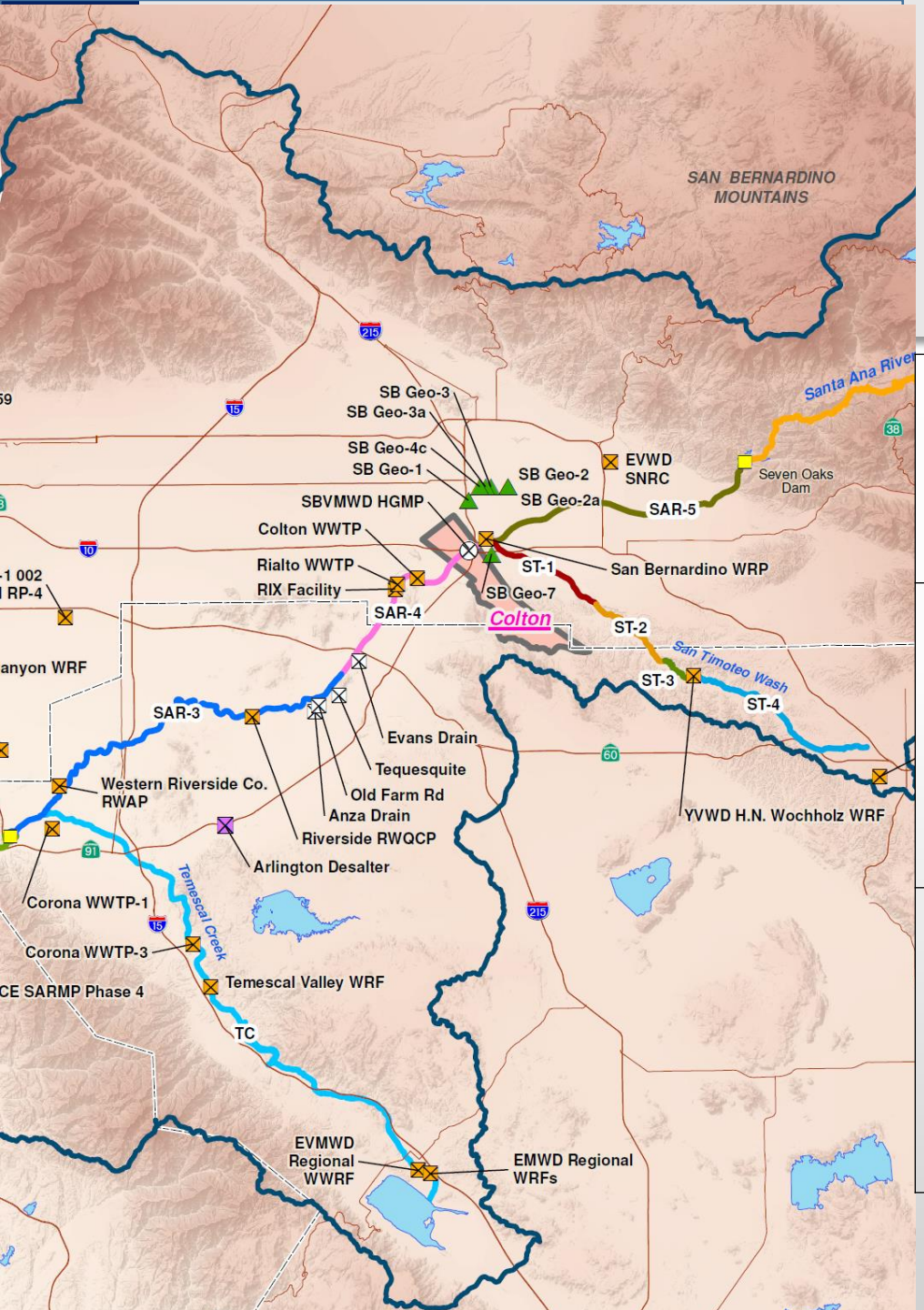
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of San Timoteo Creek - Reach 1 and Santa Ana River - Reach 5[1] Overlying Bunker Hill-B GMZ Scenario A - 2020 Maximum Expected Discharge



[1]Santa Ana River - Reach 5 from Confluence with City Creek to San Jacinto Fault

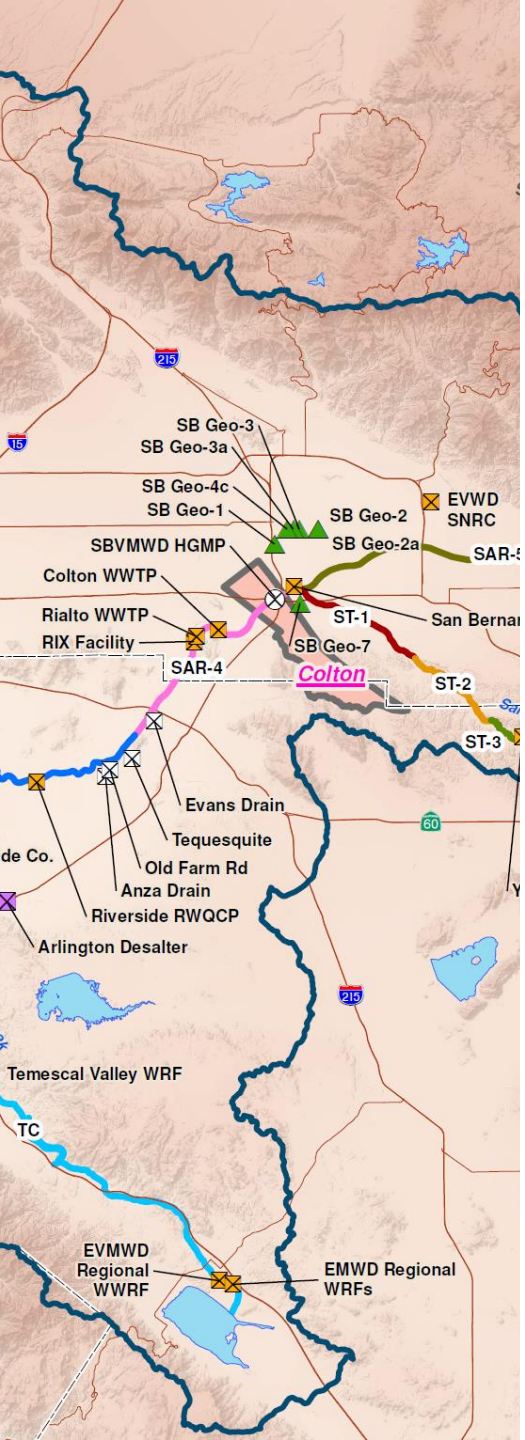
Santa Ana River – Reach 4 Overlying Colton GMZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

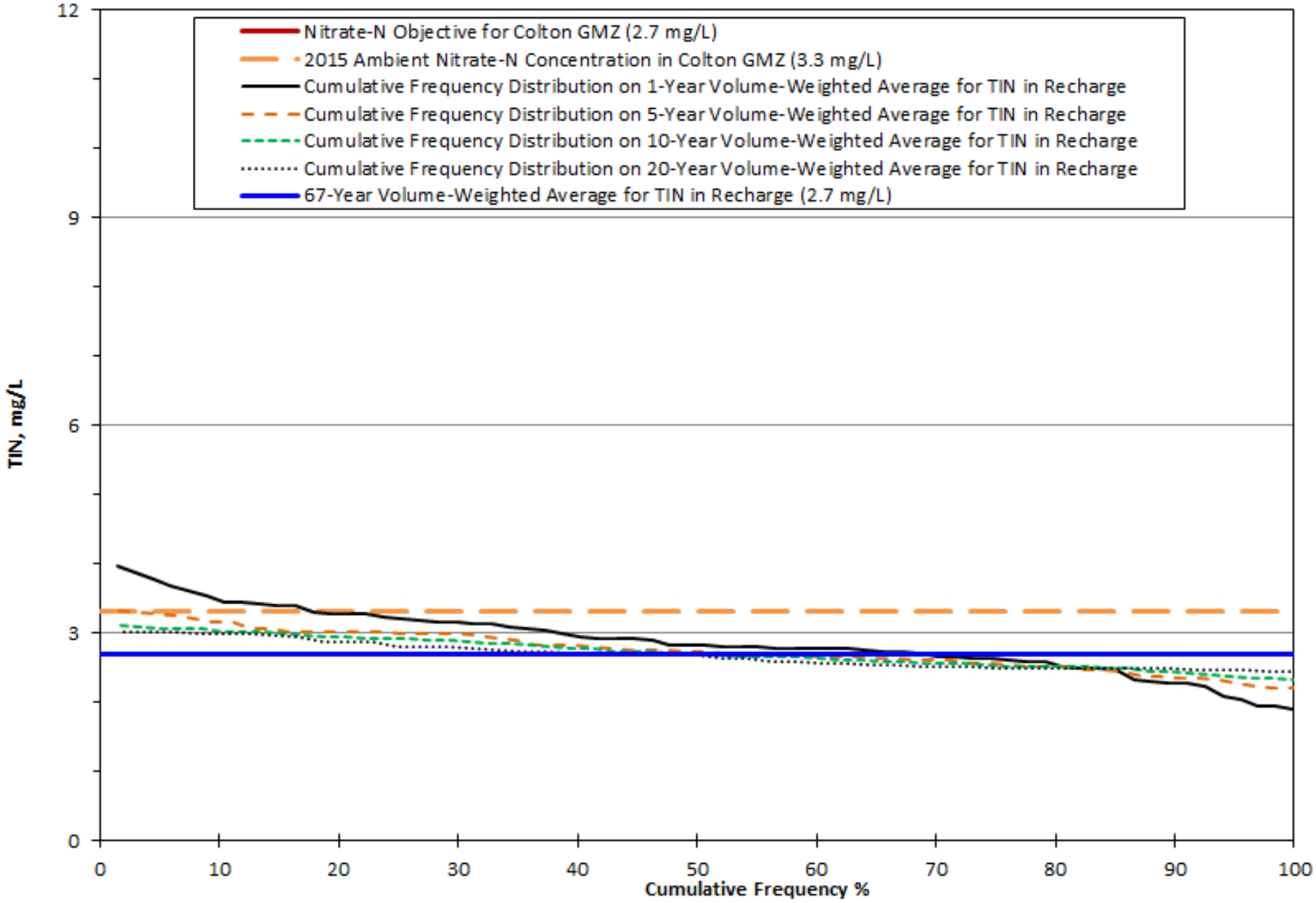


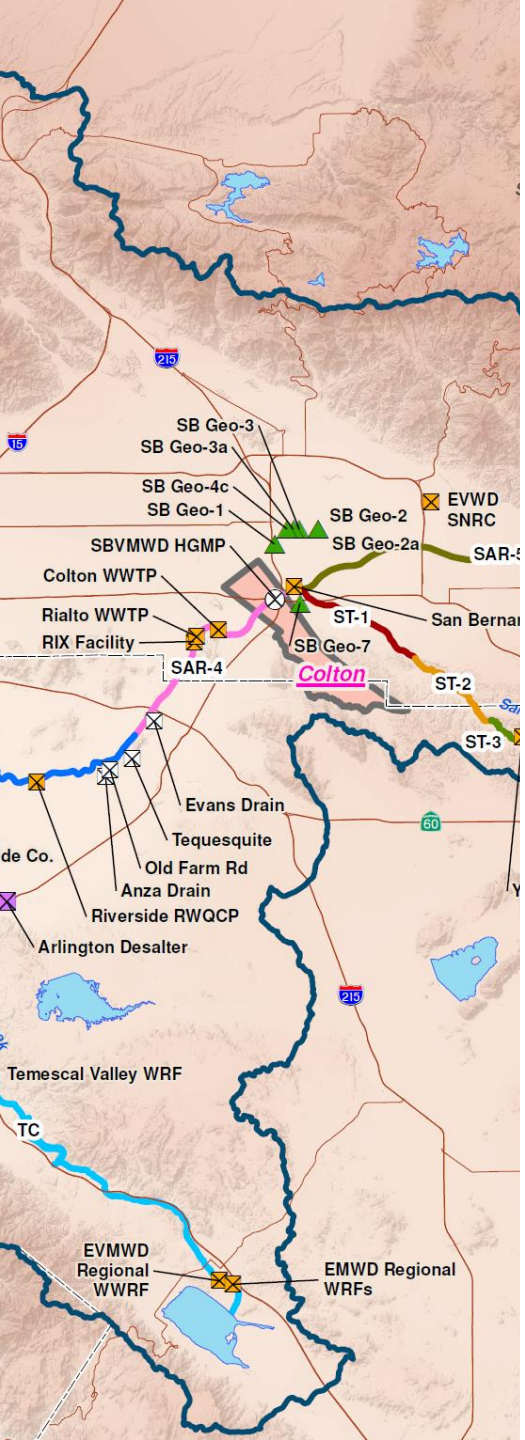
	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	410	480	none	1-year	399	307	260	346	356	293
				5-year	340	250	221	307	300	237
				10-year	317	246	217	290	281	233
				20-year	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

Bold red values represent concentrations above basin objective.

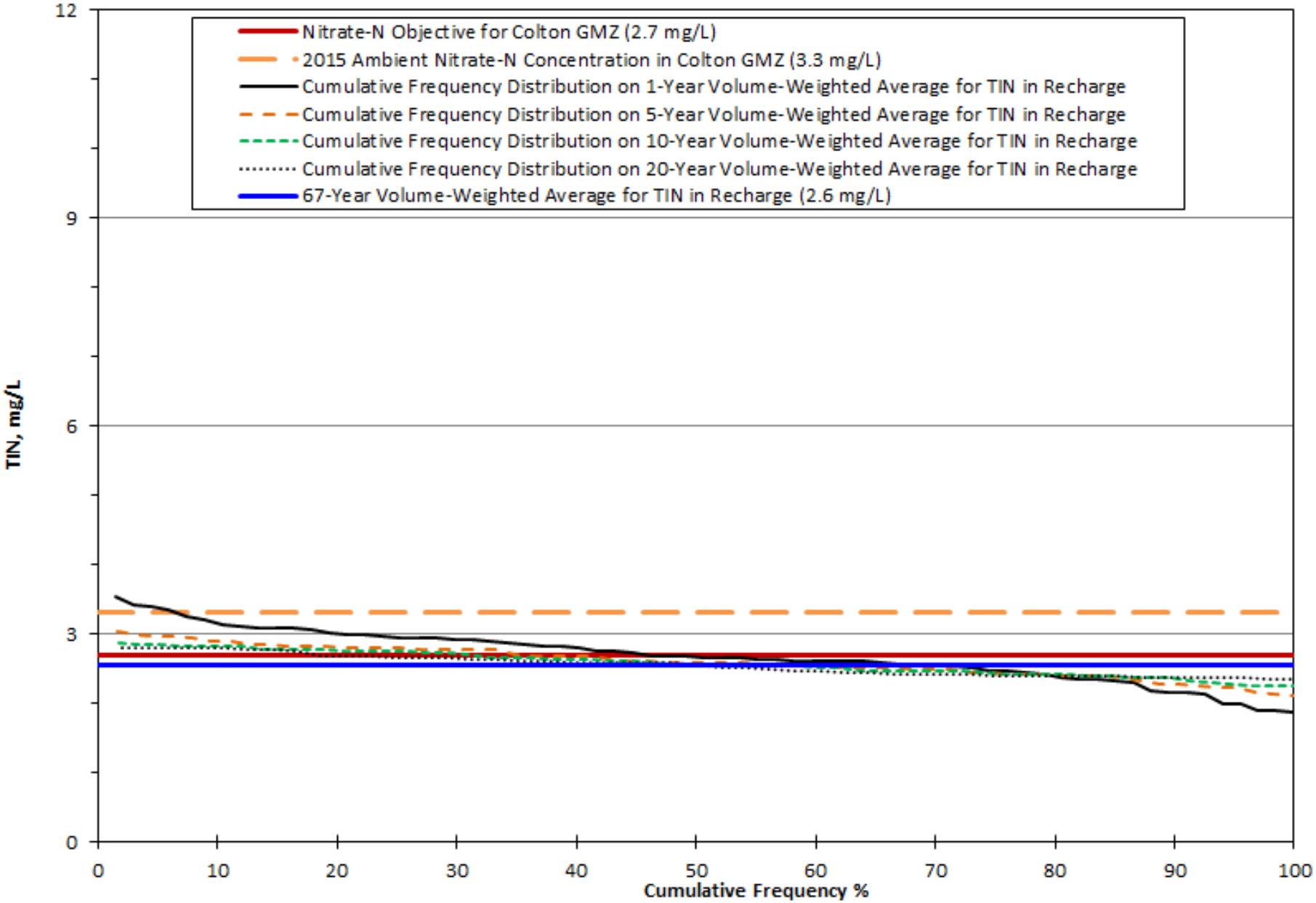


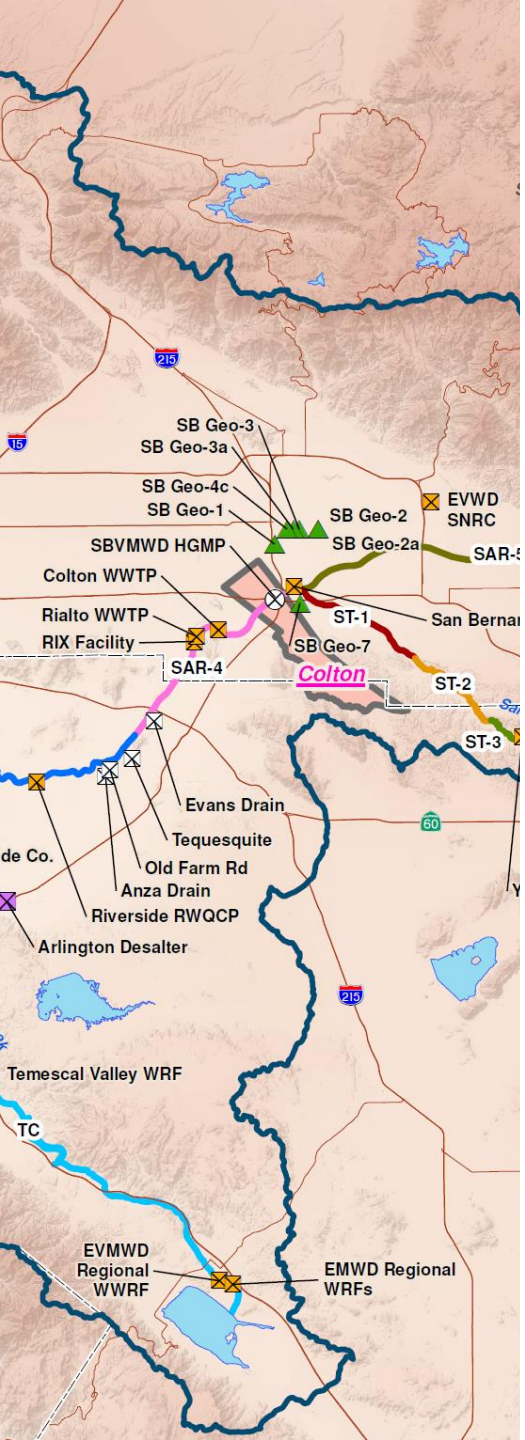
Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Colton GMZ Scenario A - 2020 Maximum Expected Discharge



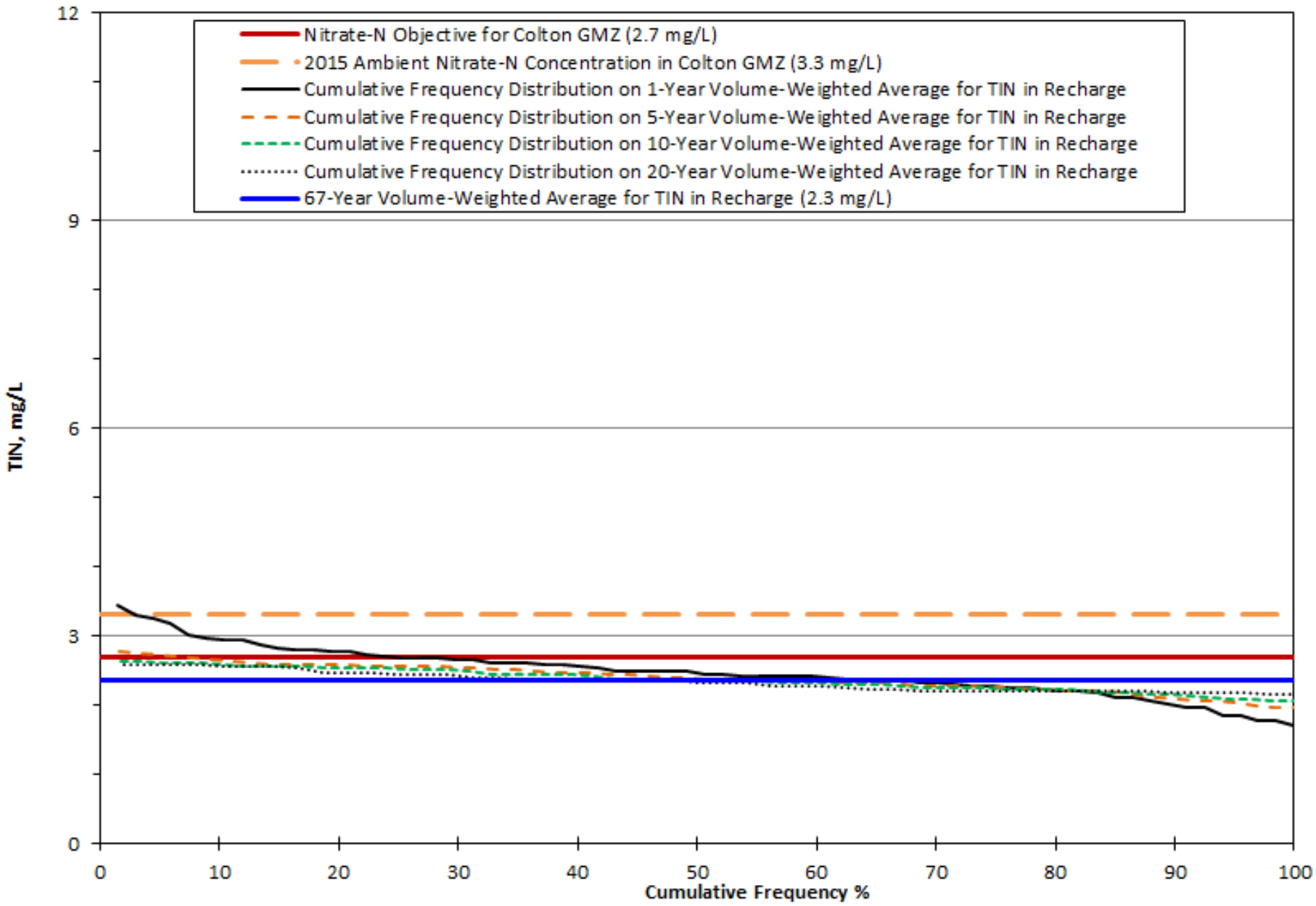


Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Colton GMZ Scenario D - 2040 Maximum Expected Discharge



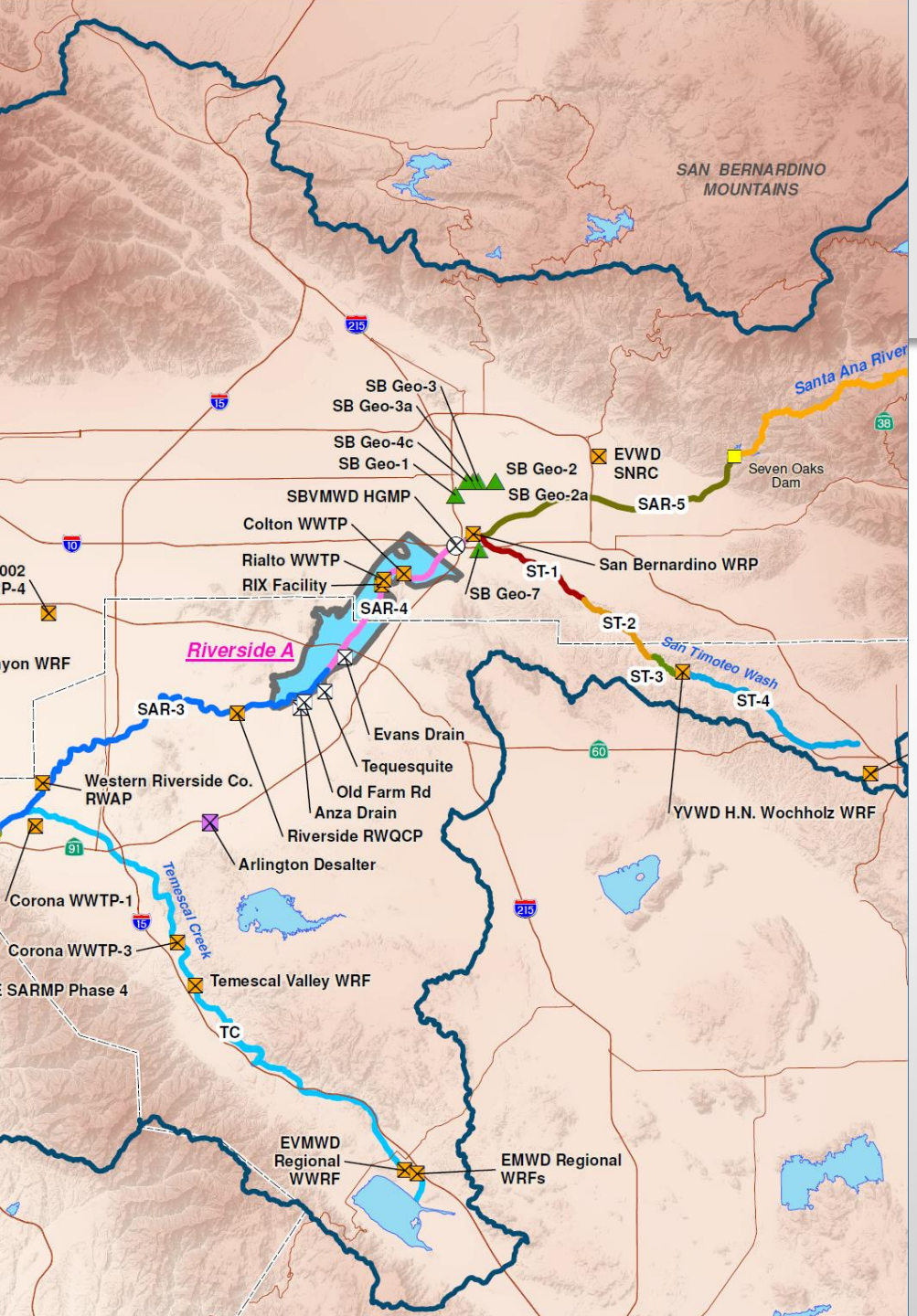


Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Colton GMZ Scenario E - 2040 Average Expected Discharge



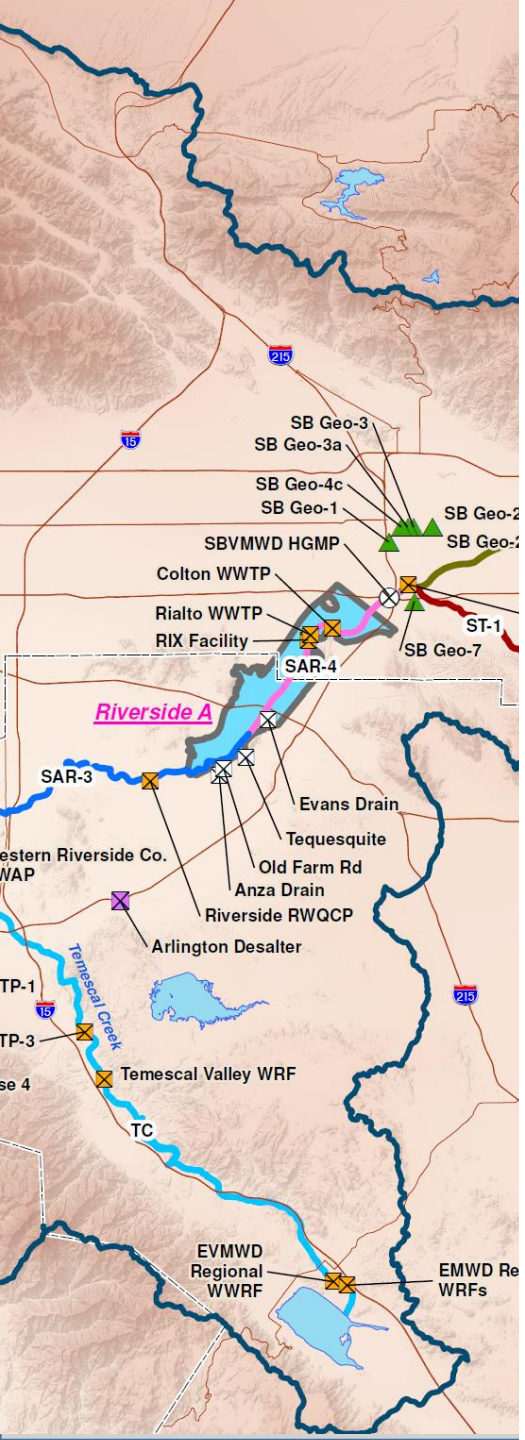
Santa Ana River – Reach 4 Overlying Riverside A GMZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

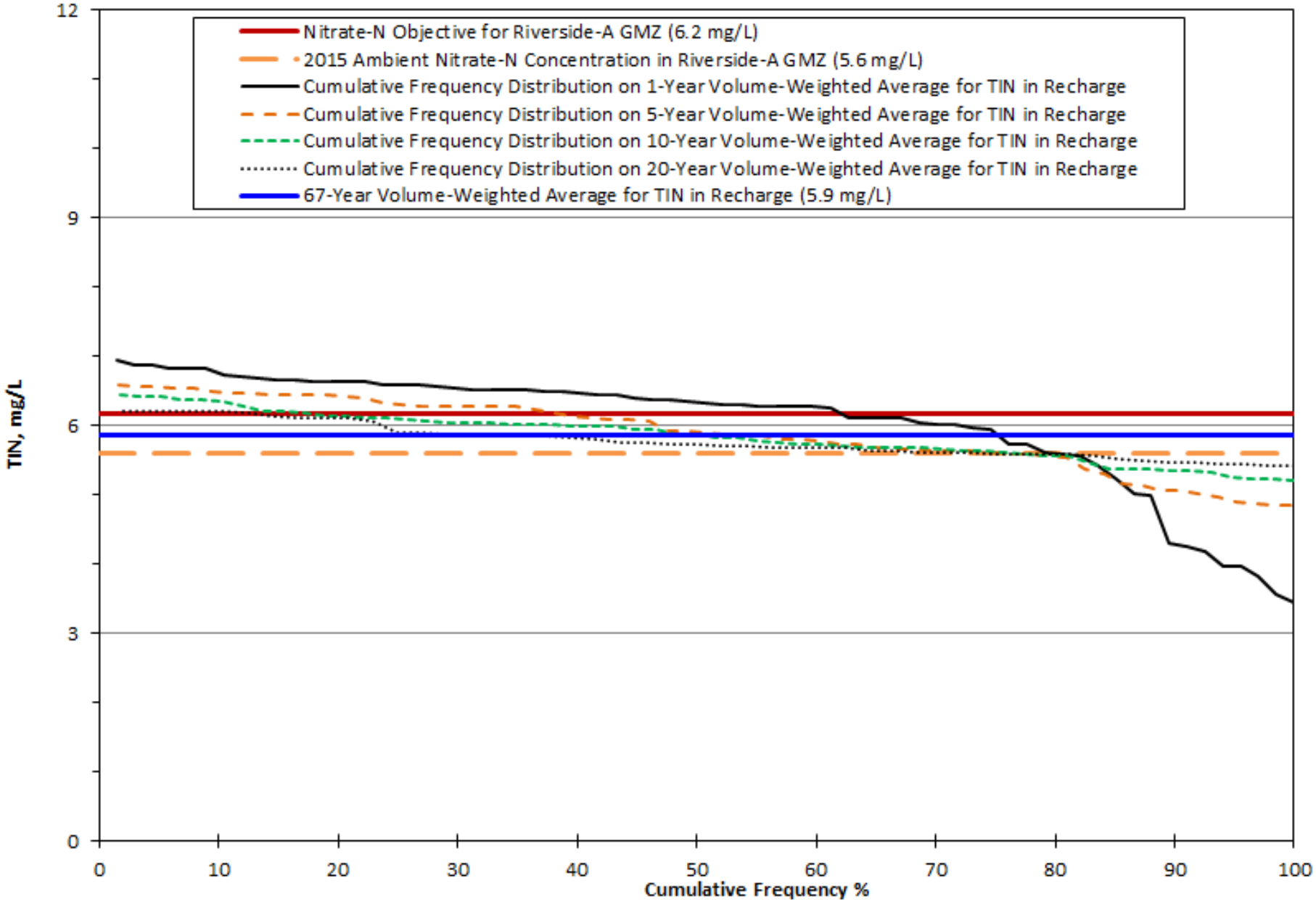


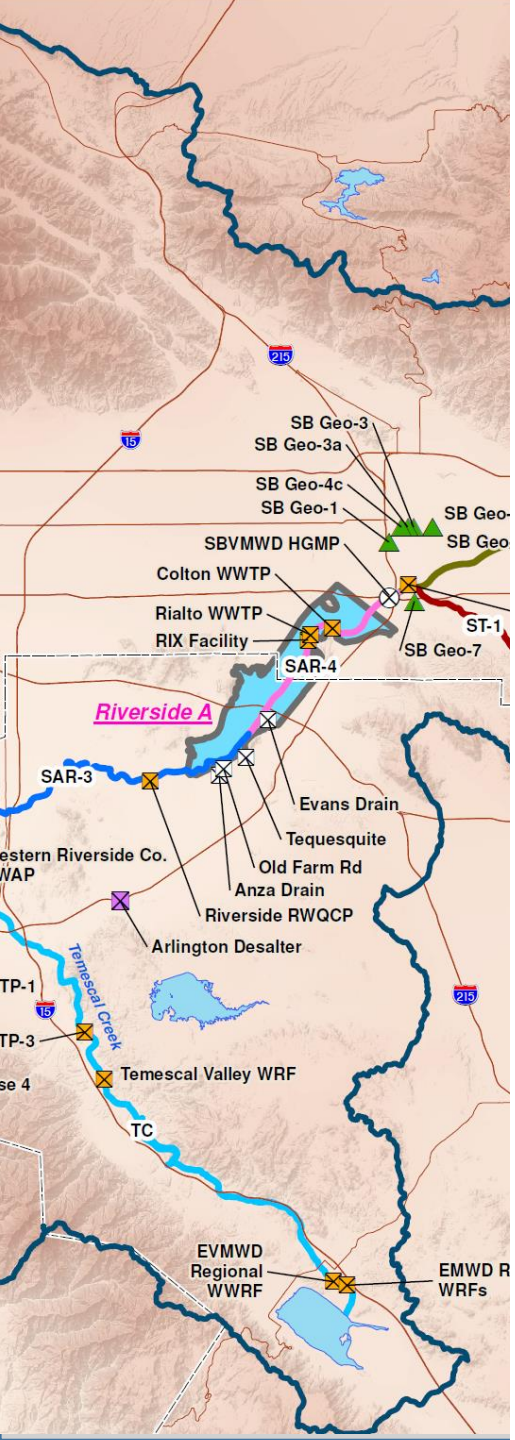
	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	560	440	120	1-year	***510***	***487***	***486***	***492***	***477***	***471***
				5-year	***487***	***453***	***449***	***467***	***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

Bold black values represent concentrations above ambient, but below objective.
Bold red values represent concentrations above basin objective.

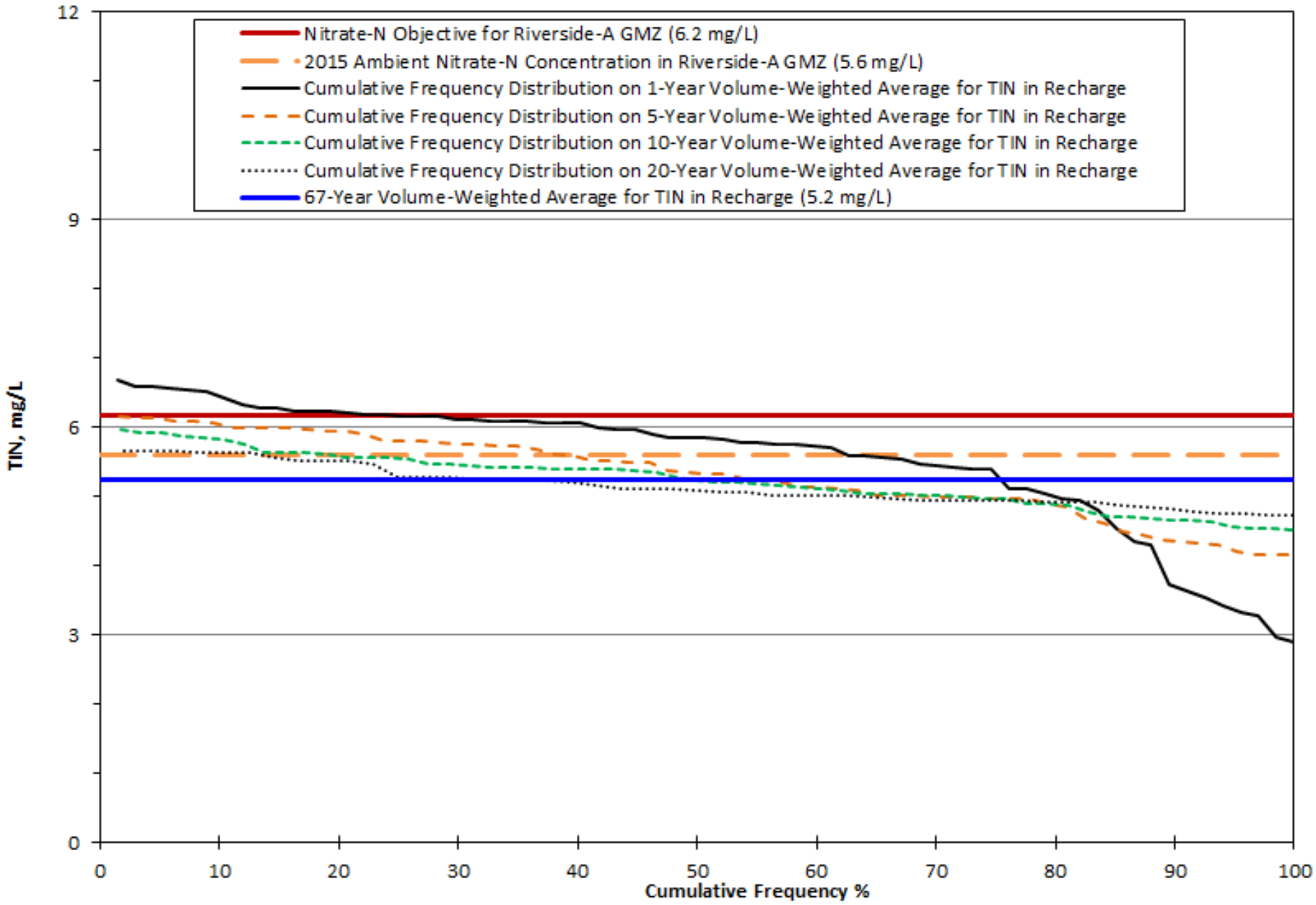


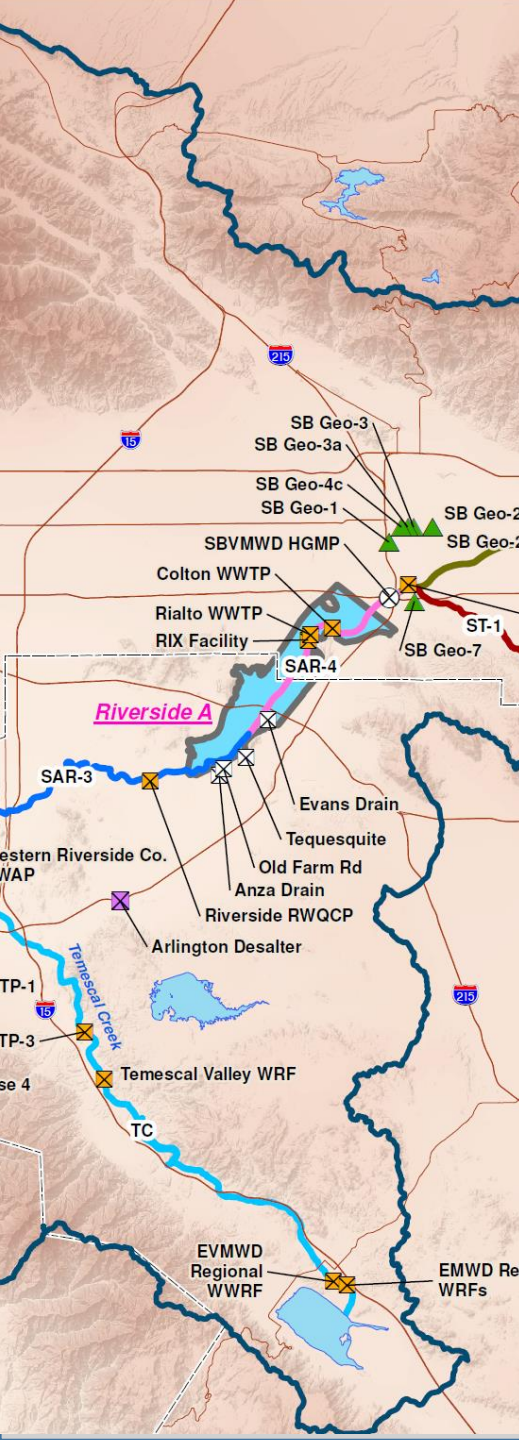
Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario A - 2020 Maximum Expected Discharge



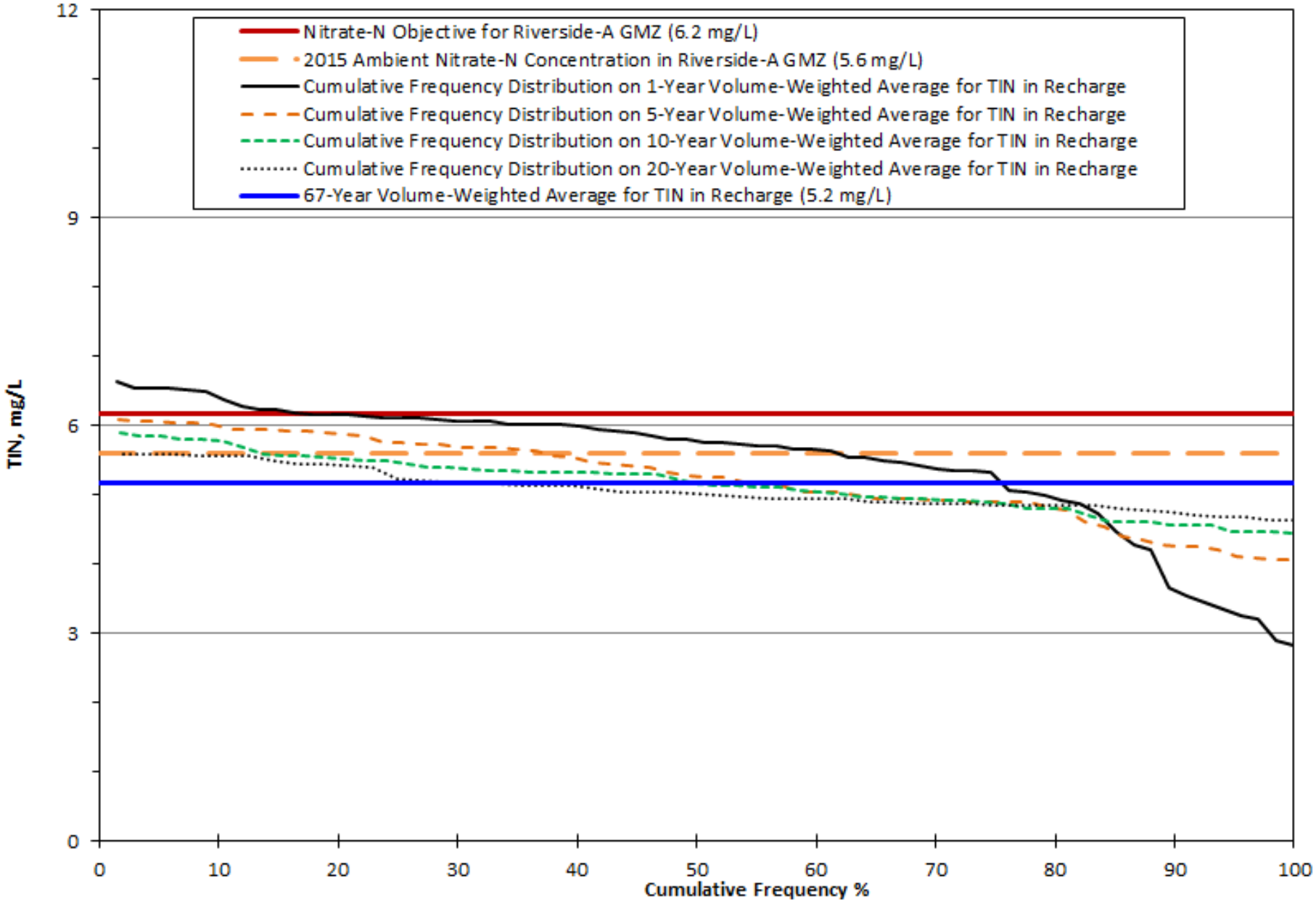


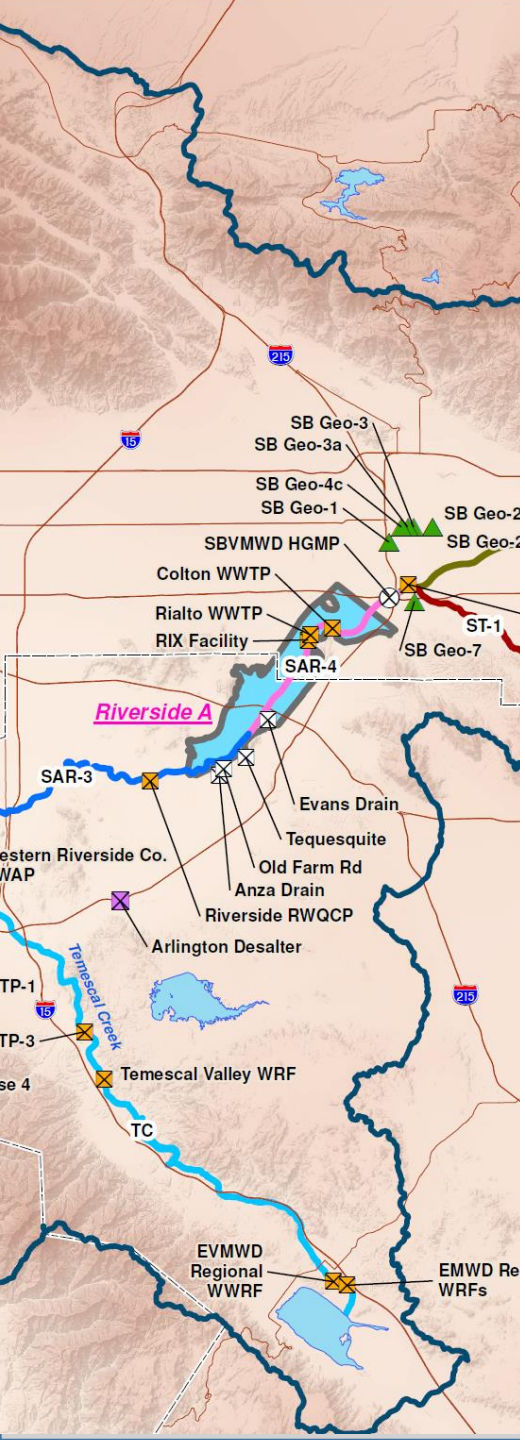
Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario B - 2020 Average Expected Discharge



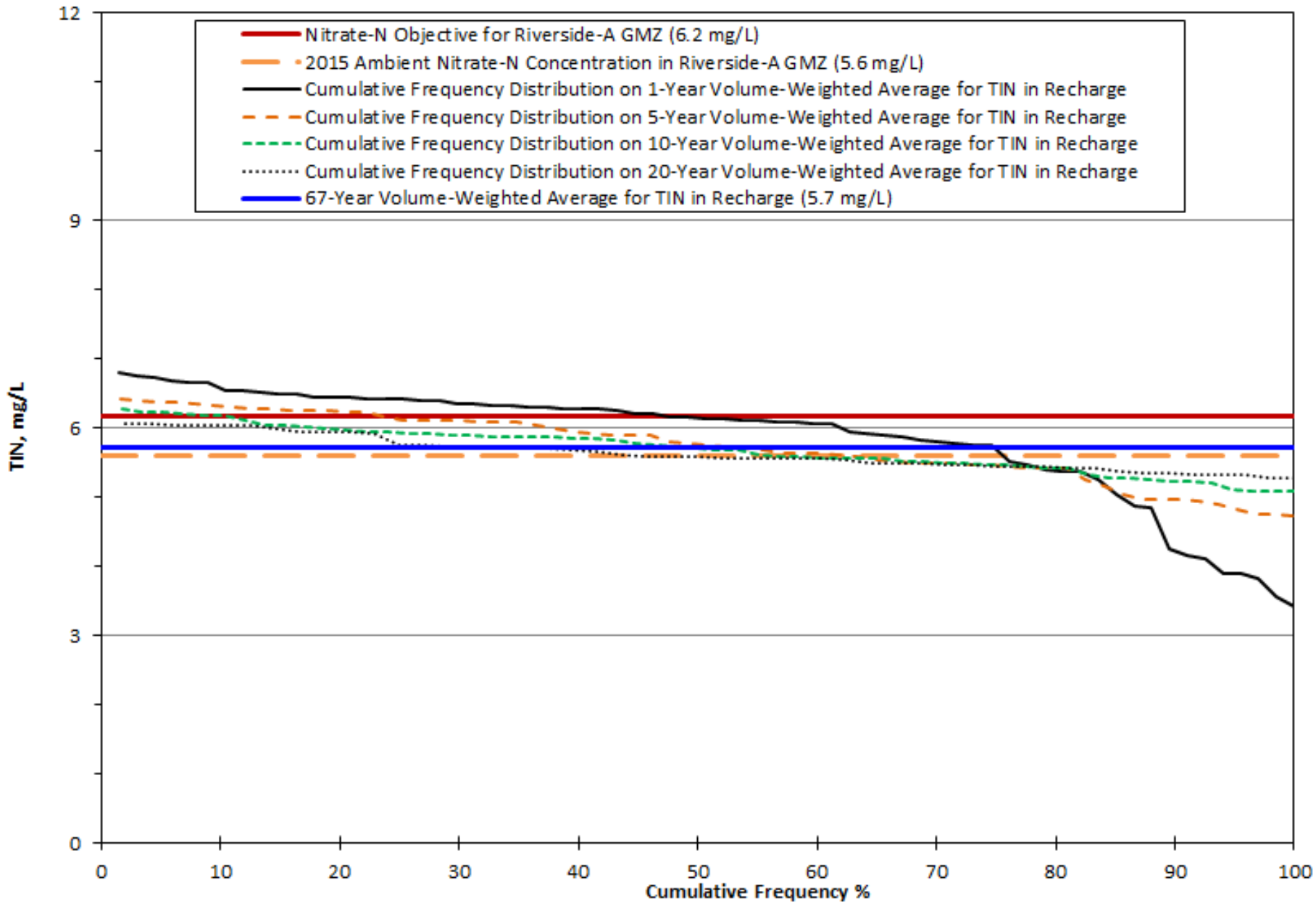


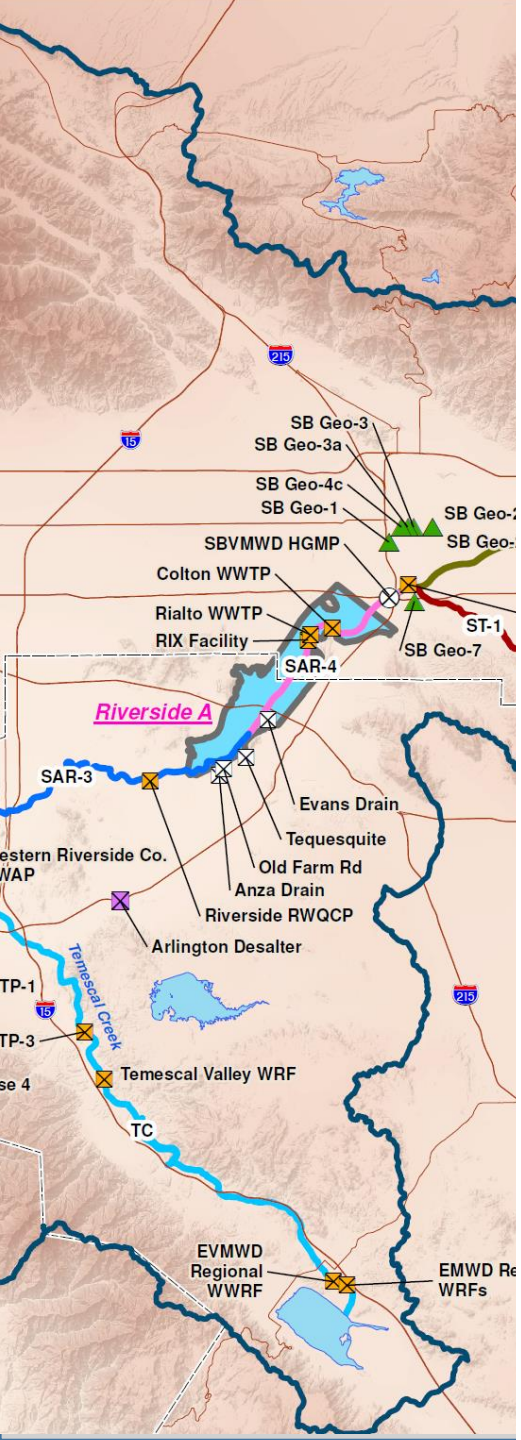
Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario C - 2020 Minimum Expected Discharge



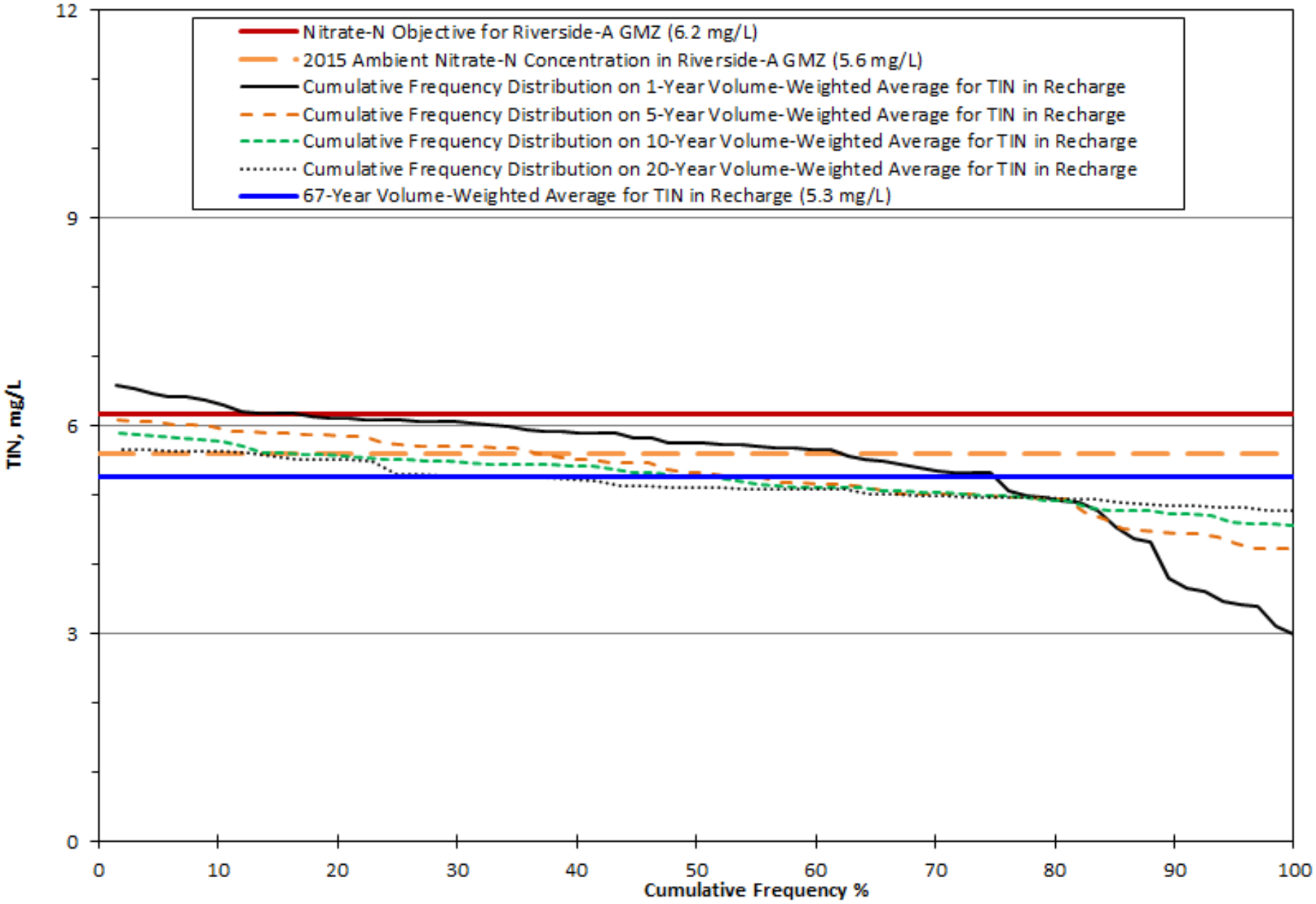


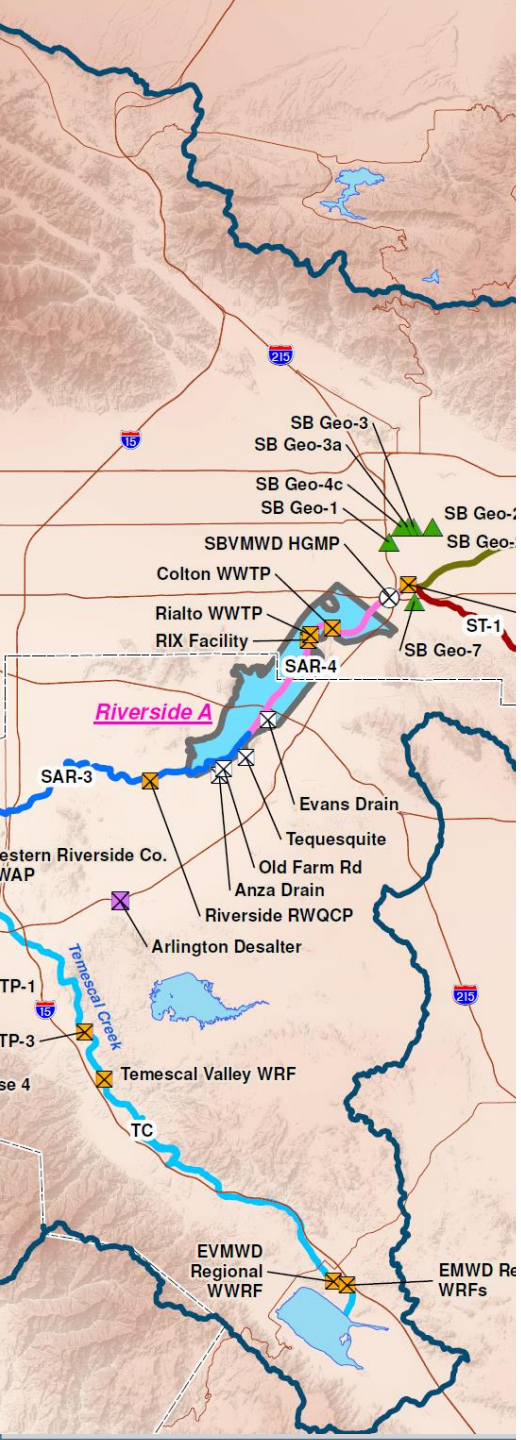
Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario D - 2040 Maximum Expected Discharge



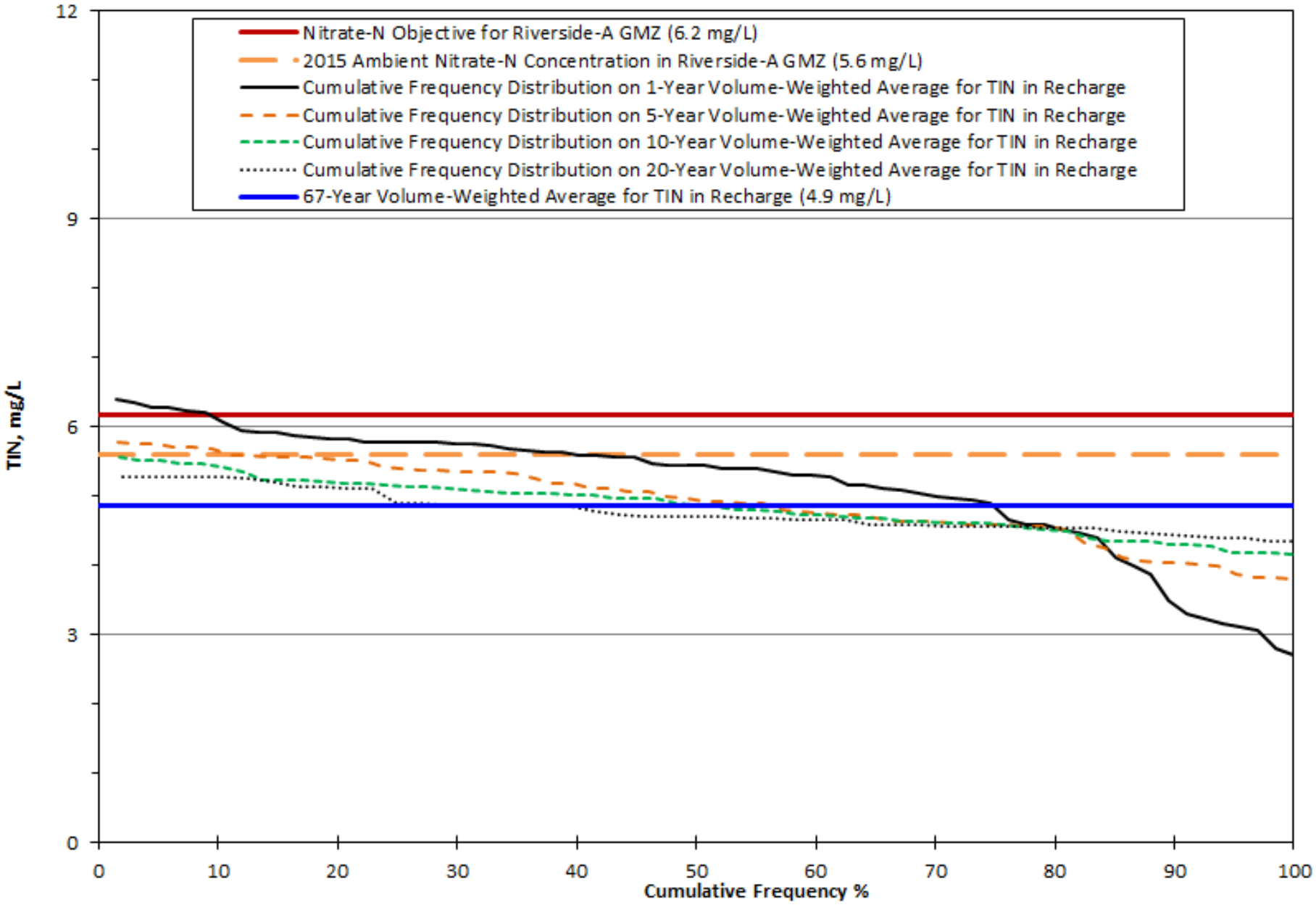


Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario E - 2040 Average Expected Discharge





Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 4 Overlying Riverside-A GMZ Scenario F - 2040 Minimum Expected Discharge



Santa Ana River – Reach 3 Overlying Chino-South GMZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
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	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

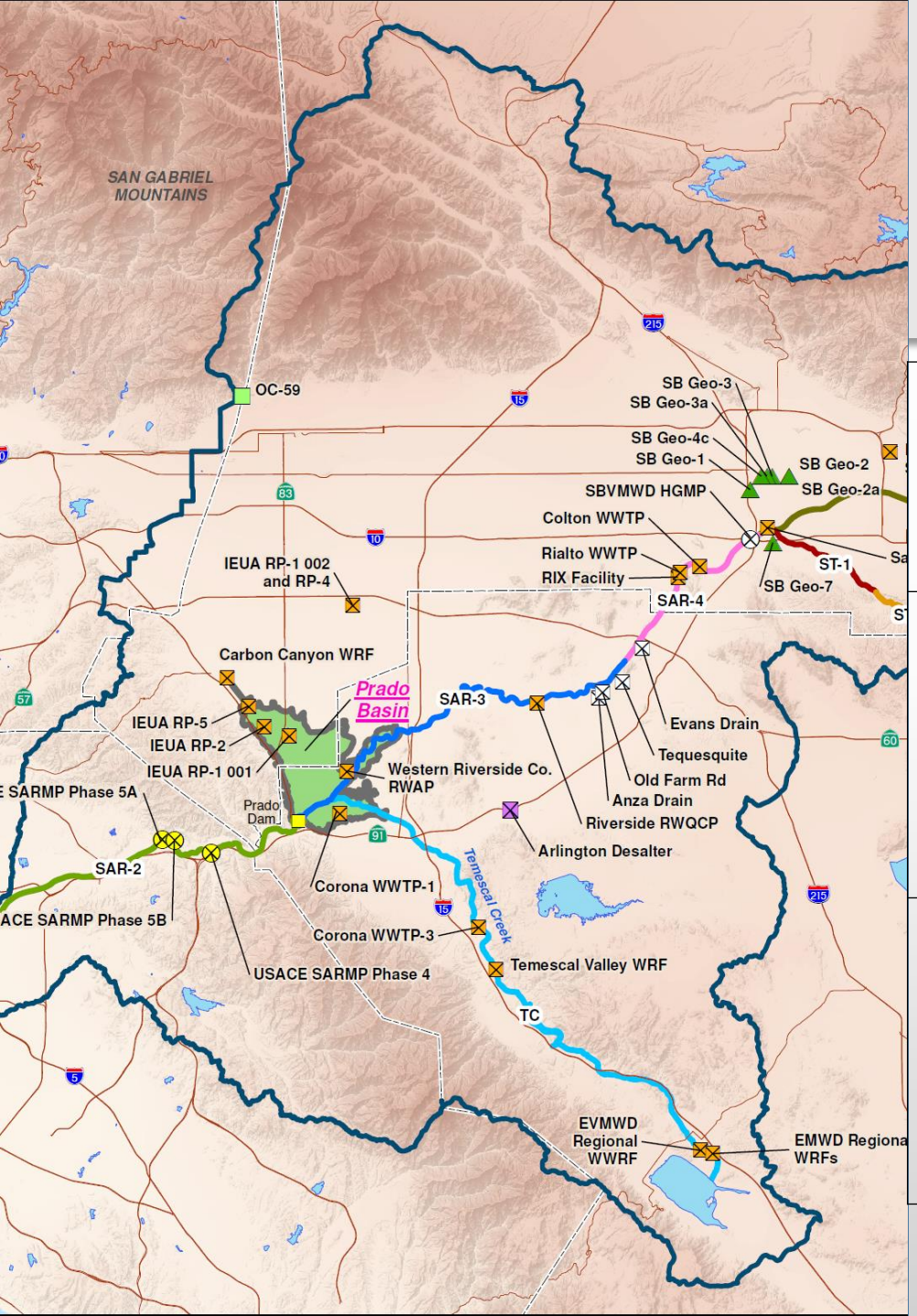
Temescal Creek - Reach 2, 3, 4, 5 and 6 Overlying Upper Temescal Valley GMZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	820	822	none	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	7.9	none	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

Santa Ana River – Reach 3 Overlying Prado Basin MZ

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

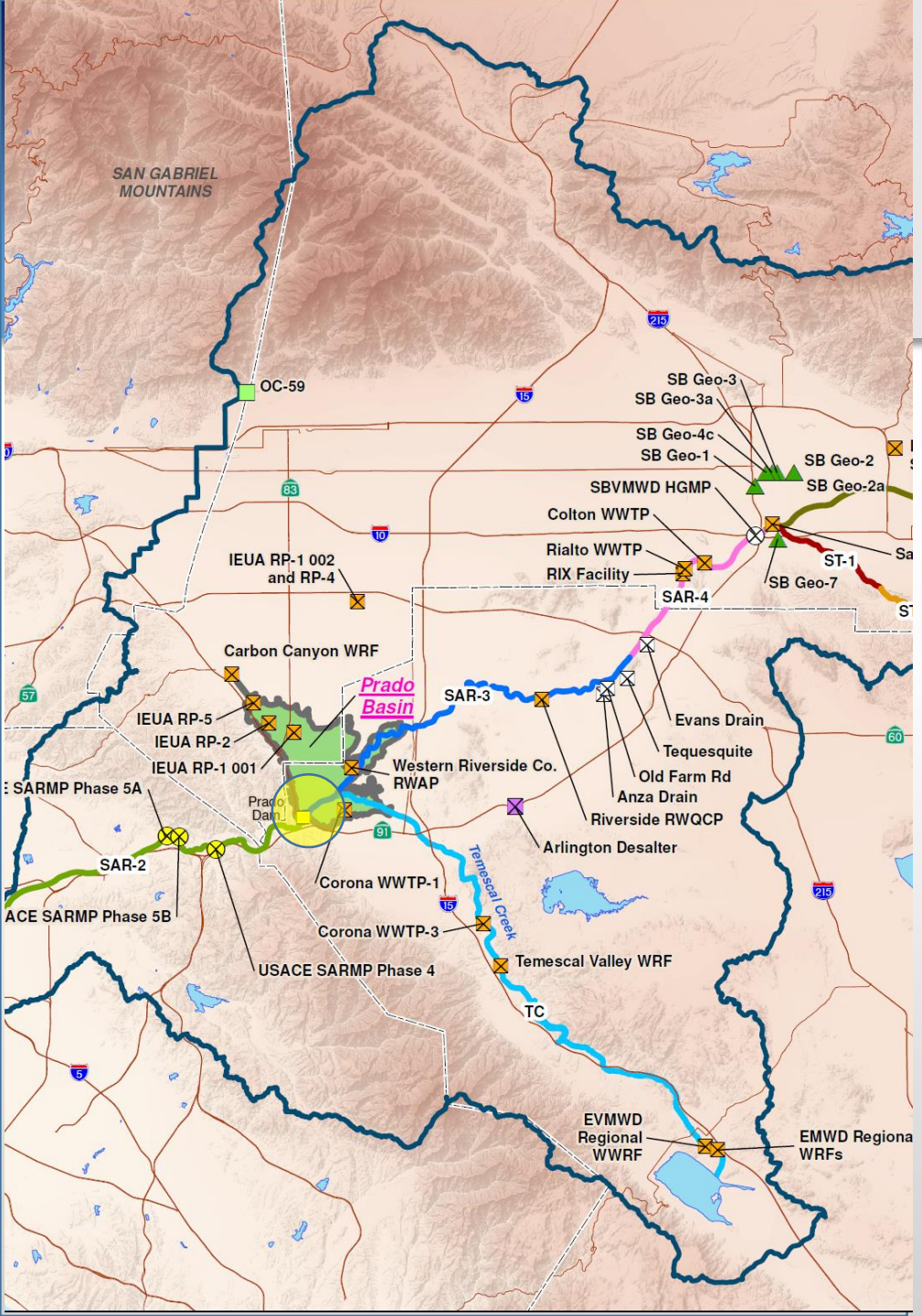


	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	550 - 700[A]	na	none	1-year	652	662	666	636	650	654
				5-year	637	646	649	622	635	638
				10-year	630	638	640	616	627	629
				20-year	621	629	630	607	617	619
TIN	8.0 - 10.0[A]	na	none	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

Note:
A. Based on Prado Basin Management Zone Objectives presented in the Prado Basin Surface Water Management Zone Section of the 2016 Water Quality Control Plan (Basin Plan) for the Santa Ana River Basin (Pg. 4-29)

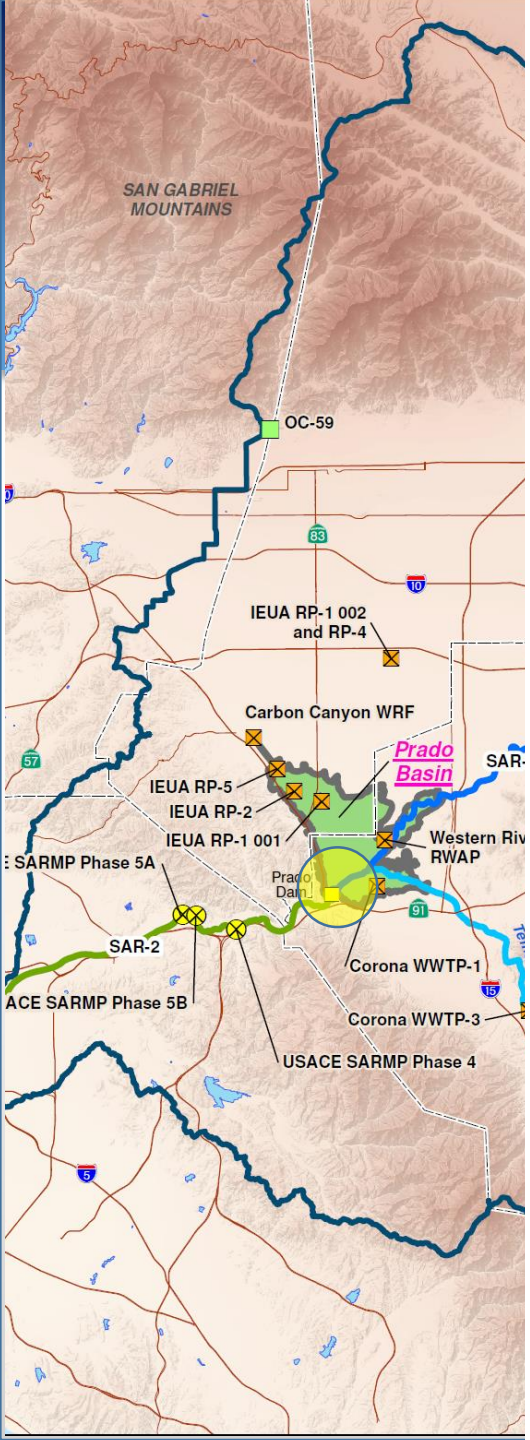
Santa Ana River Reach 3 Below Prado Dam

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)



	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	700	na	na	August Only	616	***722***	***746***	615	***721***	***736***
TIN	10.0	na	na		6.98	5.69	5.01	6.94	6.03	4.99

Bold red values represent concentrations above basin objective.



Estimated Annual Discharge and Volume-Weighted TDS Concentration at Santa Ana River Below Prado Dam Scenario A - 2020 Maximum Expected Discharge

Annual Discharge at Santa Ana River Below Prado Dam (Average = 278,902 acre-ft/yr)
August-Only TDS Objective for Reach 3 (700 mg/L)
5 Year Moving Average TDS Objective for Reach 2 (650 mg/L)
August-Only Volume-Weighted Average for TDS at Below Prado Dam (Max = 616 mg/L)
1-Year Volume-Weighted Average for TDS at Below Prado Dam (Max = 595 mg/L)
5-Year Moving Average of the 1-Year Volume Weighted Average for TDS at Below Prado Dam (Max = 523 mg/L)
5-Year Volume-Weighted Running Average for TDS at Below Prado Dam (Max = 522 mg/L)
10-Year Volume-Weighted Running Average for TDS at Below Prado Dam (Max = 483 mg/L)
20-Year Volume-Weighted Running Average for TDS at Below Prado Dam (Max = 457 mg/L)
67-Year Volume-Weighted Average for TDS at Below Prado Dam (436 mg/L)

TDS, mg/L

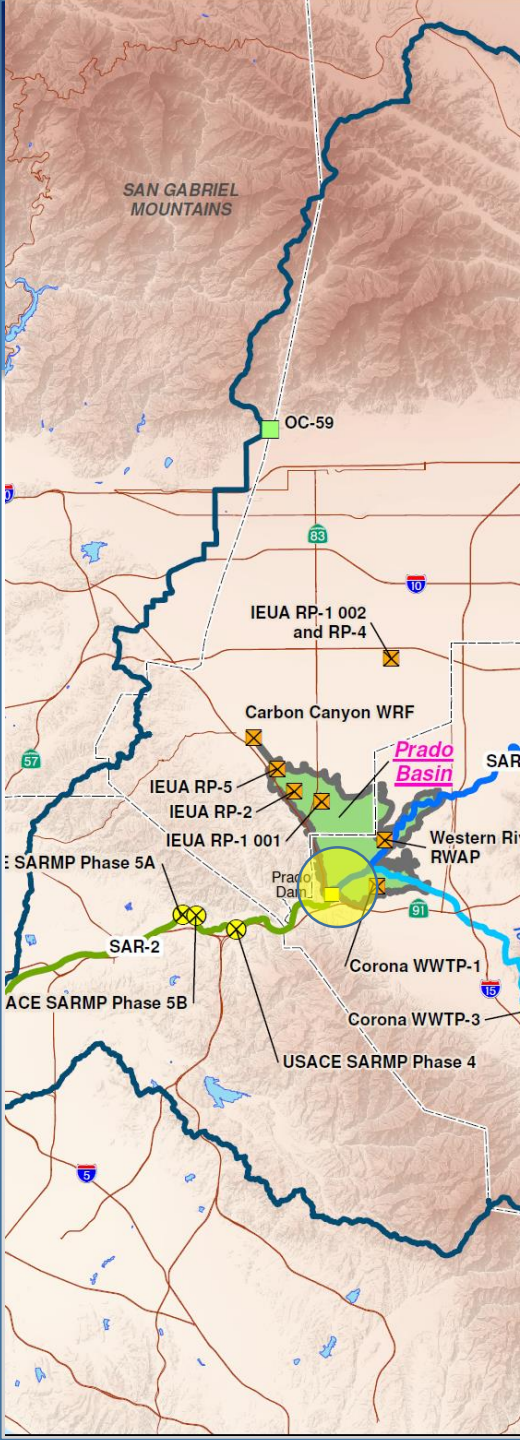
1,000
750
500
250
0

Streamflow (acre-ft/yr)

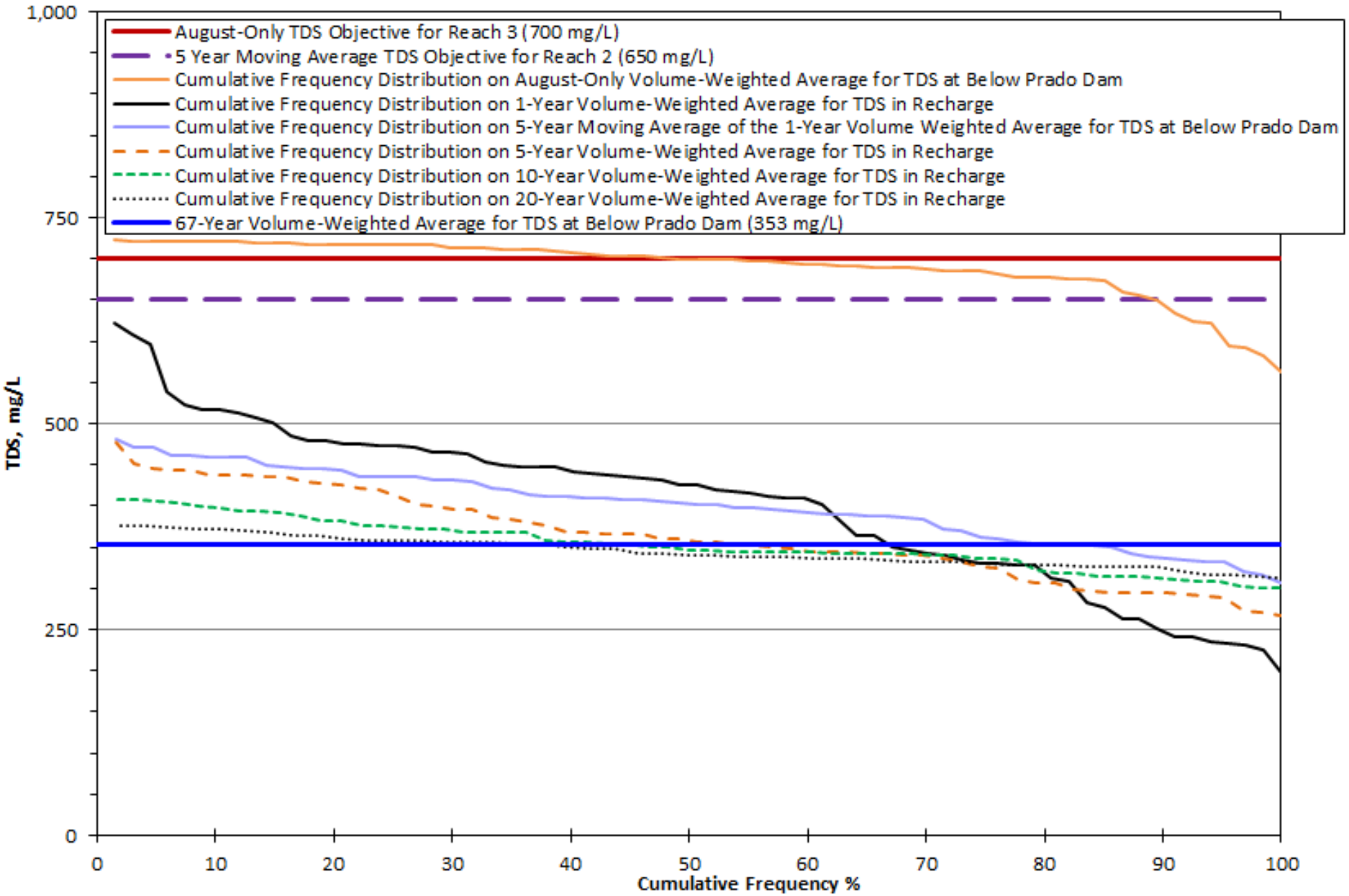
1,000,000
750,000
500,000
250,000
0

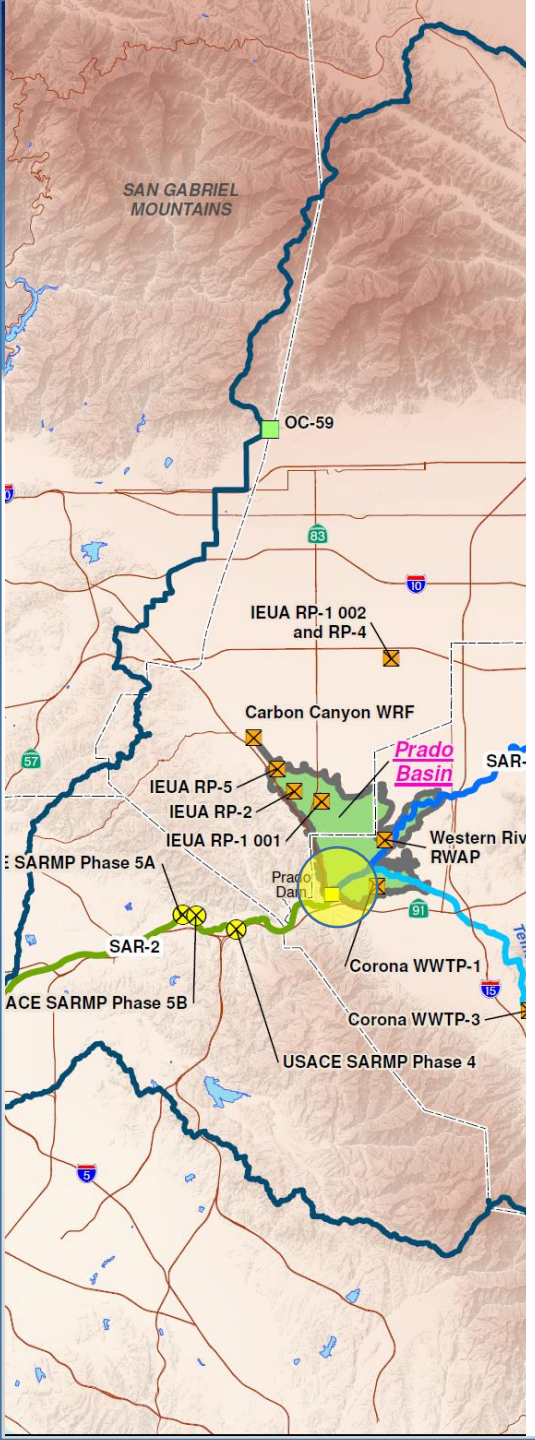
1949 1954 1959 1964 1969 1974 1979 1984 1989 1994 1999 2004 2009 2014

Water Year

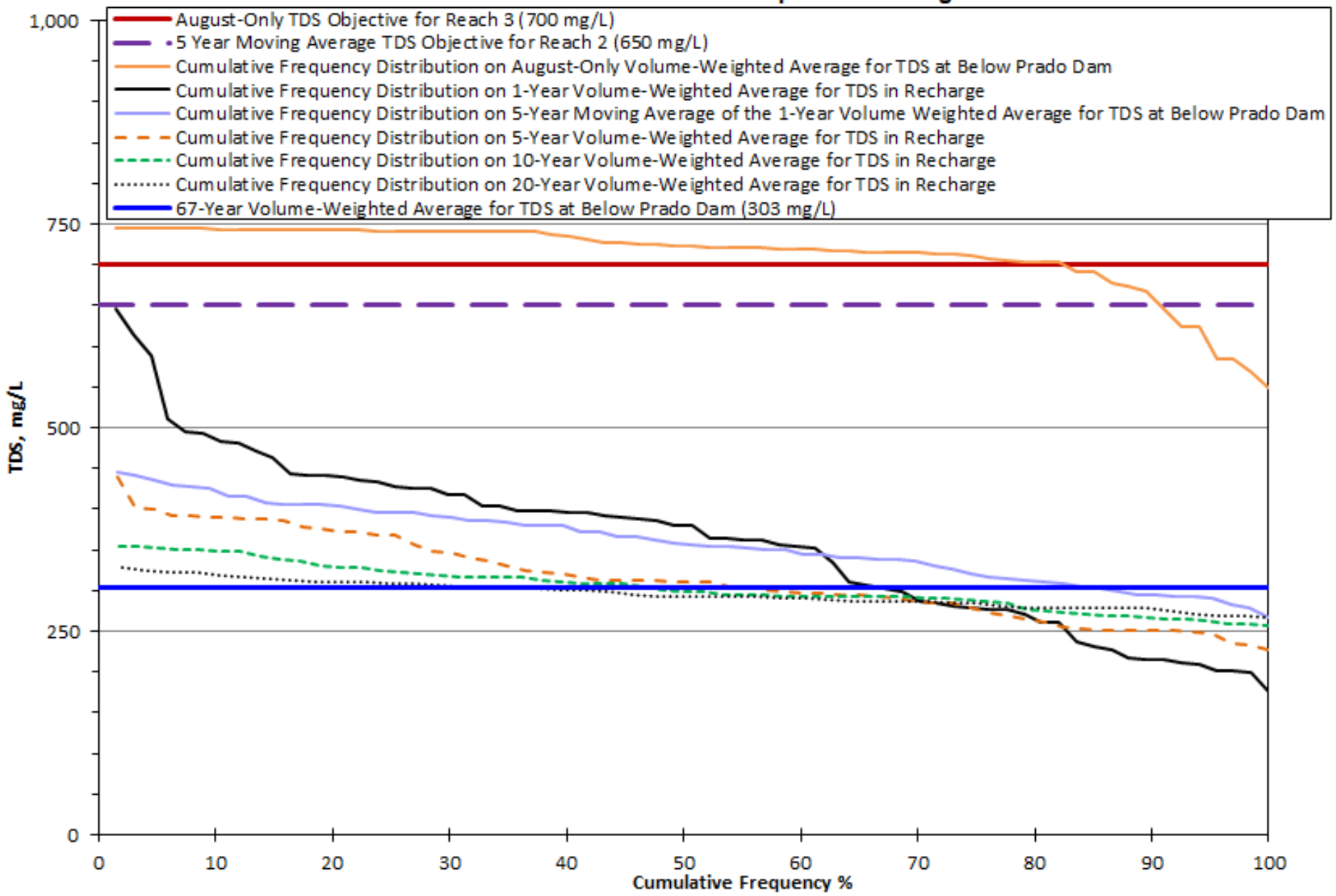


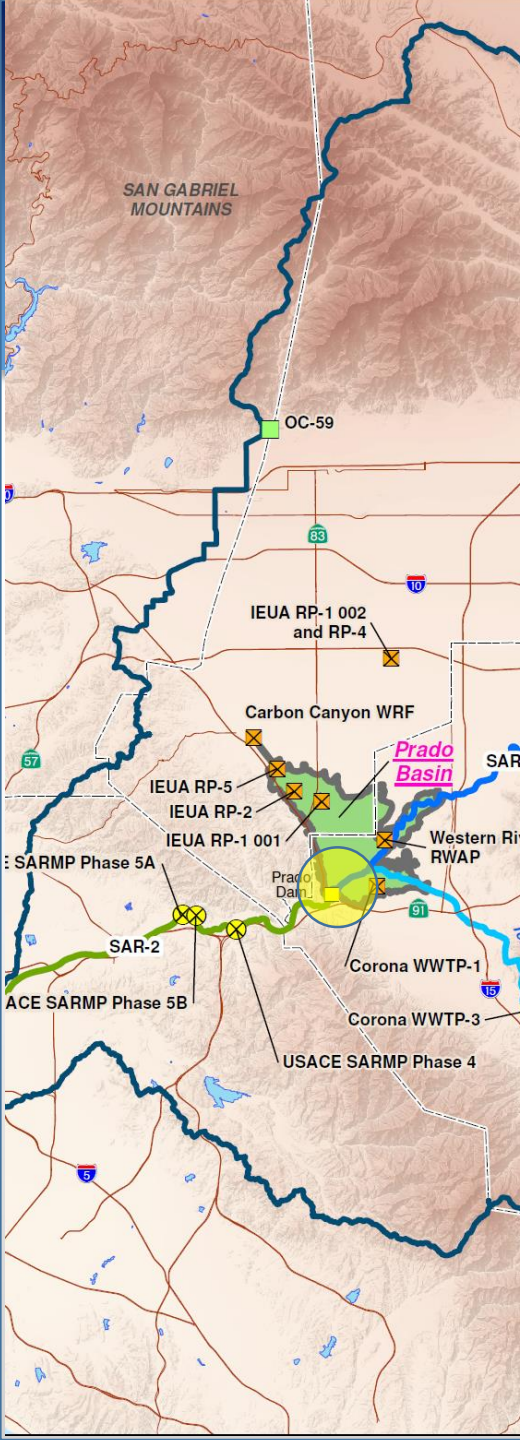
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration at Santa Ana River Below Prado Dam Scenario B - 2020 Average Expected Discharge



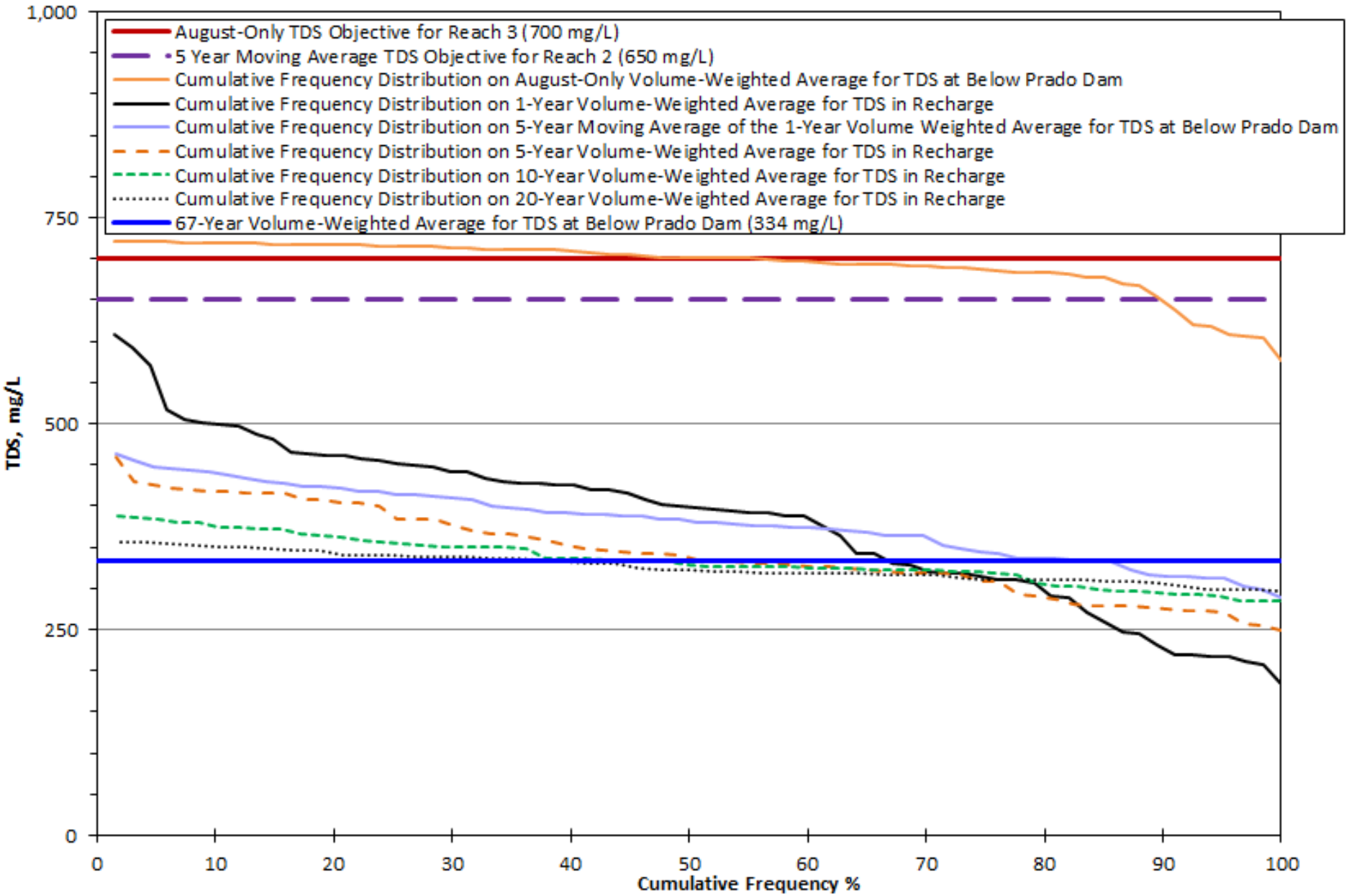


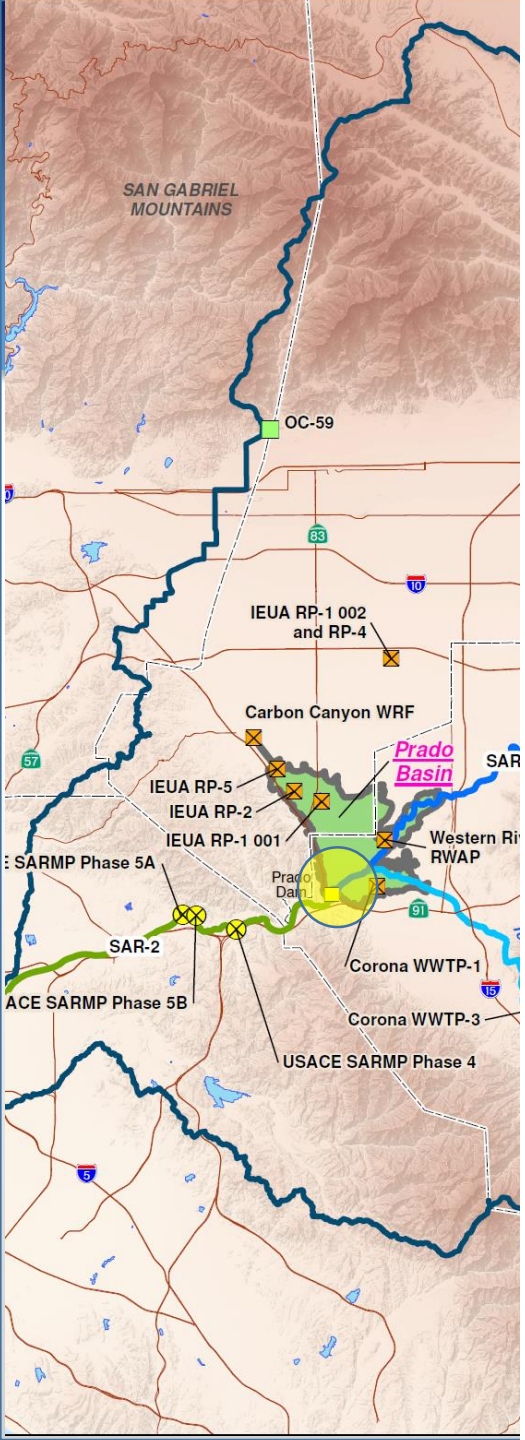
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration at Santa Ana River Below Prado Dam Scenario C - 2020 Minimum Expected Discharge



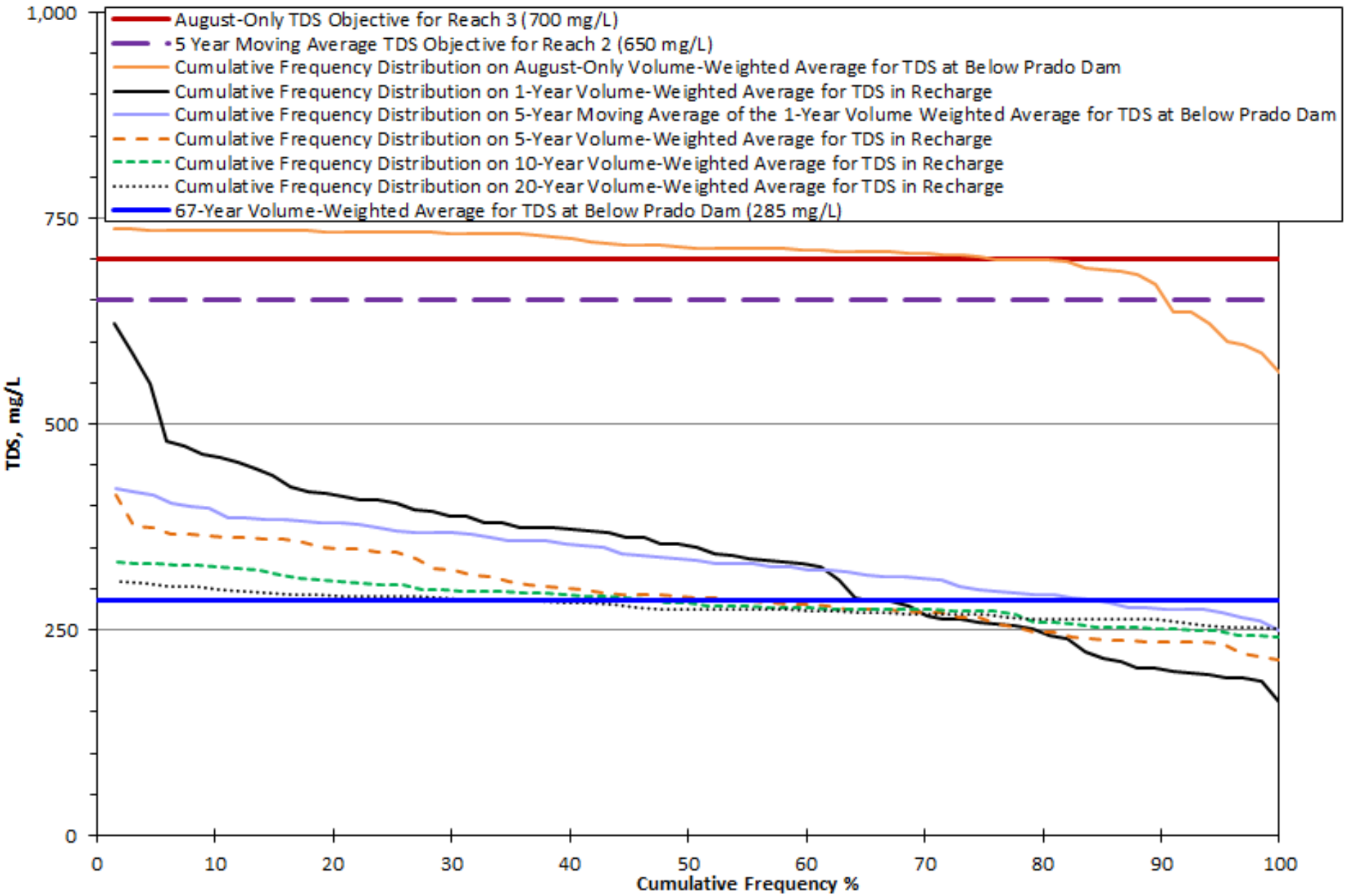


Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration at Santa Ana River Below Prado Dam Scenario E - 2040 Average Expected Discharge



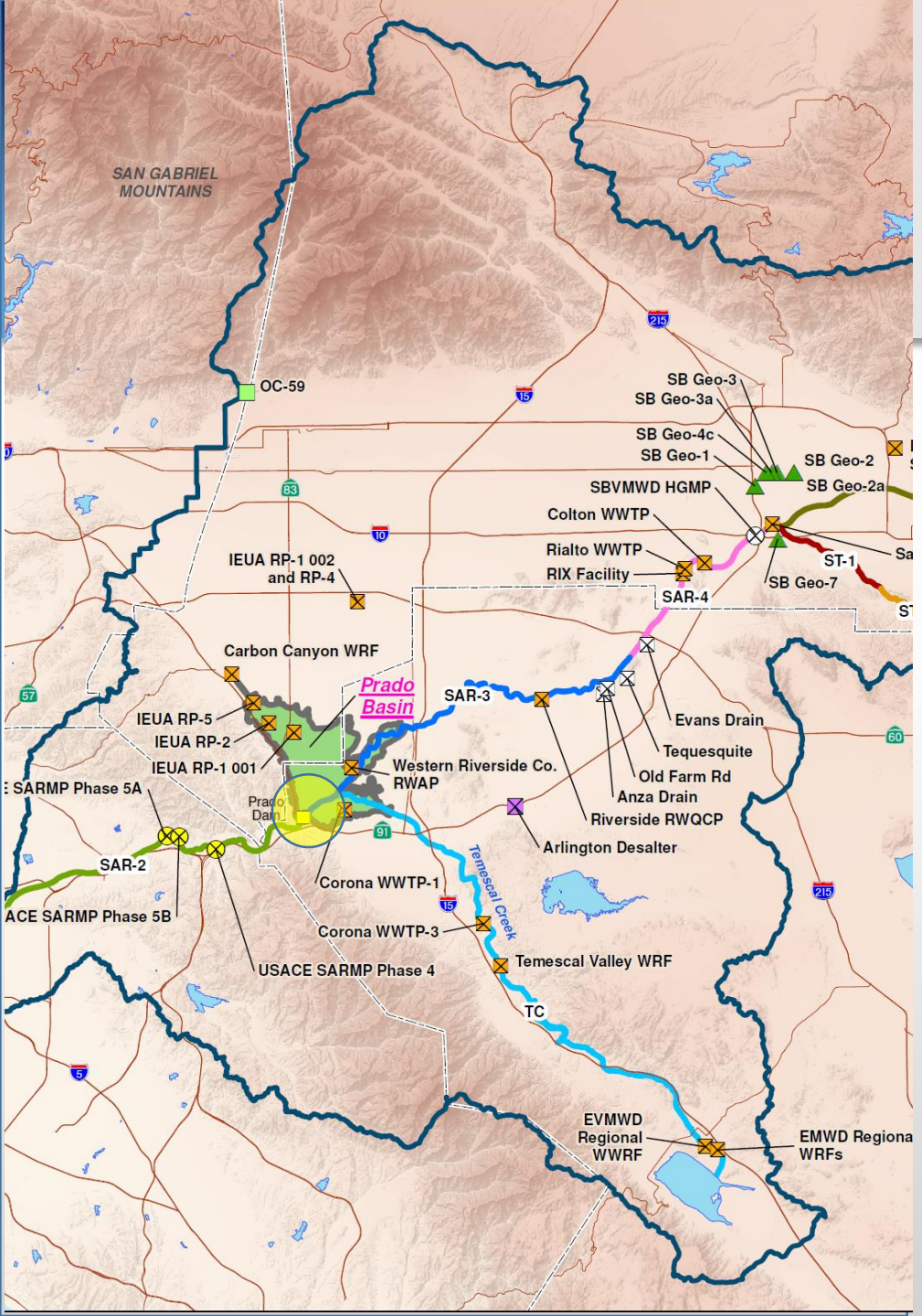


Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration at Santa Ana River Below Prado Dam Scenario F - 2040 Minimum Expected Discharge

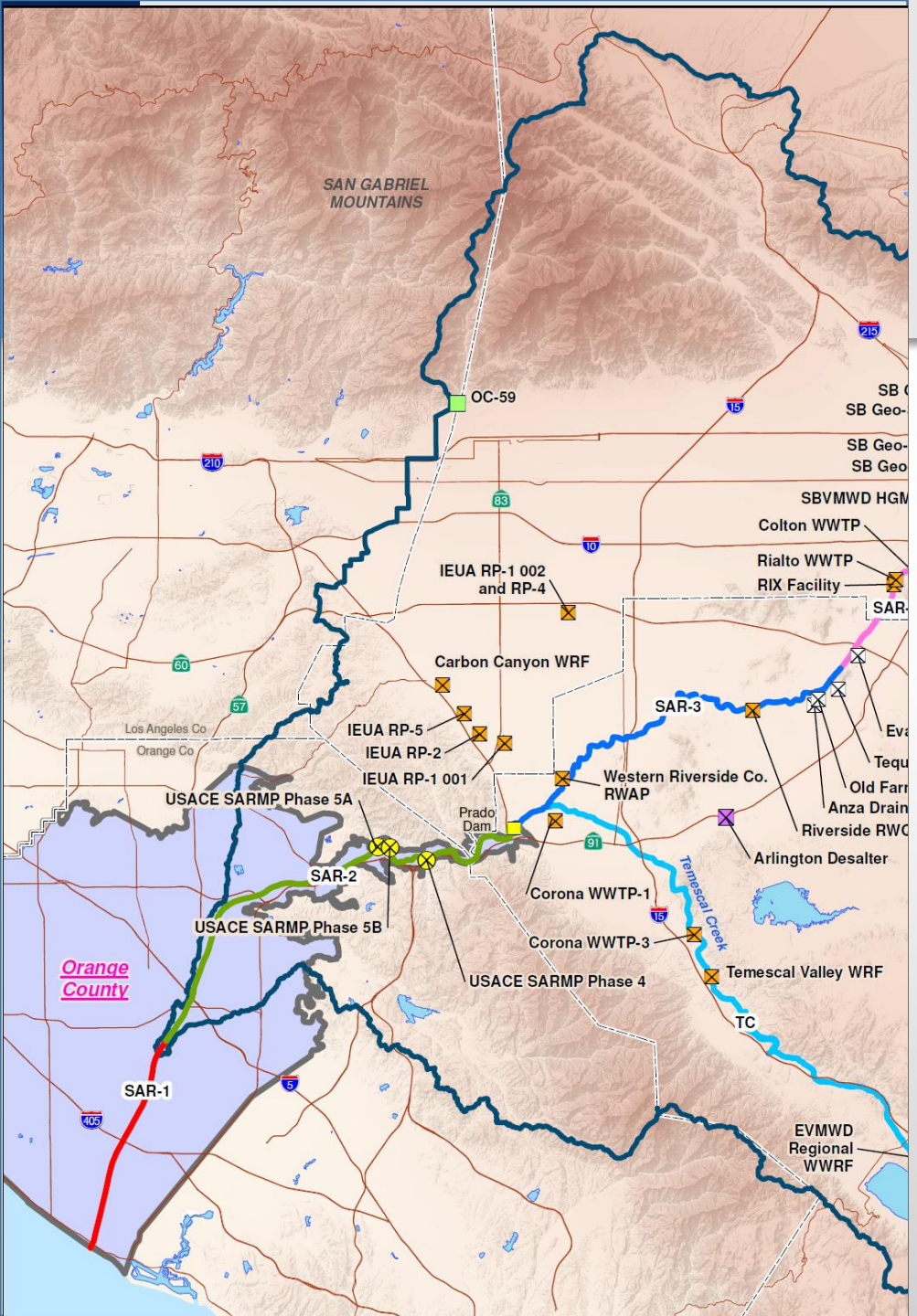


Santa Ana River Reach 2 Below Prado Dam

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)



	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	650	na	na	5-year moving average of the 1-year volume-weighted average	523	481	445	522	464	421
TIN	na	na	na		5.77	4.14	3.17	5.86	4.16	3.06

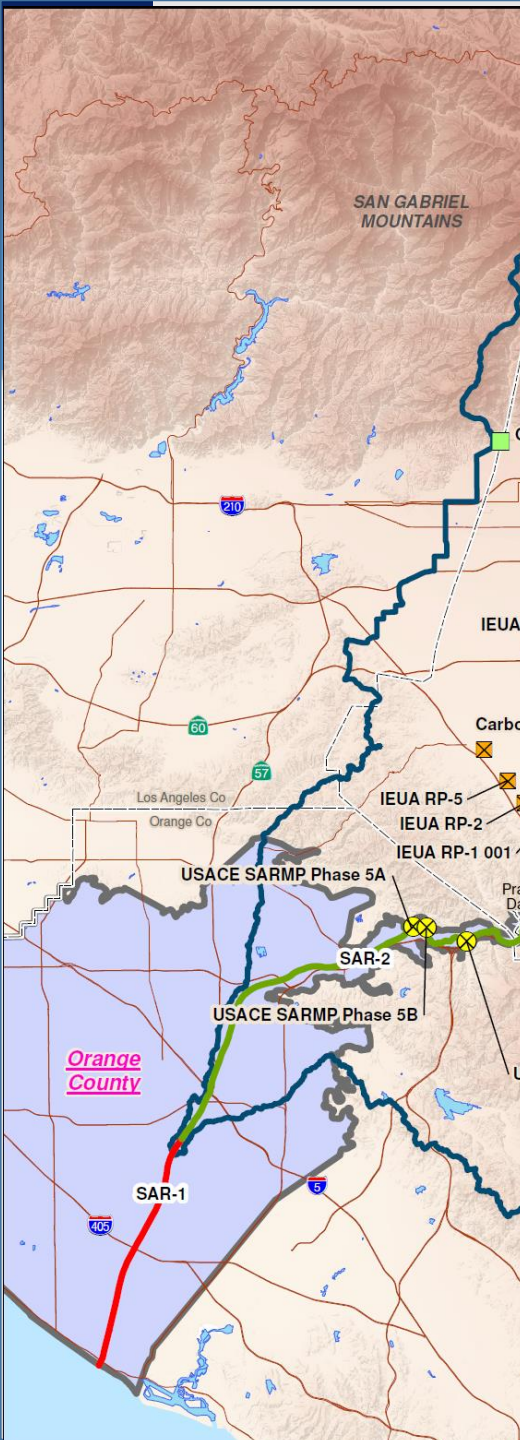


Santa Ana River – Reach 2 Overlying Orange County GMZ

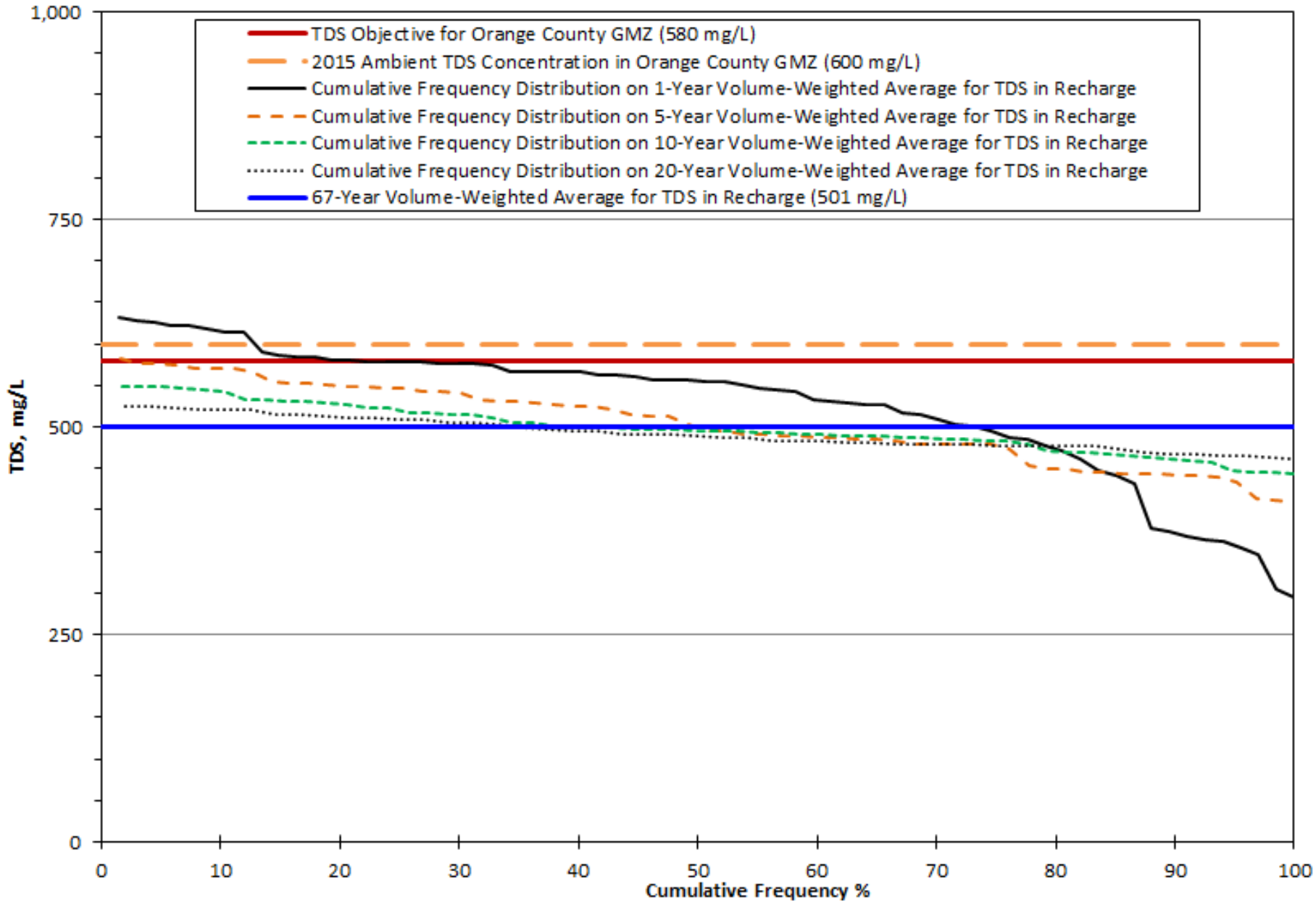
Maximum Value for the Volume-Weighted Recharge (Units in mg/L)

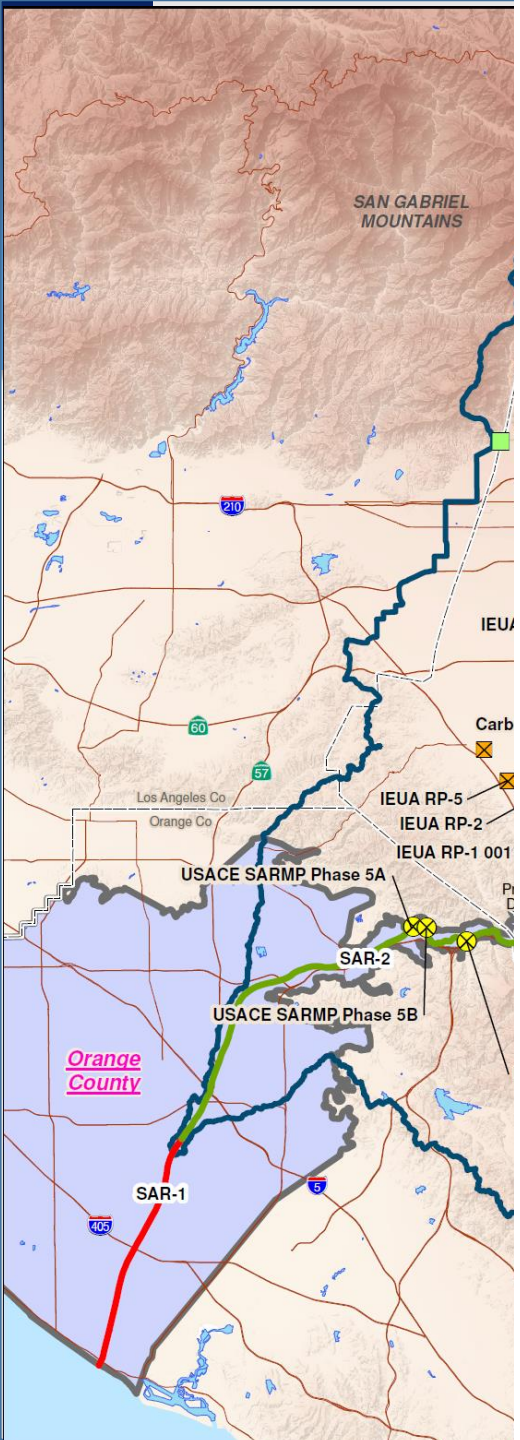
	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	580	600	None	1-year	***632***	***679***	***732***	***588***	***684***	***726***
				5-year	***582***	***646***	***684***	536	***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

Bold black values represent concentrations above ambient, but below objective.
Bold red values represent concentrations above basin objective.

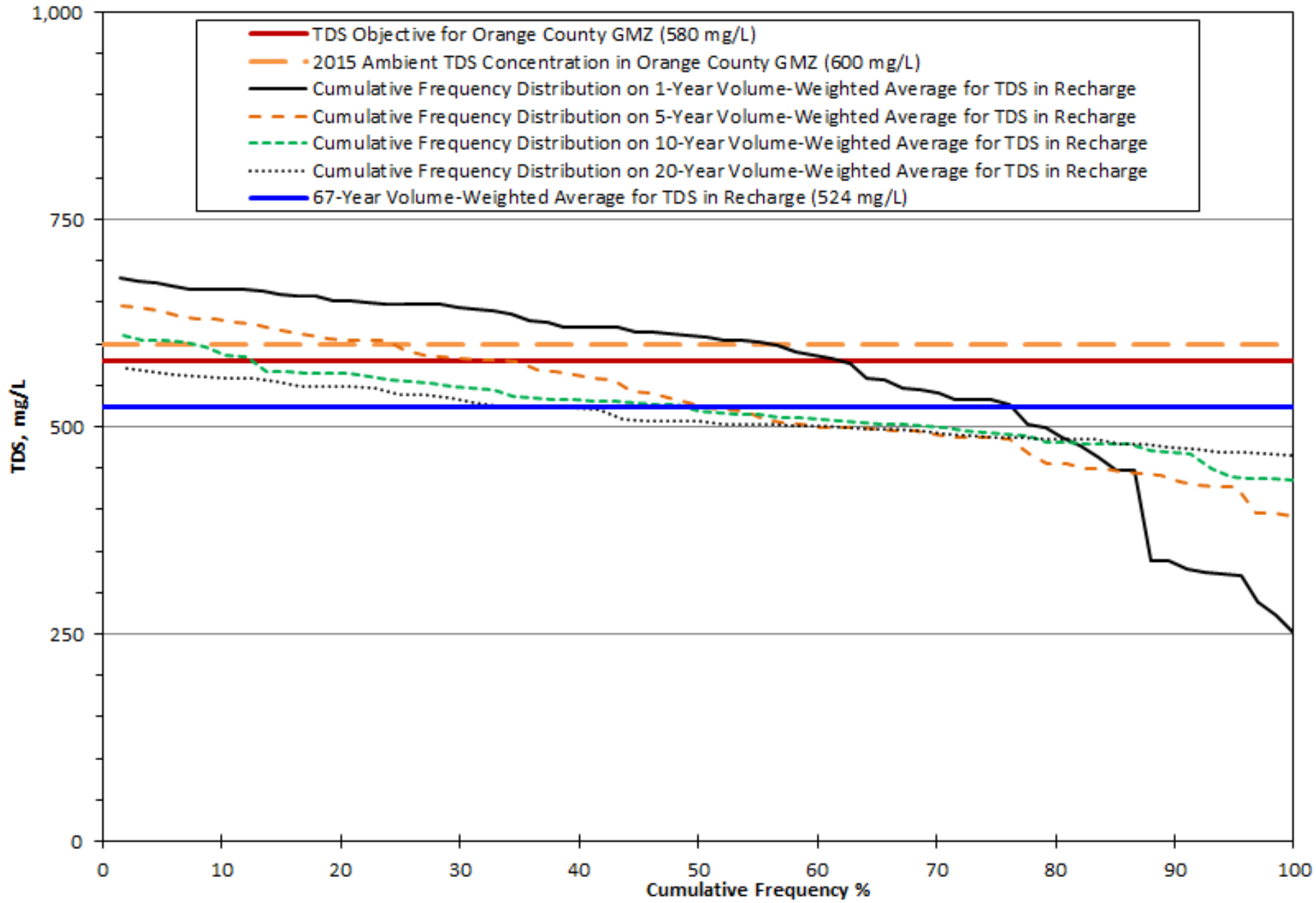


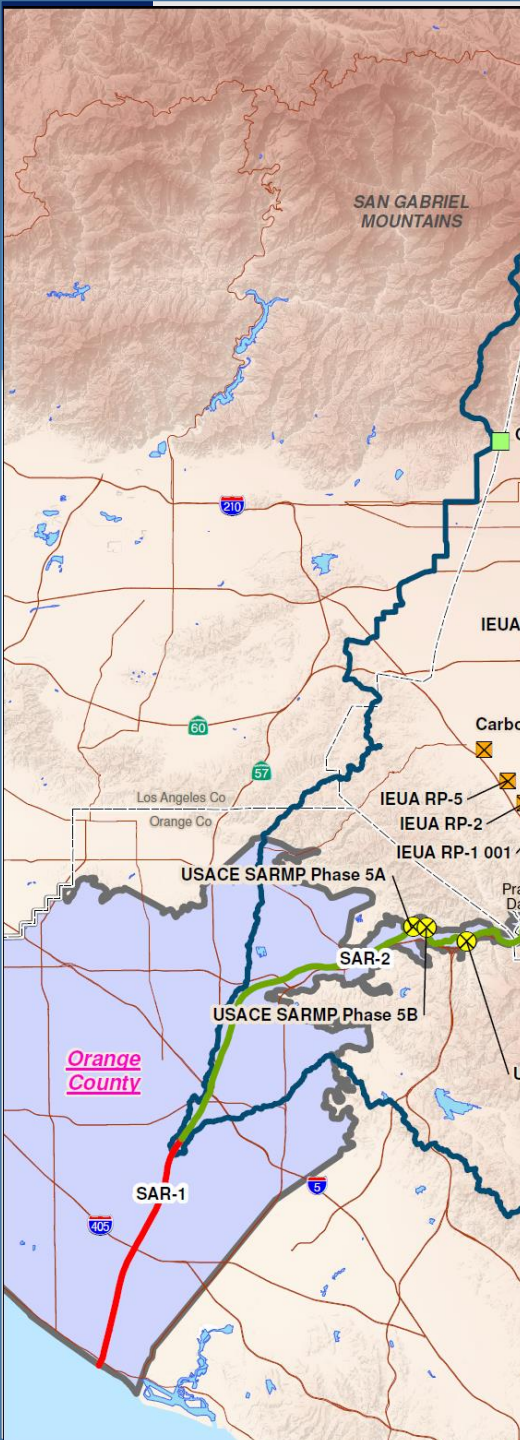
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario A - 2020 Maximum Expected Discharge



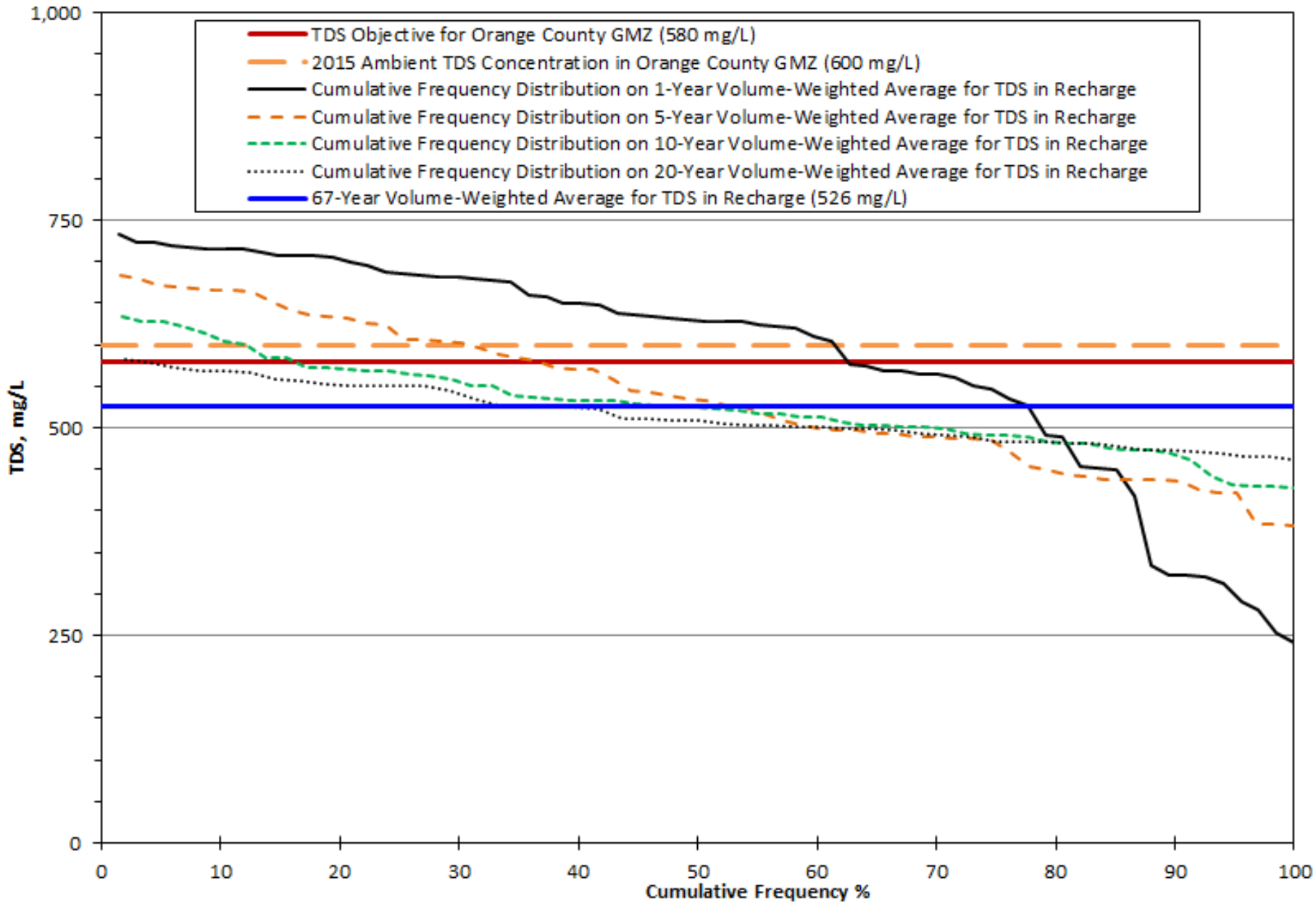


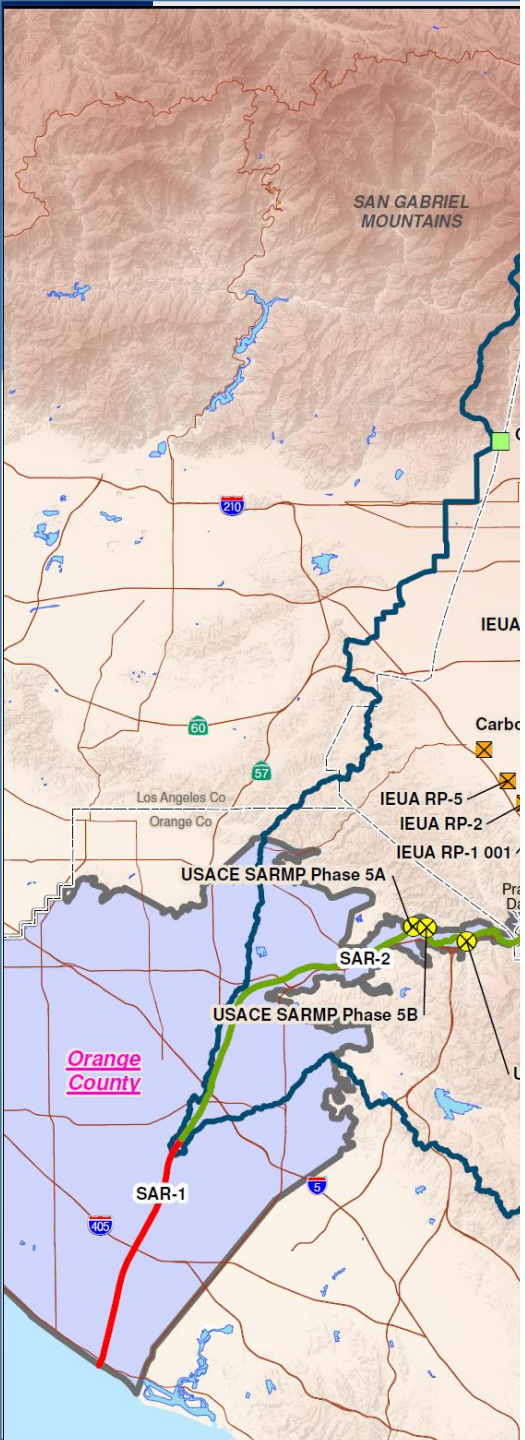
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario B - 2020 Average Expected Discharge



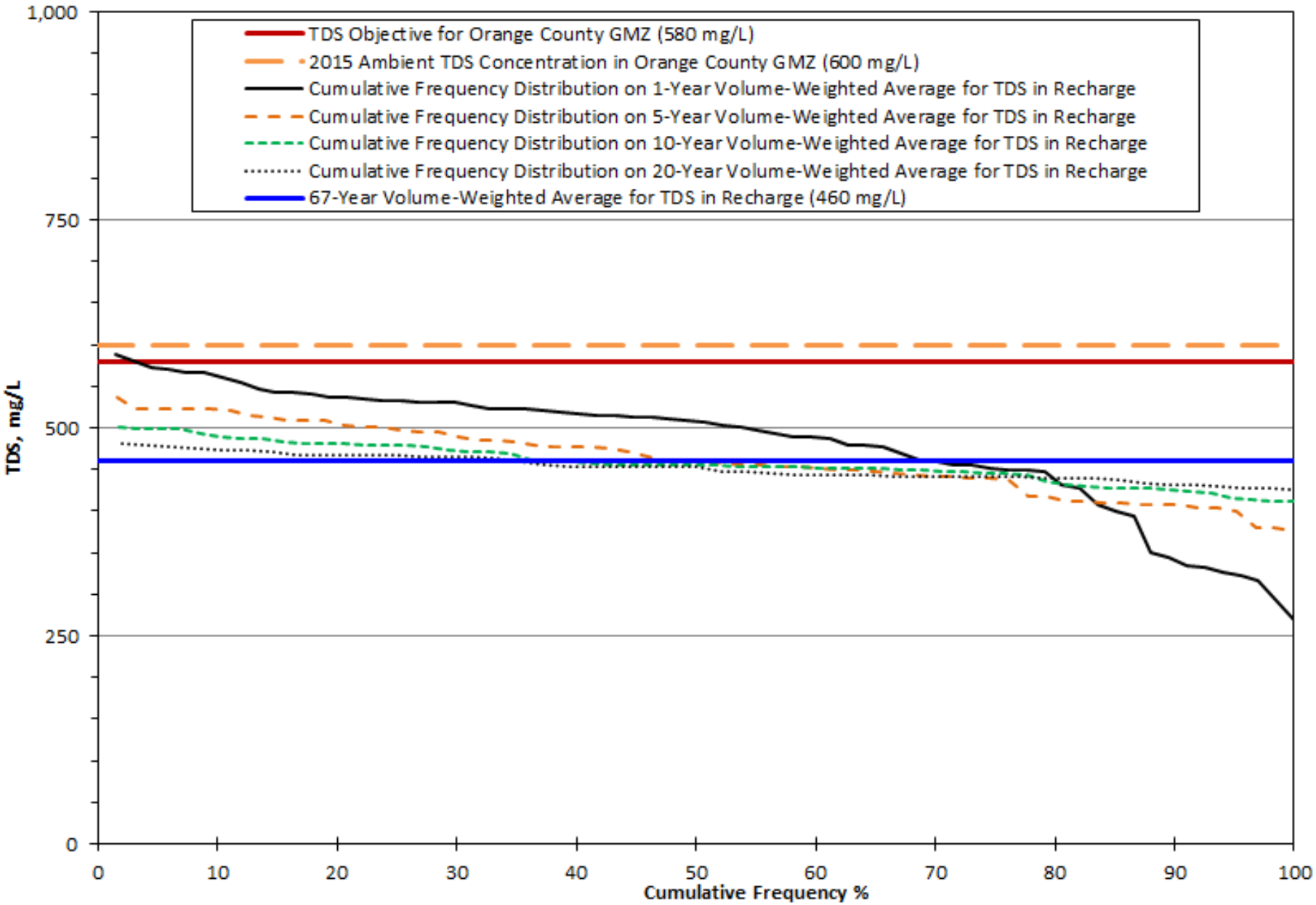


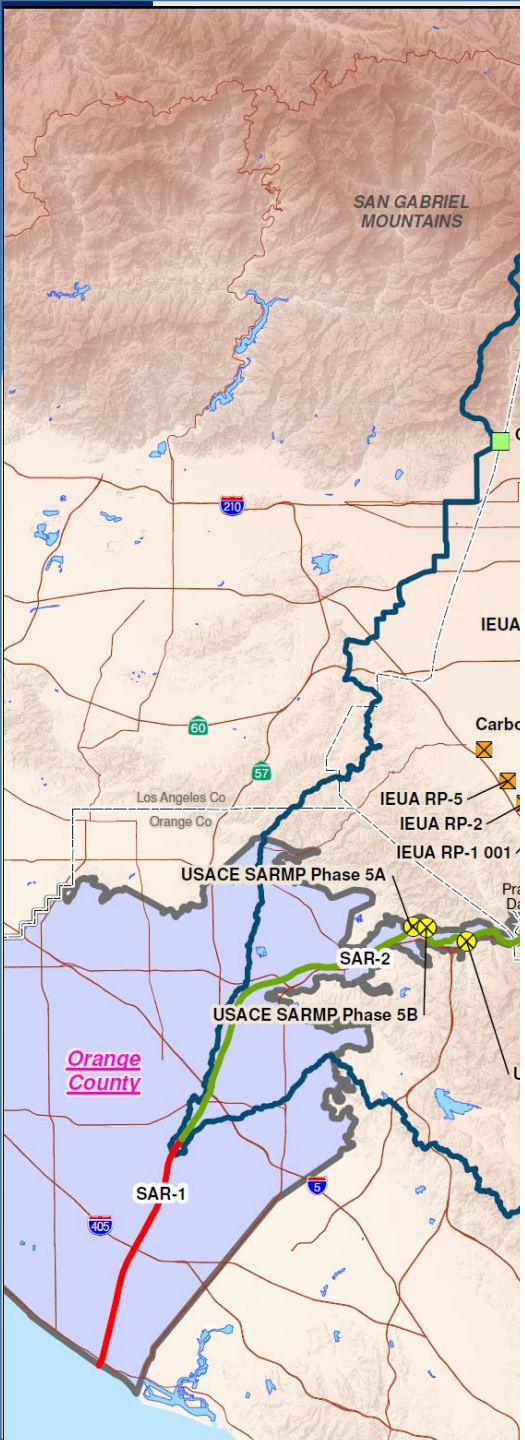
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario C - 2020 Minimum Expected Discharge



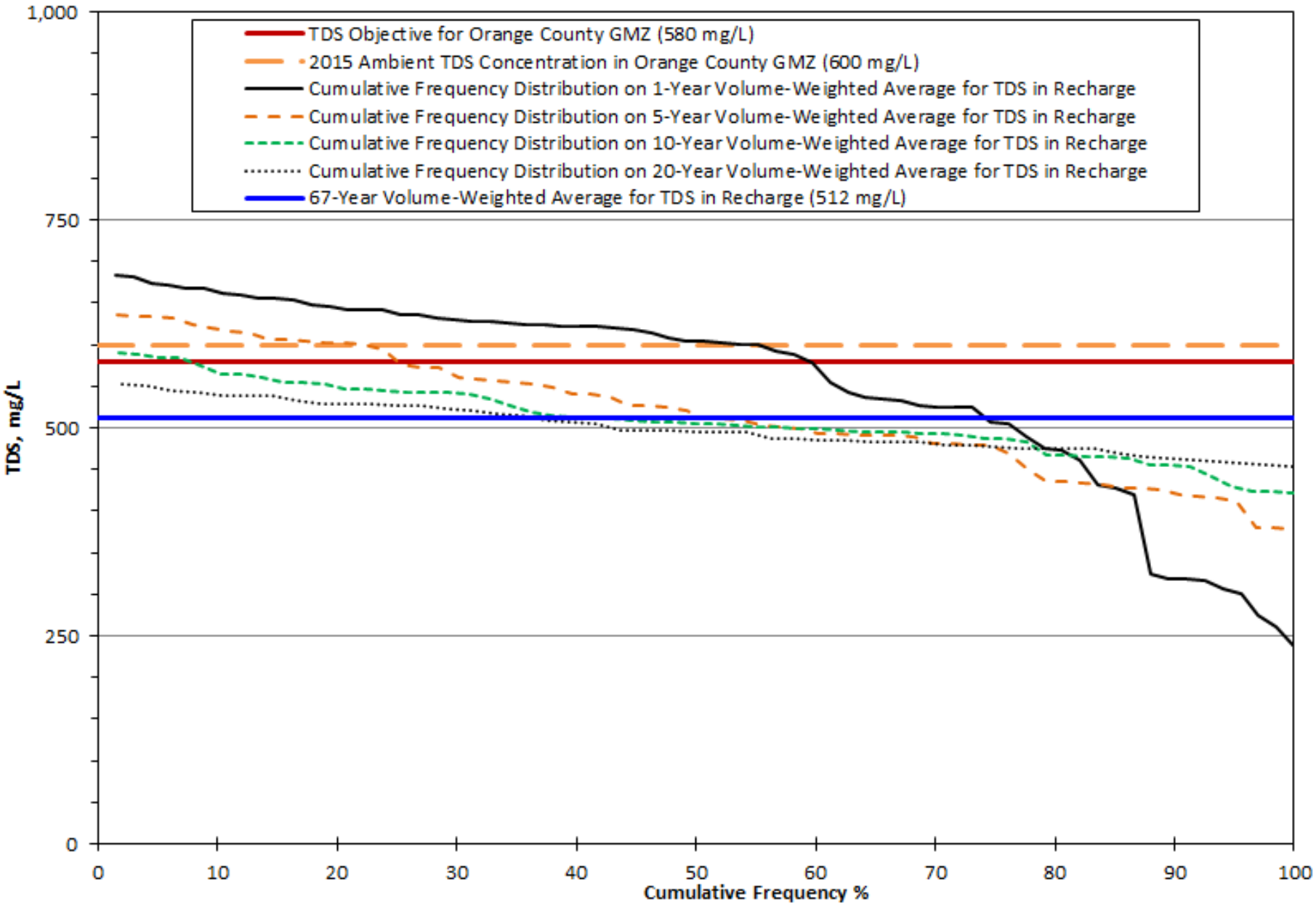


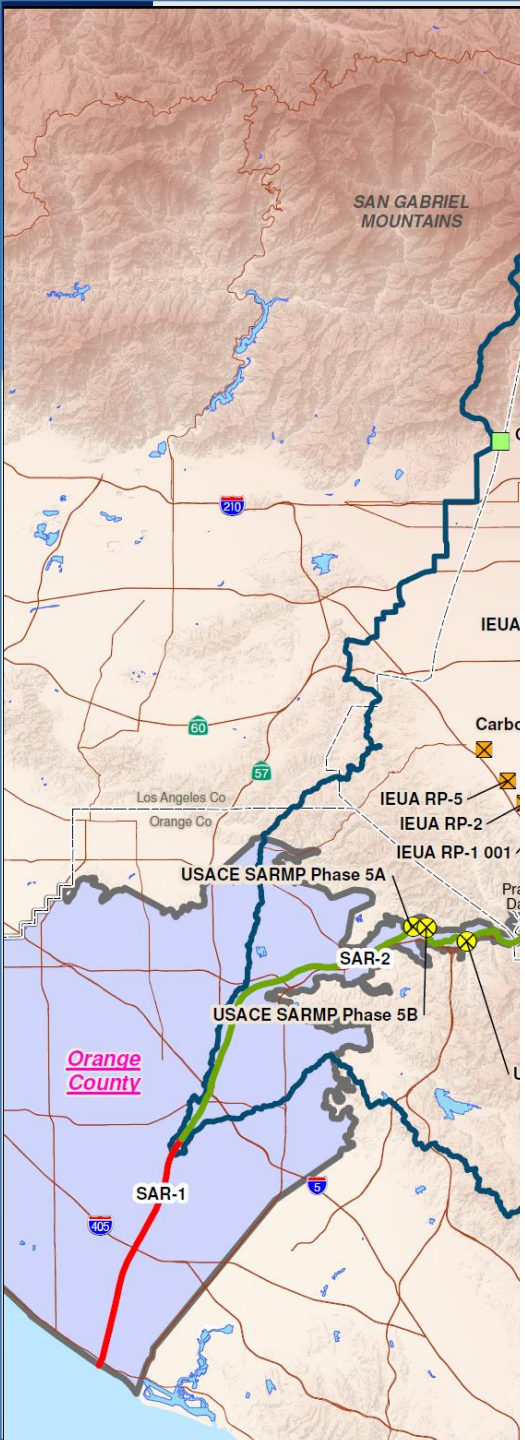
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario D - 2040 Maximum Expected Discharge



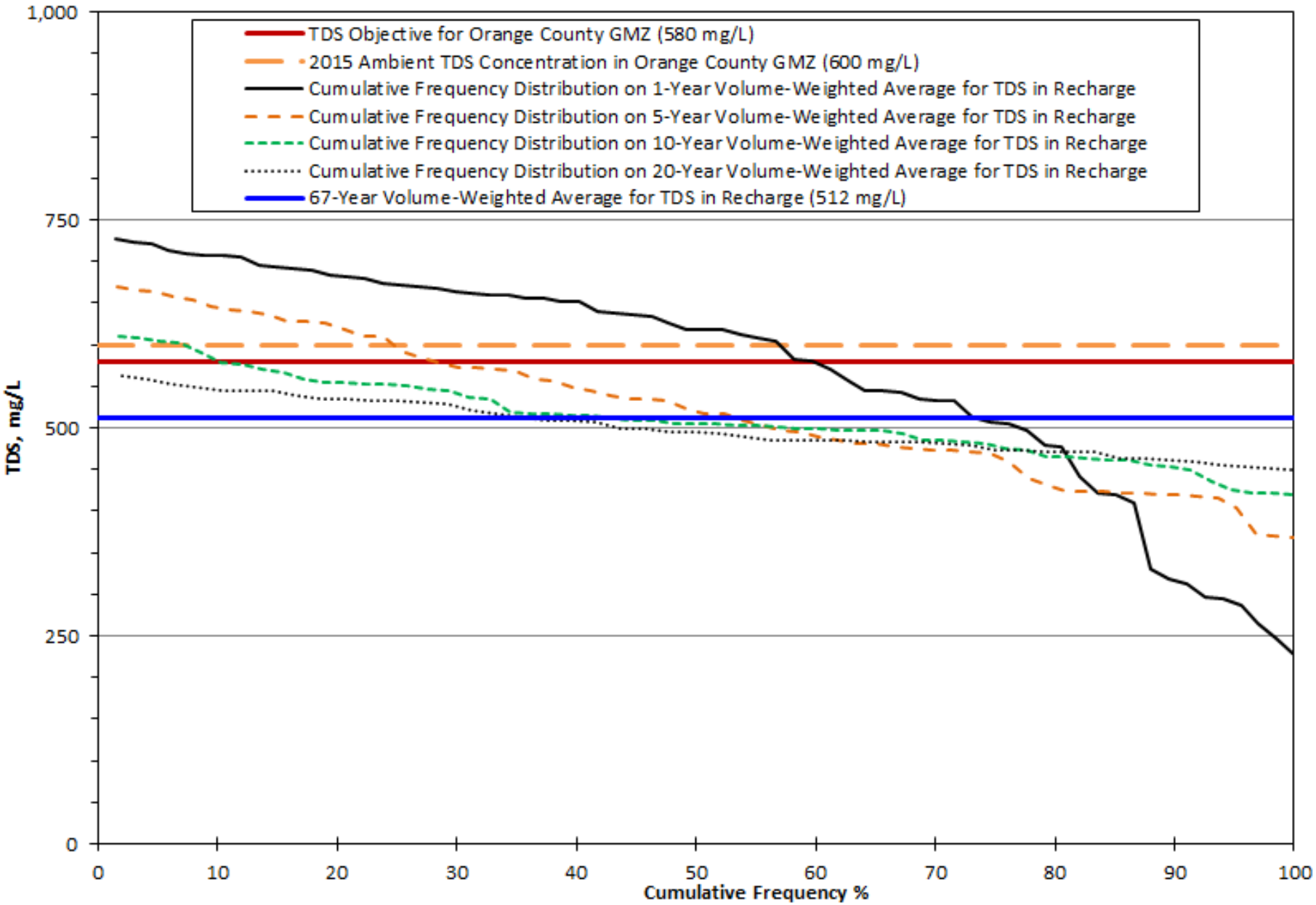


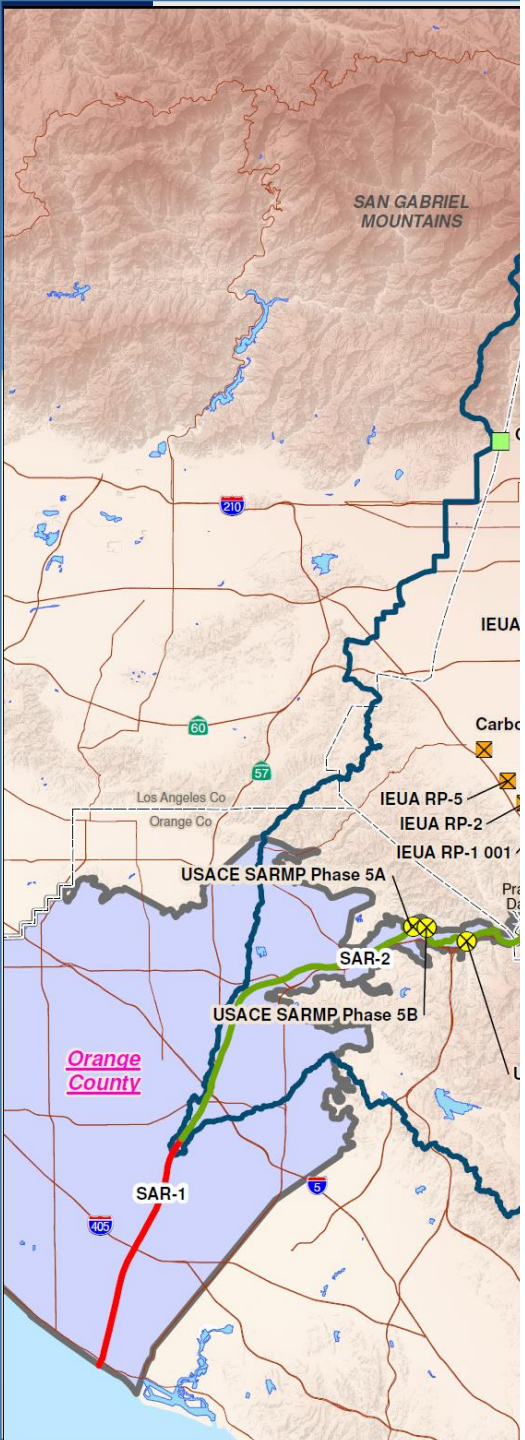
Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario E - 2040 Average Expected Discharge



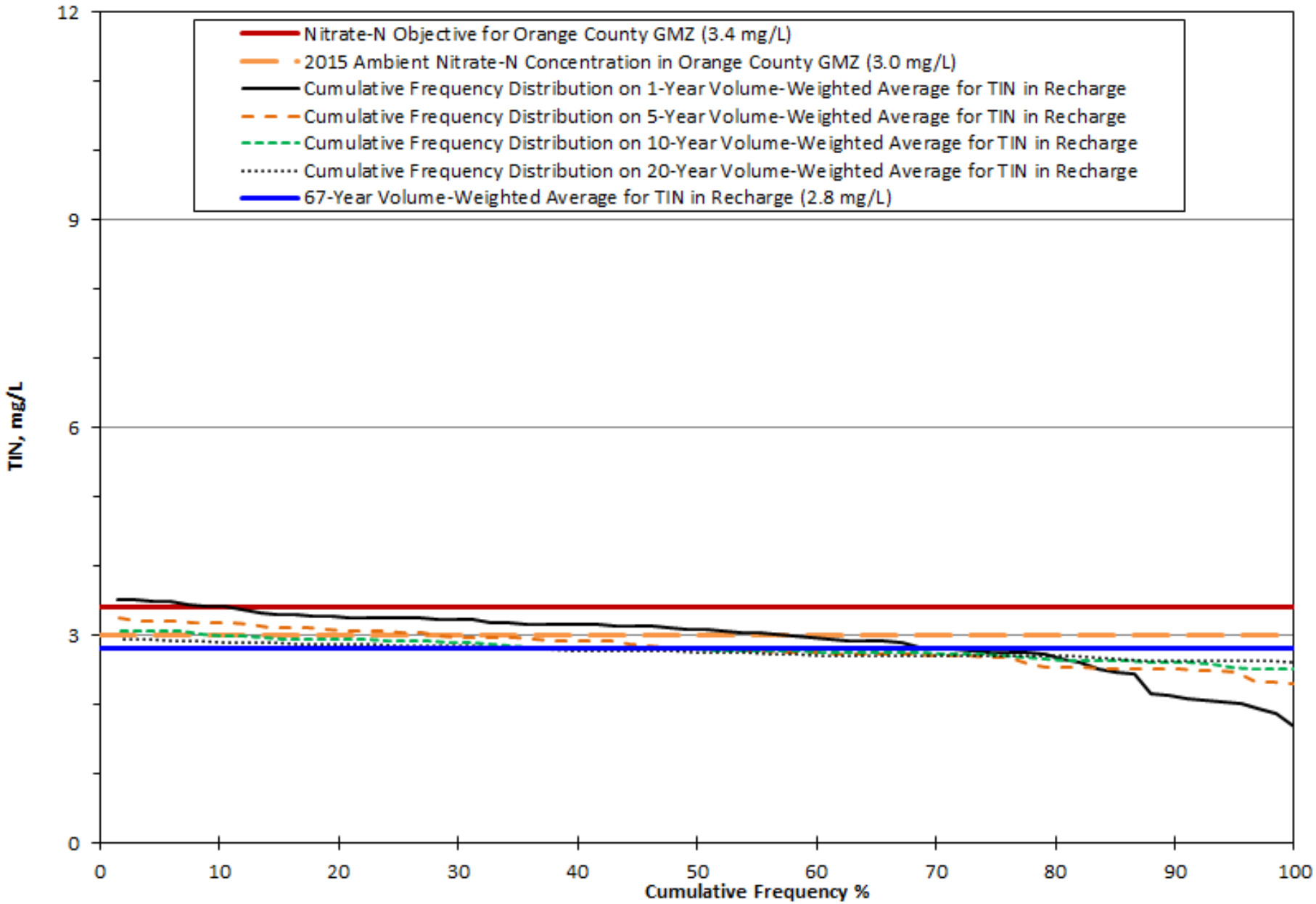


Estimated Cumulative Frequency Distribution on Volume-Weighted TDS Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario F - 2040 Minimum Expected Discharge



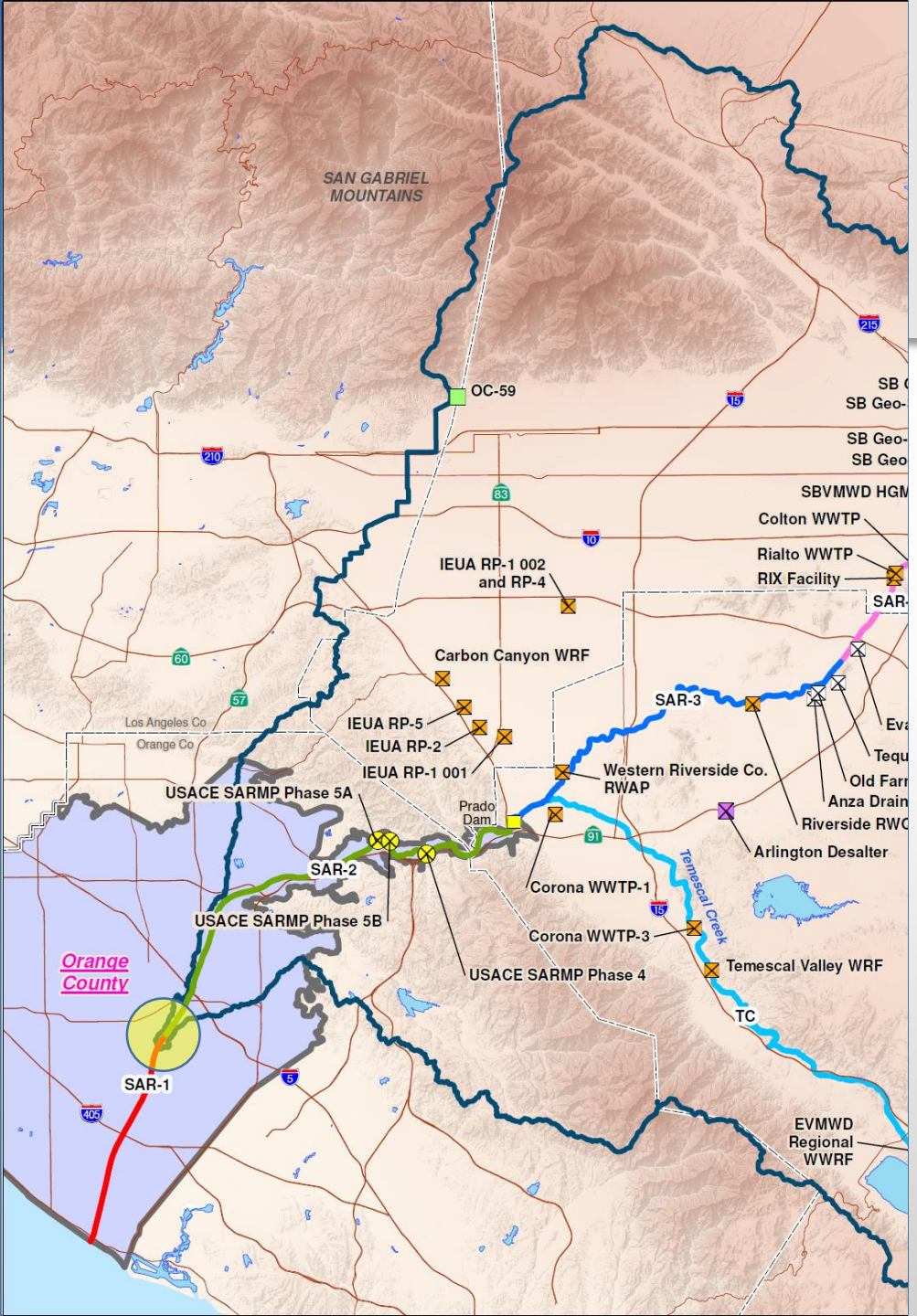


Estimated Cumulative Frequency Distribution on Volume-Weighted TIN Concentration of Santa Ana River - Reach 2 Overlying Orange County GMZ Scenario D - 2040 Maximum Expected Discharge



Santa Ana River Reach 2 at Santa Ana

Maximum Value for the Volume-Weighted Recharge (Units in mg/L)



	Objective	Ambient	Assimila-tive Capacity	Period	SCE A	SCE B	SCE C	SCE D	SCE E	SCE F
					2020 Expect Discharge			2040 Expect Discharge		
					Max.	Ave.	Min.	Max.	Ave.	Min.
TDS	650	na	na	5-year moving average of the 1-year volume-weighted average	363	159	141	375	171	139
TIN	na	na	na		2.61	1.15	1.02	3.11	1.28	1.04

Overview

- Major Assumptions of Waste Load Allocation Scenarios
- Results from Waste Load Allocation Scenarios
- Next Steps

Next Steps

- Submit the followings reports by July 12, 2019
  - Draft Study Report
  - Draft TM for Task 5 – Estimate Off-Channel Recharge from Natural Precipitation
  - Draft TM for Task 6 – Run the WLAM in Retrospective Mode, using Historical Discharge Data, to Estimate the Quantity and Quality of Recharge that Actually Occurred