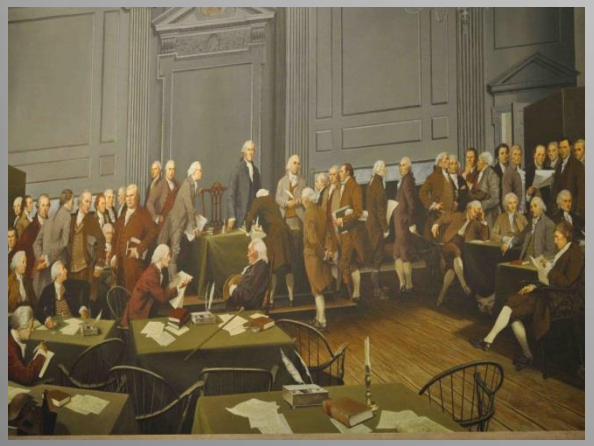
Basin Monitoring Program Task Force

“101 Workshop”



March 14, 2018

Basin Monitoring Program Task Force

City of Riverside

City of Corona

City of Redlands

City or Rialto

City of Banning

Lee Lake Water District

Chino Basin Watermaster

Yucaipa Valley Water District

Elsinore Valley MWD

City of Beaumonth

Eastern Municipal Water District

Inland Empire Utilities Agency

Orange County Water District

Irvine Ranch Water District

Beaumont Cherry Valley Water District

San Bernardino Valley MWD

San Gorgonio Pass Water Agency

Jurupa Community Services District

W. Riverside Co. Reg. Wastewater Auth.

Colton/San Bernardino RTTTWR (RIX)

Basin Monitoring Program Task Force

1) What is it and why was it formed?
2) What does it do and why is it important?
3) What are the future goals and priorities?

Basin Monitoring Program Task Force

Implements the Water Quality Monitoring Program (R8-2005-0063)

1) Annual Report of SAR Water Quality
2) Ambient Groundwater Quality Update
3) Waste Load Allocation Model (WLAM)

A long time ago
in a galaxy far, far away....


WHAT THE SIXTIES MEAN
FROM HIS NEW BOOK 'BOOM!'
BY TOM BROKAW
ESSAYS BY JERRY ADLER · SHARON BEGLEY · ELLIS COSE
JONATHAN DARMAN · DAVID GATES · BARBARA KANTROWITZ
AND EVAN THOMAS PORTRAITS BY NIGEL PARRY
Newsweek
1968
The Year That Made Us Who We Are
peter max
newsweek.com

STATE WATER RESOURCES CONTROL BOARD

RESOLUTION NO. 68-16

STATEMENT OF POLICY WITH RESPECT TO
MAINTAINING HIGH QUALITY OF WATERS IN CALIFORNIA

WHEREAS the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve highest water quality consistent with maximum benefit to the people of the State and shall be controlled so as to promote the peace, health, safety and welfare of the people of the State; and

WHEREAS water quality control policies have been and are being adopted for waters of the State; and

WHEREAS the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature;

NOW, THEREFORE, BE IT RESOLVED:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

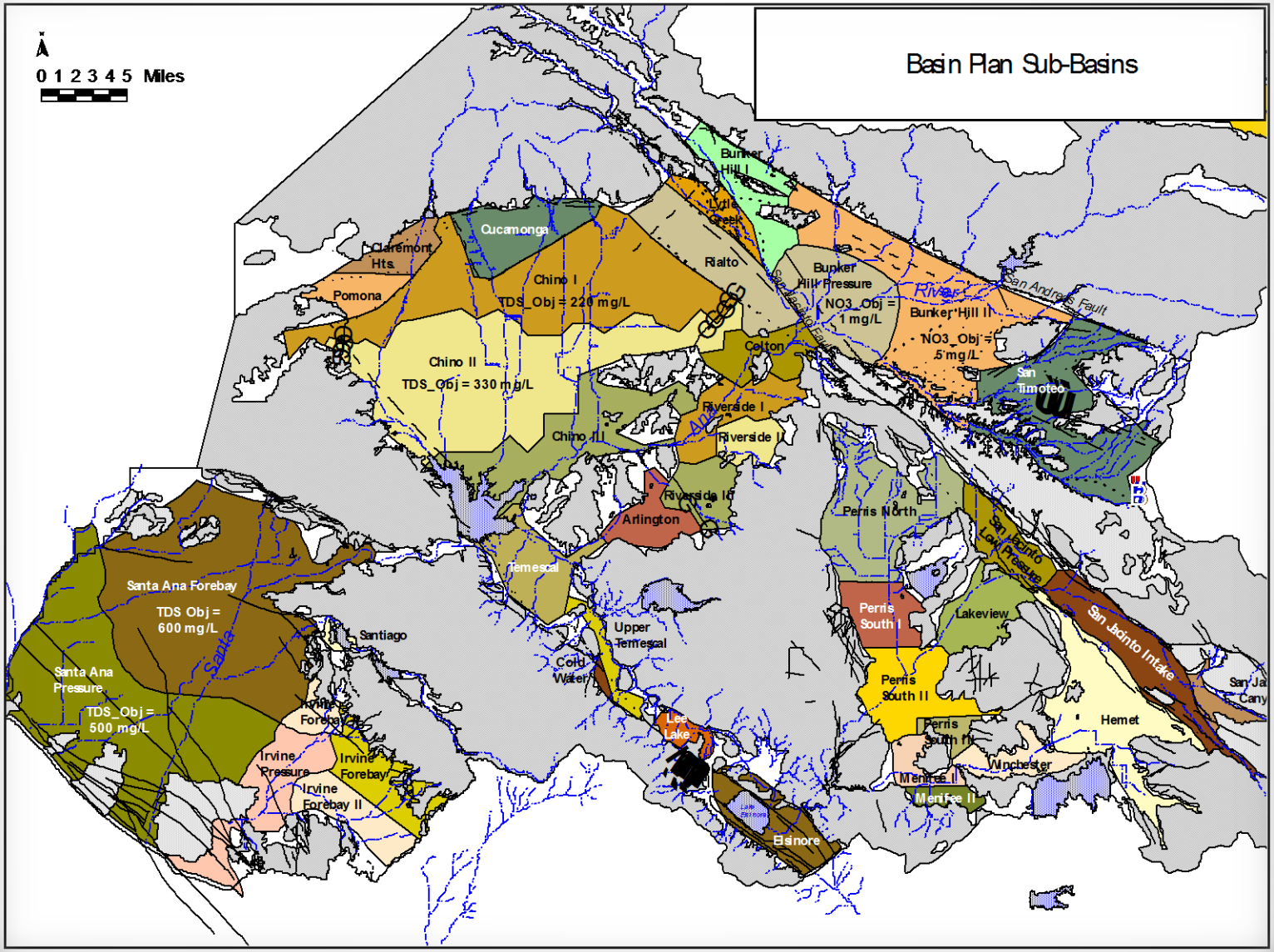
3. In implementing this policy, the Secretary of the Interior will be kept advised and will be provided with such information as he will need to discharge his responsibilities under the Federal Water Pollution Control Act.

Resolution 68-16:

The Antidegradation Policy

Predates:

1) 1969 Judgment
2) Porter-Cologne Act
3) First Basin Plans
4) Clean Water Act


Basin Plan Sub-Basins
0 1 2 3 4 5 Miles
Bunker Hill I
Lytle Creek
Cucamonga
Claremont Hts.
Pomona
Chino I
TDS_Obj = 220 mg/L
Rialto
Bunker Hill Pressure
NO3_Obj = 1 mg/L
Bunker Hill II
NO3_Obj = 5 mg/L
San Andreas Fault
Chino II
TDS_Obj = 330 mg/L
Colton
San Timoteo
Riverside I
Chino III
Riverside I
Riverside II
Arlington
Perris North
San Jacinto Low Pressure
Temescal
Santa Ana Forebay
TDS Obj = 600 mg/L
Santiago
Upper Temescal
Perris South I
Lakeview
San Jacinto Intake
Santa Ana Pressure
TDS_Obj = 500 mg/L
Cold Water
Perris South II
Irvine Forebay
Lee Lake
Hemet
Irvine Pressure
Irvine Forebay
Irvine Forebay II
Menifee II
Winchester
Elsinore

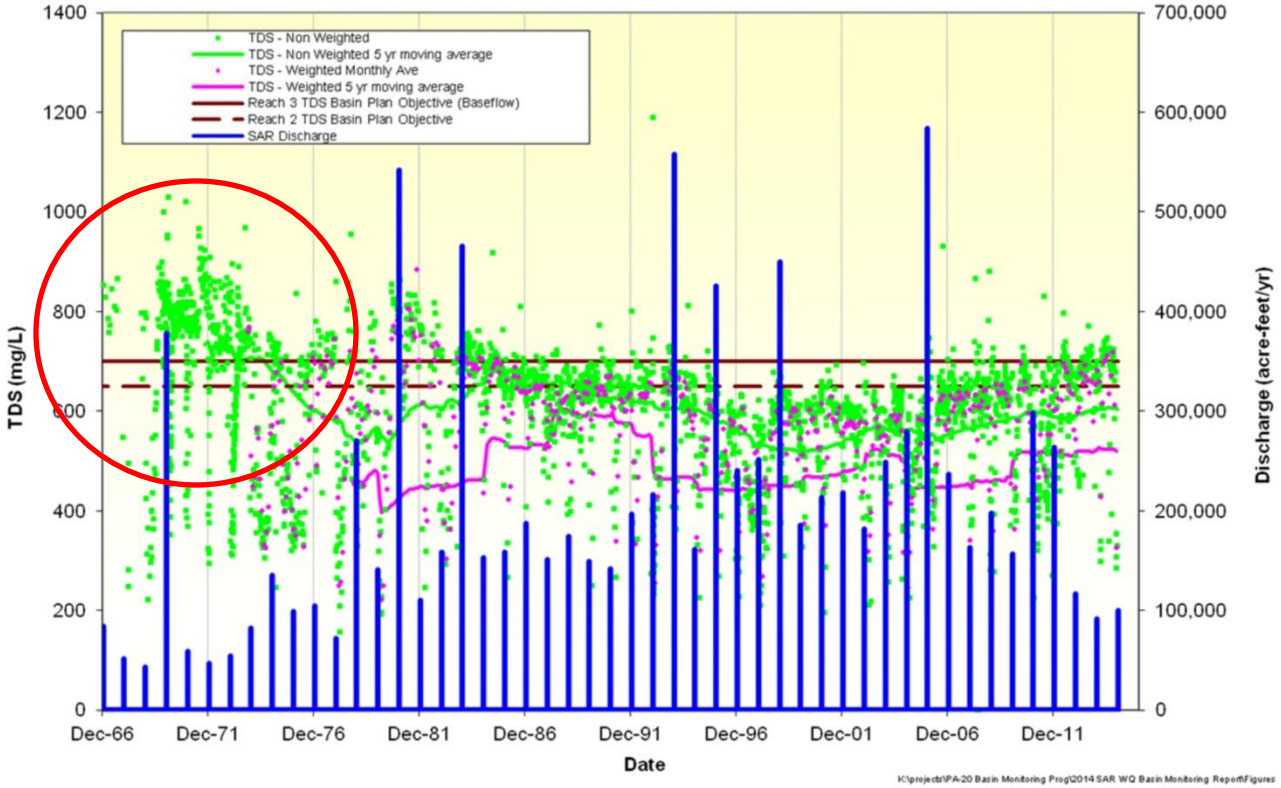
The Rancho Caballero Case (1972)

- **Receiving Water Quality = 900 mg/L**
- **Effluent Quality = 755 mg/L**
- **Basin Plan Objective = 700 mg/L**

"Arlington-Riverside Groundwater Basin has no capacity to assimilate…"

SWRCB WQO No. 73-4

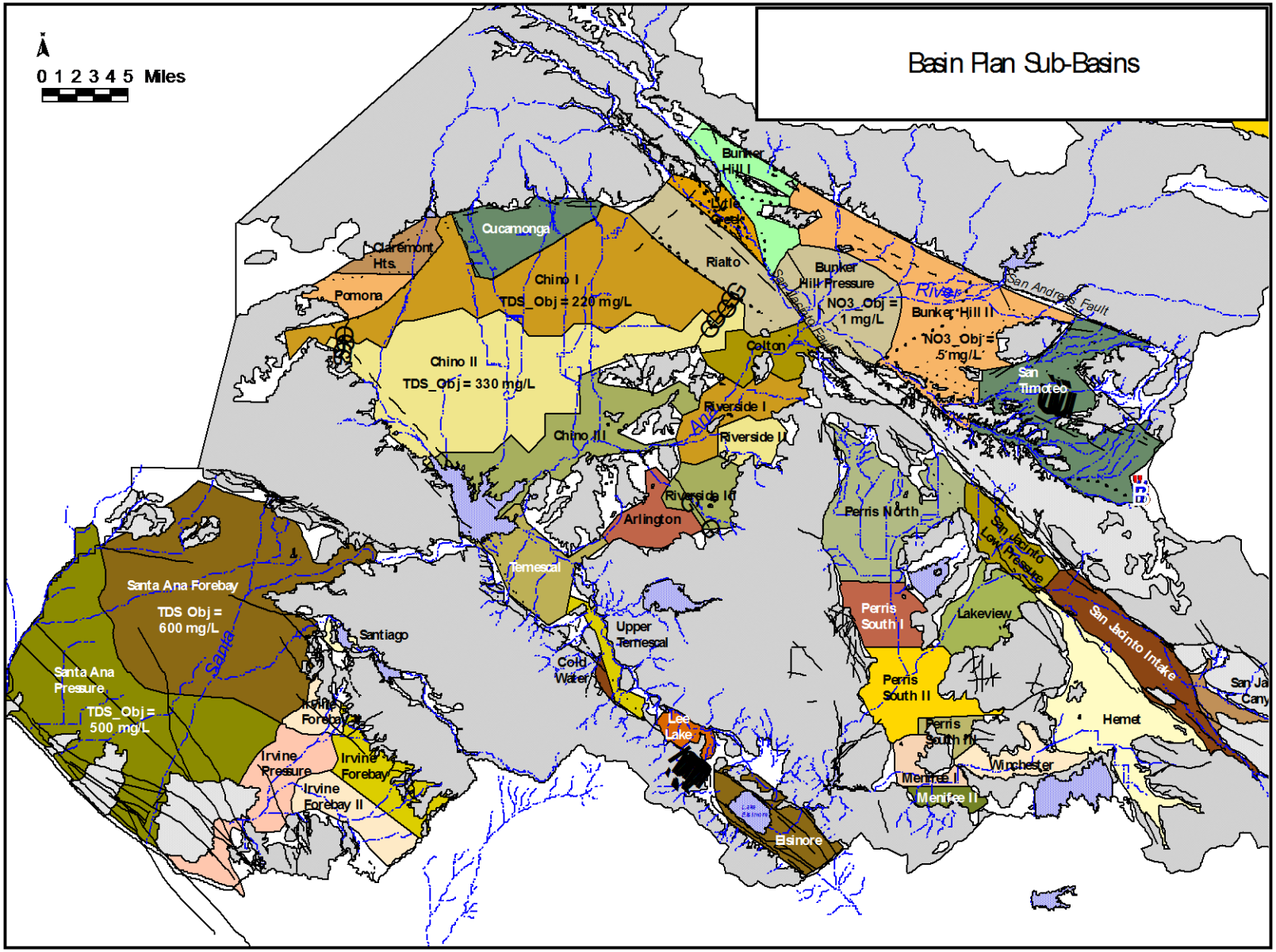
Figure 3-1. Total Dissolved Solids (TDS) Below Prado Dam



Notes:
TDS Non-Weighted = TDS samples from RWQCB, USGS, HCMP, OCWD.
TDS Weighted = Monthly flow weighted TDS calculated from EC. Data prior to October 2003 from Watermaster, October 2003 to December 2004 from WeInc, 2005 to 2014 from SAWPA.

The Recycled Water Issue (1991-94)

- Basin Plan Objectives = 400 - 500 mg/L
- Effluent Quality = 550 – 650 mg/L
- Receiving Water Quality = 600+ mg/L


Basin Plan Sub-Basins
0 1 2 3 4 5 Miles
Bunker Hill I
Lytle Creek
Cucamonga
Claremont Hts.
Pomona
Chino I
TDS_Obj = 220 mg/L
Rialto
Bunker Hill Pressure
NO3_Obj = 1 mg/L
Bunker Hill II
NO3_Obj = .5 mg/L
San Andreas Fault
Chino II
TDS_Obj = 330 mg/L
Colton
San Timoteo
Riverside I
Chino III
Riverside II
Riverside IV
Arlington
Perris North
San Jacinto Low Pressure
Temescal
Santa Ana Forebay
TDS Obj = 600 mg/L
Santa Ana River
Santiago
Upper Temescal
Cold Water
Perris South I
Lakeview
San Jacinto Intake
Santa Ana Pressure
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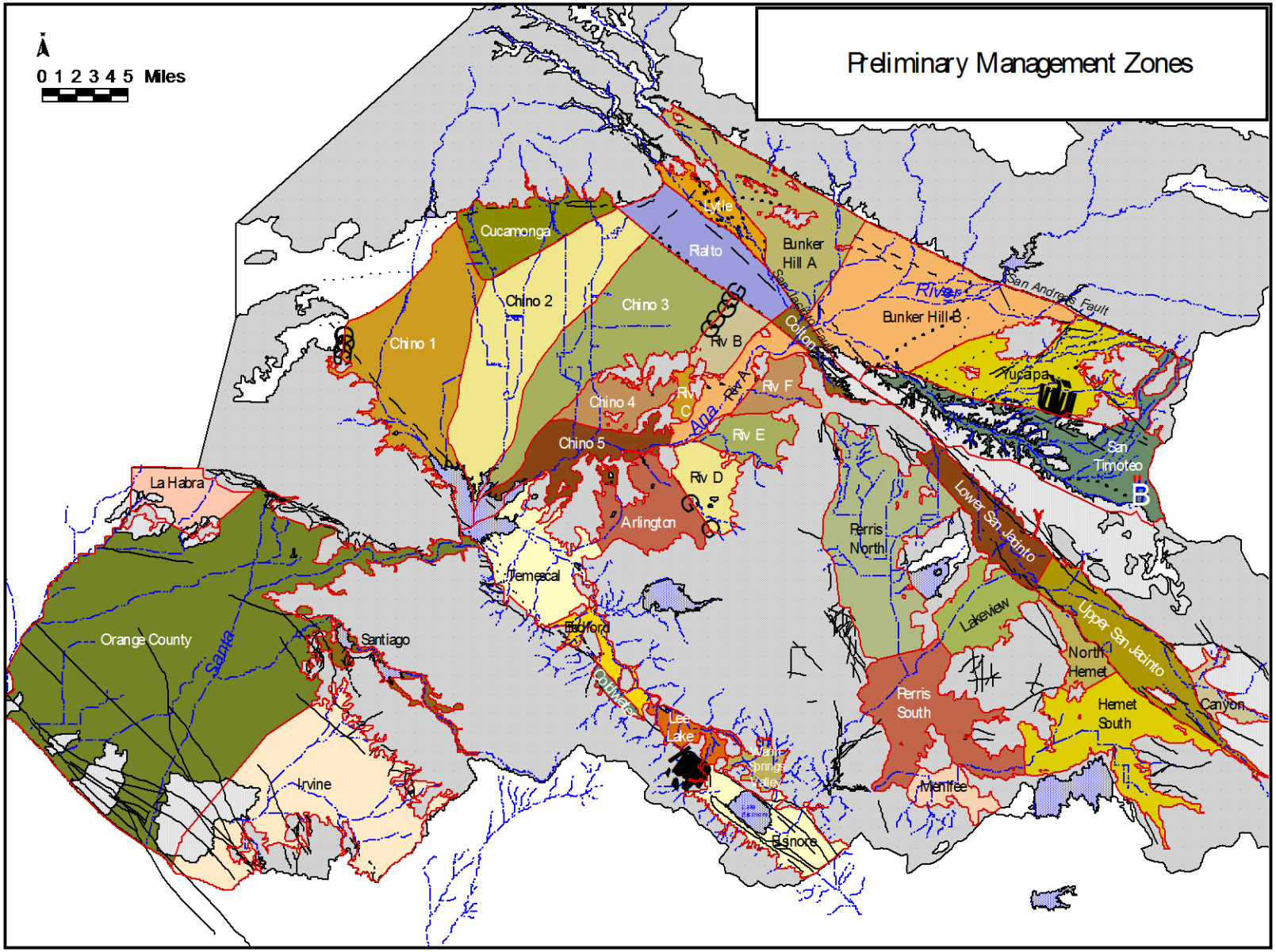
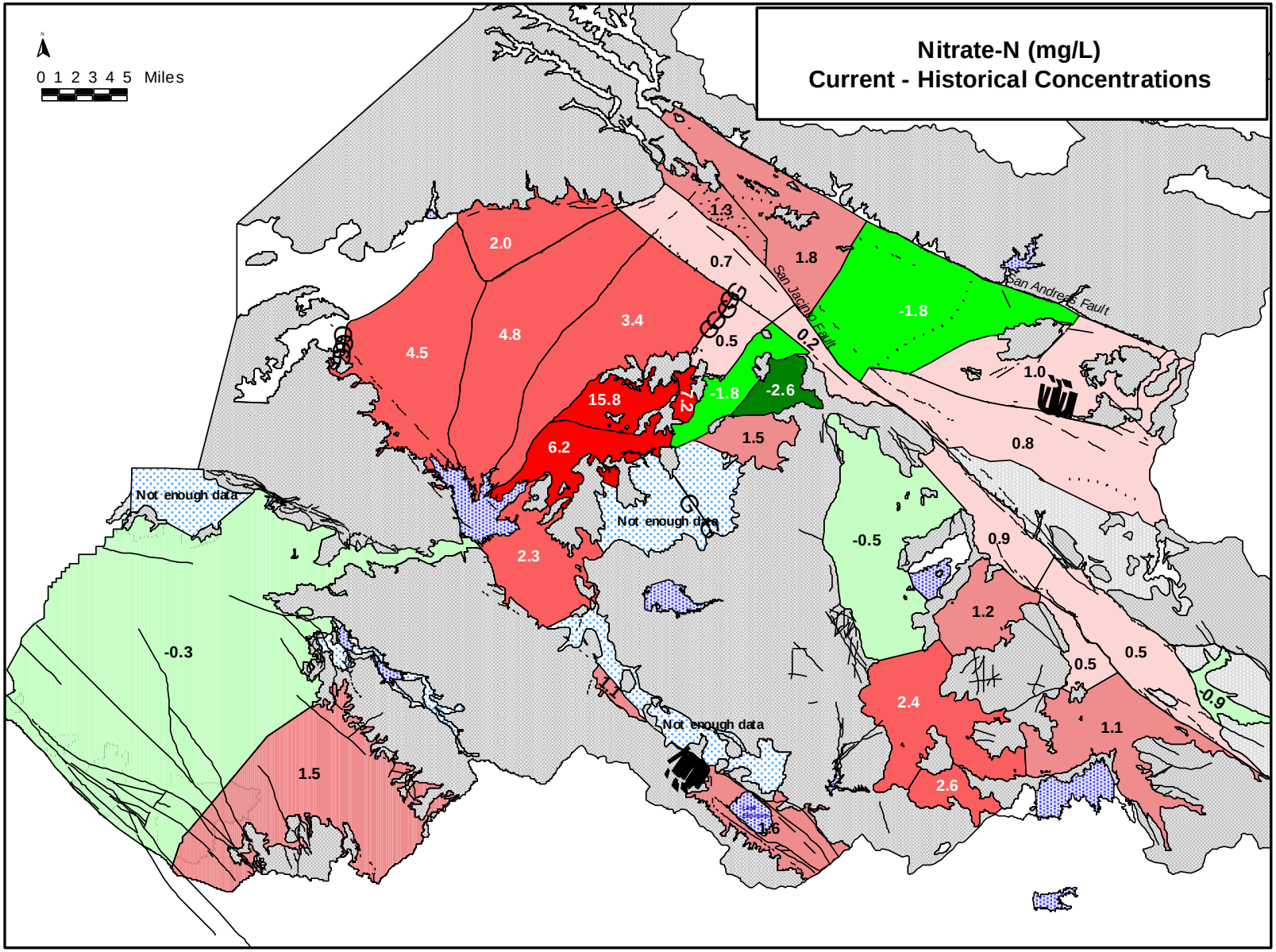
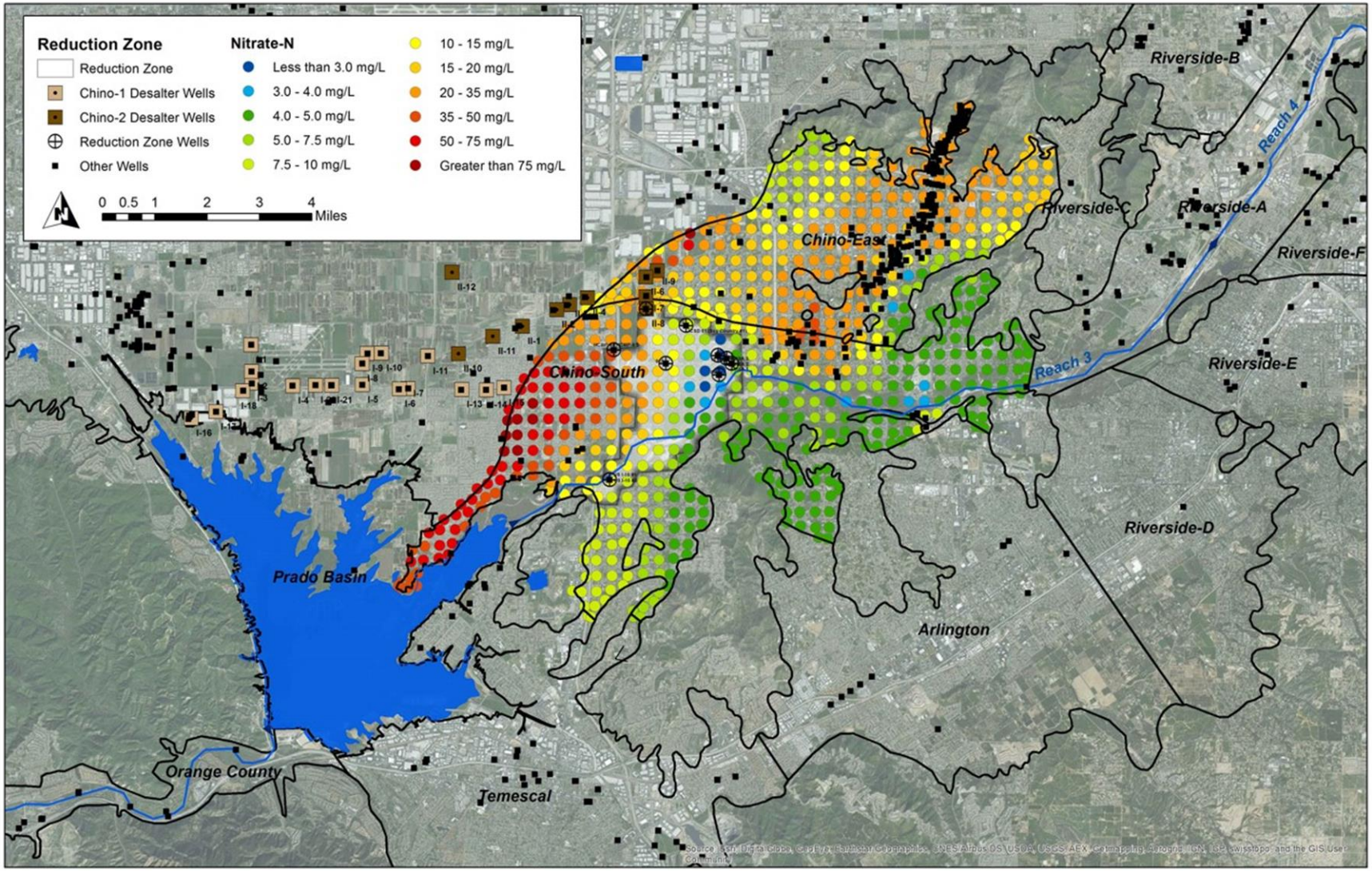
Irvine Forebay I
Perris South II
Lee Lake
Hemet
Irvine Pressure
Irvine Forebay
Irvine Forebay II
Perris South III
Winchester
Menifee I
Menifee II
Elsinore


Preliminary Management Zones
0 1 2 3 4 5 Miles
Cucamonga
Rialto
Lytle
Bunker Hill A
Bunker Hill B
Chino 1
Chino 2
Chino 3
Chino 4
Chino 5
Riv A
Riv B
Riv C
Riv D
Riv E
Riv F
Yucaipa
San Timoteo
La Habra
Arlington
Temecal
Bedford
Orange County
Santiago
Irvine
Lee Lake
Elsinore
Perris North
Perris South
Lakeview
North Hemet
Hemet South
Menifee
Lower San Jacinto
Upper San Jacinto
Canyon
Santa Ana River
San Jacinto Fault
Colton Fault
San Andreas Fault


Nitrate-N (mg/L)
Current - Historical Concentrations
0 1 2 3 4 5 Miles
San Jacinto Fault
San Andreas Fault
1.3
2.0
0.7
1.8
-1.8
4.5
4.8
3.4
0.5
0.2
1.0
15.8
-1.8
-2.6
6.2
1.5
0.8
Not enough data
Not enough data
-0.5
0.9
2.3
1.2
-0.3
0.5
0.5
2.4
-0.9
1.1
Not enough data
1.5
2.6
1.6

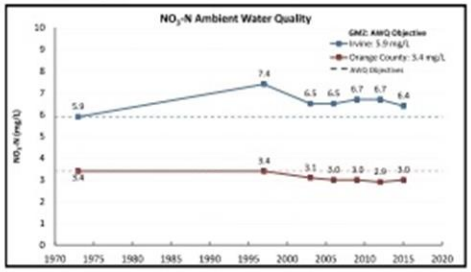

Reduction Zone
Reduction Zone
Chino-1 Desalter Wells
Chino-2 Desalter Wells
Reduction Zone Wells
Other Wells
Nitrate-N
Less than 3.0 mg/L
3.0 - 4.0 mg/L
4.0 - 5.0 mg/L
5.0 - 7.5 mg/L
7.5 - 10 mg/L
10 - 15 mg/L
15 - 20 mg/L
20 - 35 mg/L
35 - 50 mg/L
50 - 75 mg/L
Greater than 75 mg/L
0 0.5 1 2 3 4
Miles
Riverside-B
Reach 4
Riverside-C
Riverside-A
Chino-East
Riverside-F
Chino-South
Reach 3
Riverside-E
Riverside-D
Prado Basin
Arlington
Orange County
Temescal

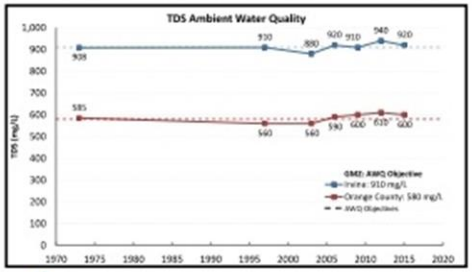
Attachment Contents:

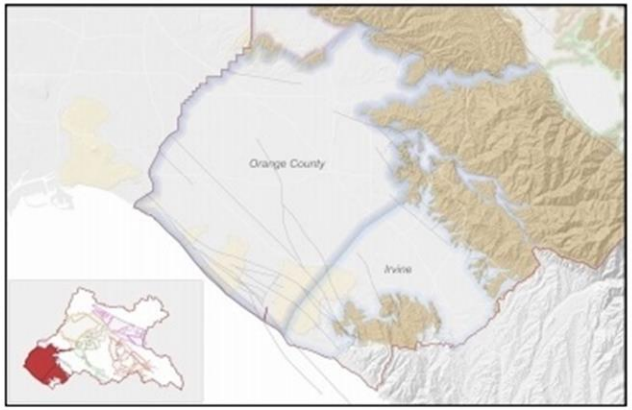
B11-1a,b Groundwater Storage and Elevation Contours Fall 2015
B11-2a,b NO_3-N Concentration and Contour Map
B11-3a,b TDS Concentration and Contour Map
B11-4a,b NO_3-N Concentration Change (2015-2012)
B11-5a,b TDS Concentration Change (2015-2012)
B11-6 Key Well Analysis Charts

	Basin Analytics	Irvine	Orange County
Basin	GMZ Area (acres)	53,900	163,000
	Volume of storage (acre-ft)	1,800,000	23,600,000
NO_3-N	Wells per GMZ	133	1639
	Statistics per GMZ	63	824
	Total Mass (tons)	96,300	15,700
	1996-2015 AWQ	6.4	3
TDS	Wells per GMZ	131	1666
	Statistics per GMZ	90	1331
	Total Mass (tons)	19,400,000	15,700
	1996-2015 AWQ	920	600

Table 1 - Basin Analytics







Nitrate as Nitrogen (Nitrate or NO_3-N)

Irvine

The nitrate objective for Irvine is 5.9 mg/L. The ambient nitrate concentration decreased from 6.7 mg/L in 2012 to 6.4 mg/L in 2015, and there is no assimilative capacity. Five out of the nine key wells in Irvine GMZ have an increasing trend in nitrate concentrations, two show a decreasing trend, and two show no trends in the nitrate concentrations. Fourteen of the total 133 wells with nitrate values in Irvine will not be eligible for the next AWQ recomputation if the well is not sampled prior to 2018. No new wells with statistics were added to the 1996 to 2015 AWQ recomputation, and sixteen wells that were sampled between 2014 and 2015 will be eligible to have statistics determined, if the wells are sampled again in the next AWQ recomputation period (1999-2018).

Orange County

The nitrate objective for Orange County is 3.4 mg/L. The ambient nitrate concentration increased from 2.9 mg/L in 2012 to 3.0 mg/L in 2015, and there is no assimilative capacity. Two out of the twenty-three key wells in Orange County GMZ have an increasing trend in nitrate concentrations, twelve key wells show a decreasing trend, and the other nine show no trends in the nitrate concentrations. Sixty-seven of the total 1,639 wells with NITRATE values in Orange County will not be eligible for the next AWQ recomputation if the well is not sampled prior to 2018. Thirty-three new wells with statistics were added to the 1996 to 2015 AWQ recomputation and forty-five wells that were sampled between 2014 and 2015 will be eligible to have statistics determined, if the wells are sampled again in the next AWQ recomputation period (1999-2018).

Total Dissolved Solids (TDS)

Irvine

The TDS objective for Irvine is 910 mg/L. The ambient TDS concentration decreased from 940 mg/L in 2012 to 920 mg/L in 2015, and there is no assimilative capacity. One out of the nine key interpretive wells in Irvine GMZ show an increasing trend, five show a decreasing trend, and three show no trends in TDS concentrations. Thirteen of the total 131 wells with TDS values in Irvine will not be eligible for the next AWQ recomputation if the well is not sampled prior to 2018. No new wells with statistics were added to the 1996 to 2015 AWQ recomputation, and sixteen wells that were sampled between 2014 and 2015 will be eligible to have statistics determined, if the wells are sampled again in the next AWQ recomputation period (1999-2018).

Orange County

The TDS objective for Orange County is 580 mg/L. The ambient TDS concentration decreased from 610 mg/L in 2012 to 600 mg/L in 2015, and there is no assimilative capacity. Five out of the twenty-three key wells in Orange County GMZ have an increasing trend in TDS concentrations, seven key wells show a decreasing trend, and the other eleven show no trends in the TDS concentrations. Sixty-one of the total 1,666 wells with TDS values in Orange County will not be eligible for the next AWQ recomputation if not sampled prior to 2018. Forty-seven new wells with statistics were added to the 1996 to 2015 AWQ recomputation, and sixty-six wells that were sampled between 2014 and 2015 will be eligible to have statistics determined, if the wells are sampled again in the next AWQ recomputation period (1999-2018).

GMZ	Well ID	Well Name	NO_3-N (mg/L)	NO_3-N Trend	TDS (mg/L)	TDS Trend
Irvine	1213535	ET-1/1	10.8	Increasing	931	Decreasing
Irvine	1213902	IRWD-78/1	0.5	Decreasing	579	No Trend
Irvine	1213987	MCAS-1/1/WB2/MP1	44.2	Increasing**	2,420	Increasing**
Irvine	1213988	MCAS-1/1/WB2/MP2	54.8	Increasing	2,265	Decreasing*
Irvine	1213994	MCAS-10/1	1.0	No Trend	777	No Trend
Irvine	1214019	MCAS-3/1/WB2/MP1	15.5	Decreasing**	1,281	Decreasing**
Irvine	1214020	MCAS-3/1/WB2/MP2	22.8	Increasing*	1,371	Decreasing
Irvine	1214048	MCAS-7/1/WB3/MP1	34.0	No Trend	2,261	Decreasing
Irvine	1215112	TIC-61/1	10.7	Increasing	1,745	No Trend
Orange County	1213146	AM-13/1	2.7	Decreasing**	579	Increasing
Orange County	1213164	AM-23/1	3.2	Decreasing**	564	Decreasing**
Orange County	1213186	AM-37/1	3.2	Decreasing	588	Decreasing*
Orange County	1213206	AM-8/1	2.7	Decreasing**	531	Decreasing
Orange County	1213225	AMD-11/2	2.8	Decreasing**	564	Decreasing*
Orange County	1213296	AMD-7/1/WB1/MP1	10.0	Decreasing*	972	No Trend
Orange County	1213407	BPM-2/1/WB1/MP1	0.1	No Trend	344	Increasing*
Orange County	1213515	DIAW-5A/1	7.9	Increasing**	866	Increasing
Orange County	1213533	EOCW-W/1	5.0	Decreasing**	592	No Trend
Orange County	1213579	FM-1/1	4.8	No Trend	663	No Trend
Orange County	1213609	FM-7A/1	6.6	No Trend	731	No Trend
Orange County	1213673	GG-24/1	4.7	No Trend	564	Increasing
Orange County	1213707	GGM-2/1/WB1/MP1	0.1	No Trend	269	No Trend
Orange County	1214069	MCWD-5/1	0.4	Increasing**	297	Decreasing**
Orange County	1214212	O-3/1	3.7	Decreasing**	604	No Trend
Orange County	1214529	OCWD-5A12/1	4.1	No Trend	766	Decreasing**
Orange County	1214837	SB-LEI/1	0.1	No Trend	223	No Trend
Orange County	1214955	SCS-7/1	3.4	No Trend	501	No Trend
Orange County	1214983	SCWC-PU2/1	2.9	Decreasing**	512	Decreasing**
Orange County	1214993	SCWC-SSHR/1	5.0	No Trend	654	No Trend
Orange County	1215500	WBS-2A/1/WB1/MP2	2.3	Decreasing*	619	Increasing**
Orange County	1215504	WBS-3/1/WB1/MP2	3.3	Decreasing*	601	No Trend
Orange County	1215593	YLWD-5/1	3.5	Decreasing**	644	No Trend

* significant trend **very significant trend

Table 2 - Key Interpretive Wells

Mann-Kendall trend analyses on the annualized average concentrations for wells that have been identified as key interpretive wells was used to determine the significance of the trends in well concentrations. See Key Well Analysis Charts for more details. See Attachment B11-4 and B11-5 for NO_3-N and TDS well locations, respectively.

Well Information			NO_3-N Well Attrition				TDS Well Attrition			
GMZ	Well ID	Well Name	Risk	Years[1]	Value[2]	Method	Risk	Years[1]	Value[2]	Method
Irvine	1213833	IDM-1/1/WB1/MP1	Medium	3	46.4	Stat	Medium	3	1,888	Stat
Irvine	1213834	IDM-1/1/WB1/MP10	High	2	0.1	Ave	High	2	583	Ave
Irvine	1213835	IDM-1/1/WB1/MP2	Medium	3	0.6	Stat	Medium	3	878	Stat
Irvine	1213836	IDM-1/1/WB1/MP3	Medium	3	5.2	Stat	Medium	3	987	Stat
Irvine	1213837	IDM-1/1/WB1/MP4	High	2	0.1	Ave	High	2	690	Ave
Irvine	1213838	IDM-1/1/WB1/MP5	High	2	0.1	Ave	High	2	488	Ave
Irvine	1213839	IDM-1/1/WB1/MP6	High	2	0.1	Ave	High	2	538	Ave
Irvine	1213840	IDM-1/1/WB1/MP7	High	2	0.1	Ave	High	2	526	Ave
Irvine	1213841	IDM-1/1/WB1/MP8	High	2	0.1	Ave	High	2	535	Ave
Irvine	1213842	IDM-1/1/WB1/MP9	High	2	0.1	Ave	High	2	574	Ave
Irvine	1213872	IDP-2/1	Medium	3	26.9	Stat	Medium	2	1,720	Ave
Irvine	1213875	IDP-3/1	Medium	3	22.9	Stat	Medium	2	1,079	Ave
Irvine	1213876	IDP-4/1	Medium	2	33.2	Ave	Medium	2	1,280	Ave
Irvine	1213899	IRWD-72/1	High	2	14.2	Ave	High	2	1,030	Ave
Irvine	1215084	OSLM-1/1	Medium	2	3.2	Ave	Medium	2	665	Ave
Irvine	1215093	TIC-109/1	High	3	10.1	Stat	High	3	1,299	Stat
Irvine	1215094	TIC-110/1	Medium	3	22.4	Ave	--	--	--	--
Irvine	1215095	TIC-111/1	High	2	6.0	Ave	High	2	1,111	Ave
Irvine	1215096	TIC-112/1	High	3	9.0	Stat	High	3	868	Stat
Irvine	1215110	TIC-34/1	High	3	9.4	Ave	High	3	988	Ave
Irvine	1215115	TIC-48/1	High	3	3.0	Ave	High	3	858	Ave
Irvine	1215132	T-PANK/1	High	3	11.9	Stat	--	--	--	--
Irvine	1215604	IDP-1/1	Medium	2	24.6	Ave	Medium	2	1,368	Ave

Continue on next page...

DBS&A
Daniel B. Stephens & Associates, Inc.
CA16,0087

SAWPA Basin Monitoring Program Task Force

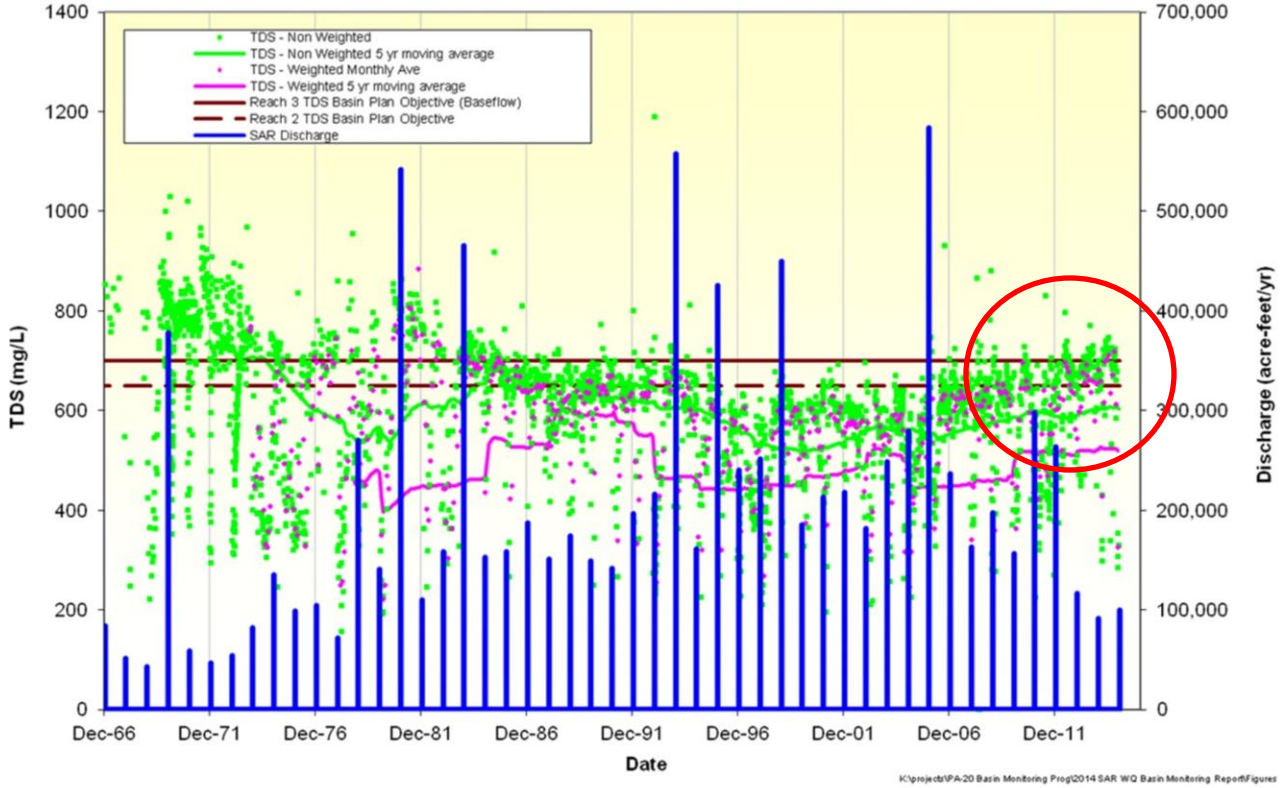
Recomputation of Ambient Water Quality for the Period 1996 to 2015

AMBIENT WATER QUALITY (1996 TO 2015)

Interpretative Tools Summary Orange County & Irvine GMZs

Attachment B11

Figure 3-1. Total Dissolved Solids (TDS) Below Prado Dam



Notes:
TDS Non-Weighted = TDS samples from RWQCB, USGS, HCMP, OCWD.
TDS Weighted = Monthly flow weighted TDS calculated from EC. Data prior to October 2003 from Watermaster; October 2003 to December 2004 from Welnc, 2005 to 2014 from SAWPA.

Figure 2
Discharge and TDS Concentration of the Santa Ana River below Prado Dam
June-September

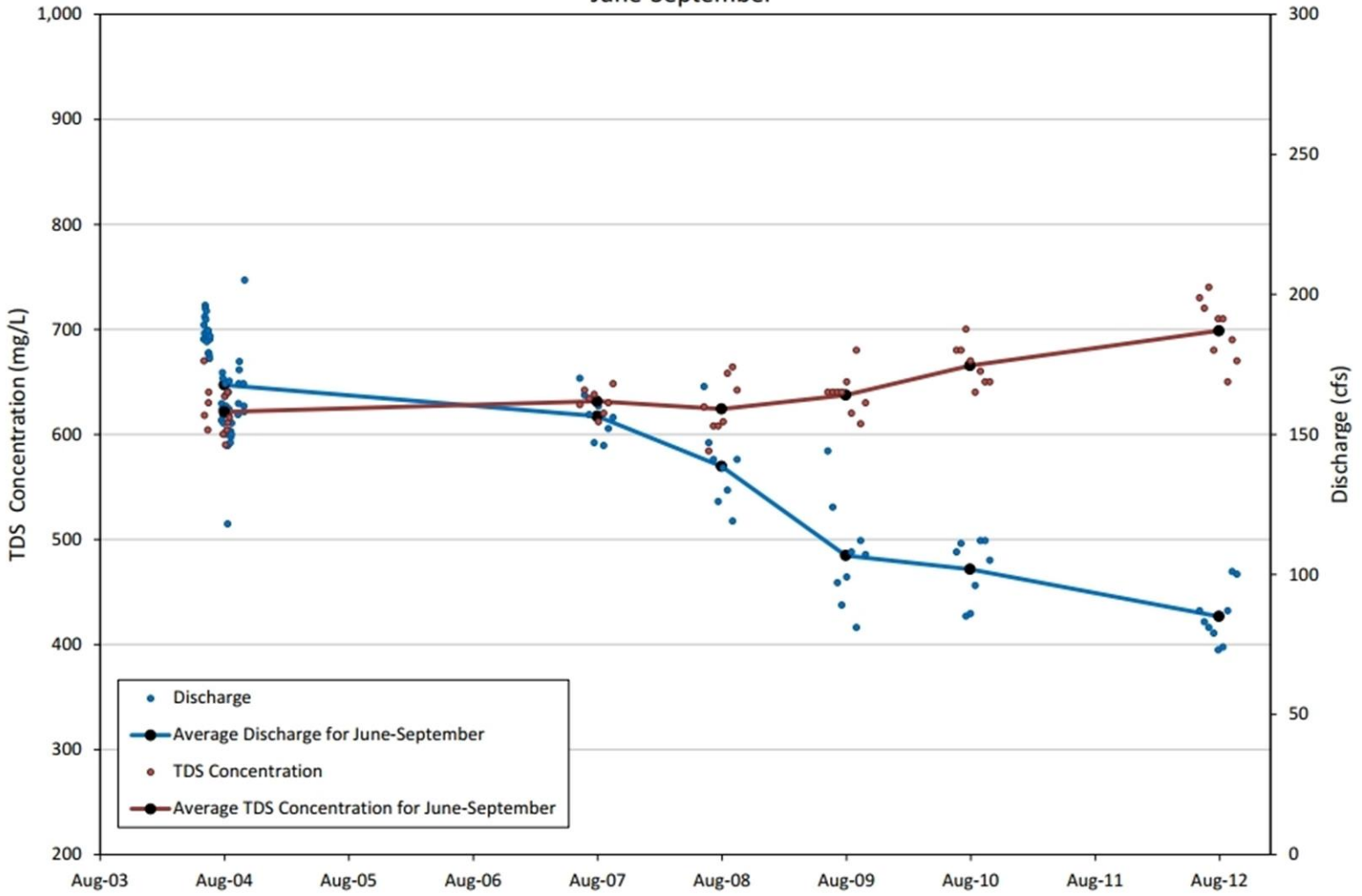
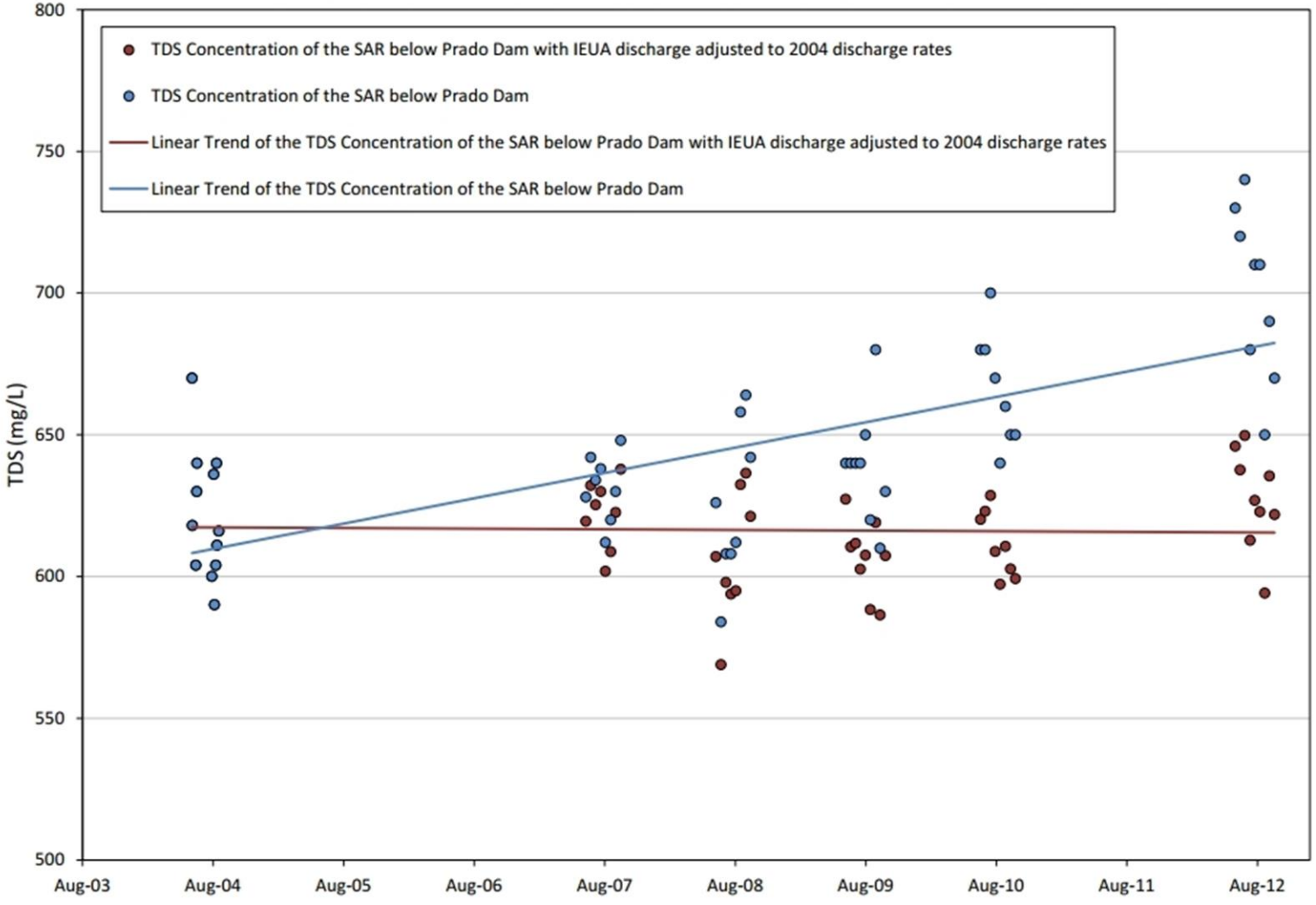


Figure 17

Influence of IEUA Discharge on the TDS Concentration of the Santa Ana River below Prado Dam



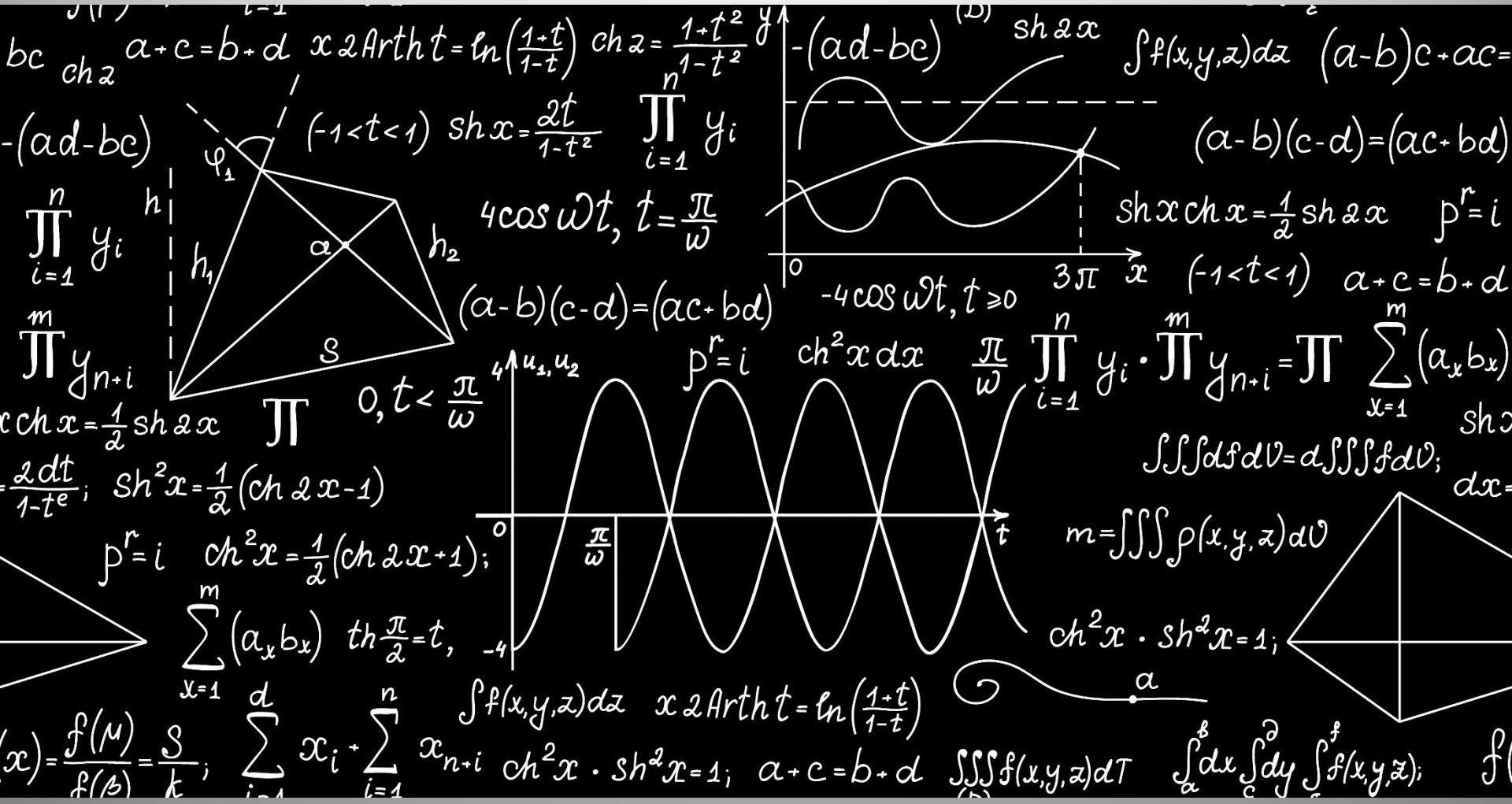
Scenario Calculations and Plots.xlsx

Basin Monitoring Program Task Force

Implements the Water Quality Monitoring Program (R8-2005-0063)

- ✓ **Annual Report of SAR Water Quality**
- ✓ **Ambient Groundwater Quality Update**
- ❑ **Waste Load Allocation Model (WLAM)**

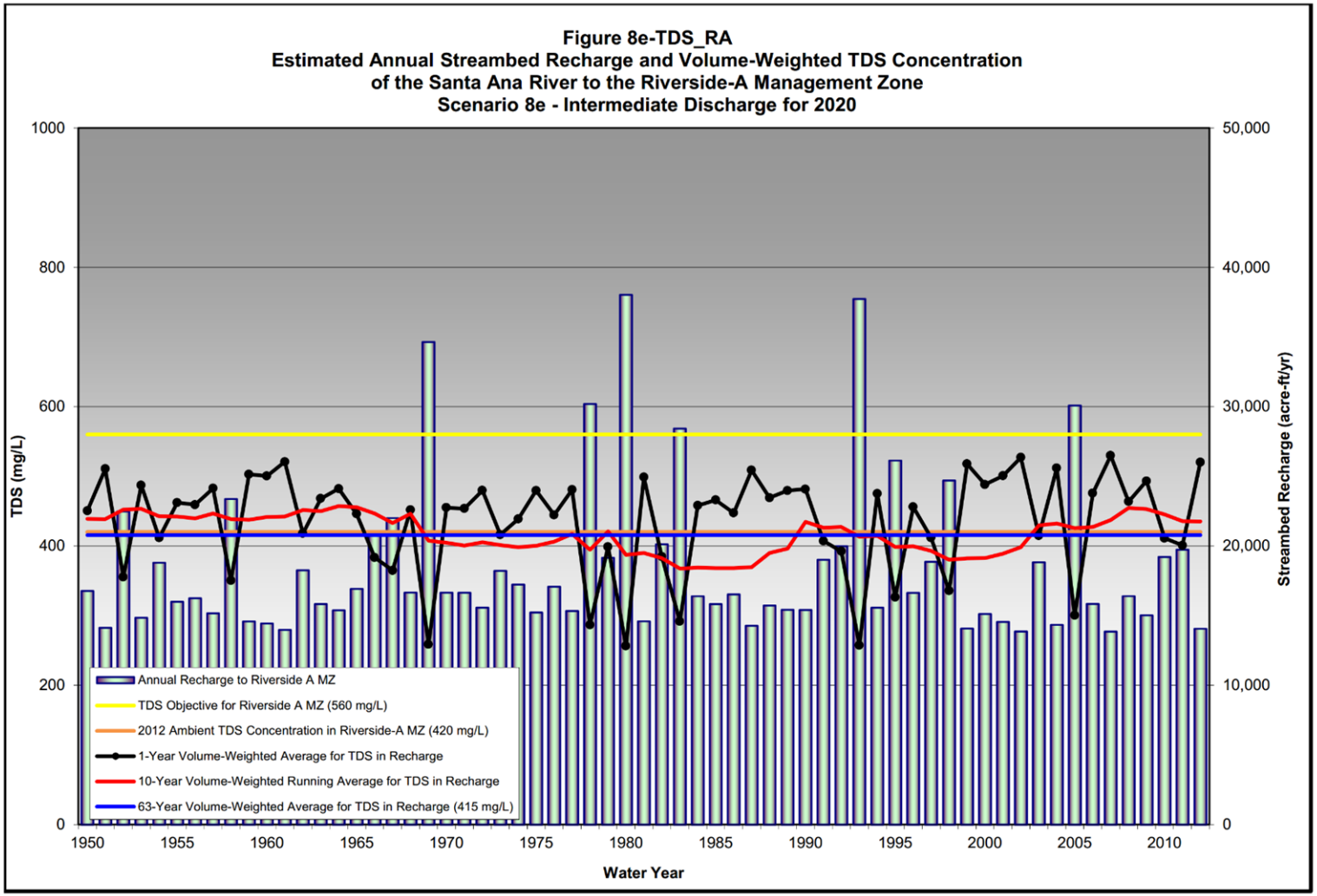
The Waste Load Allocation Model



Key Factors Considered in the WLAM:

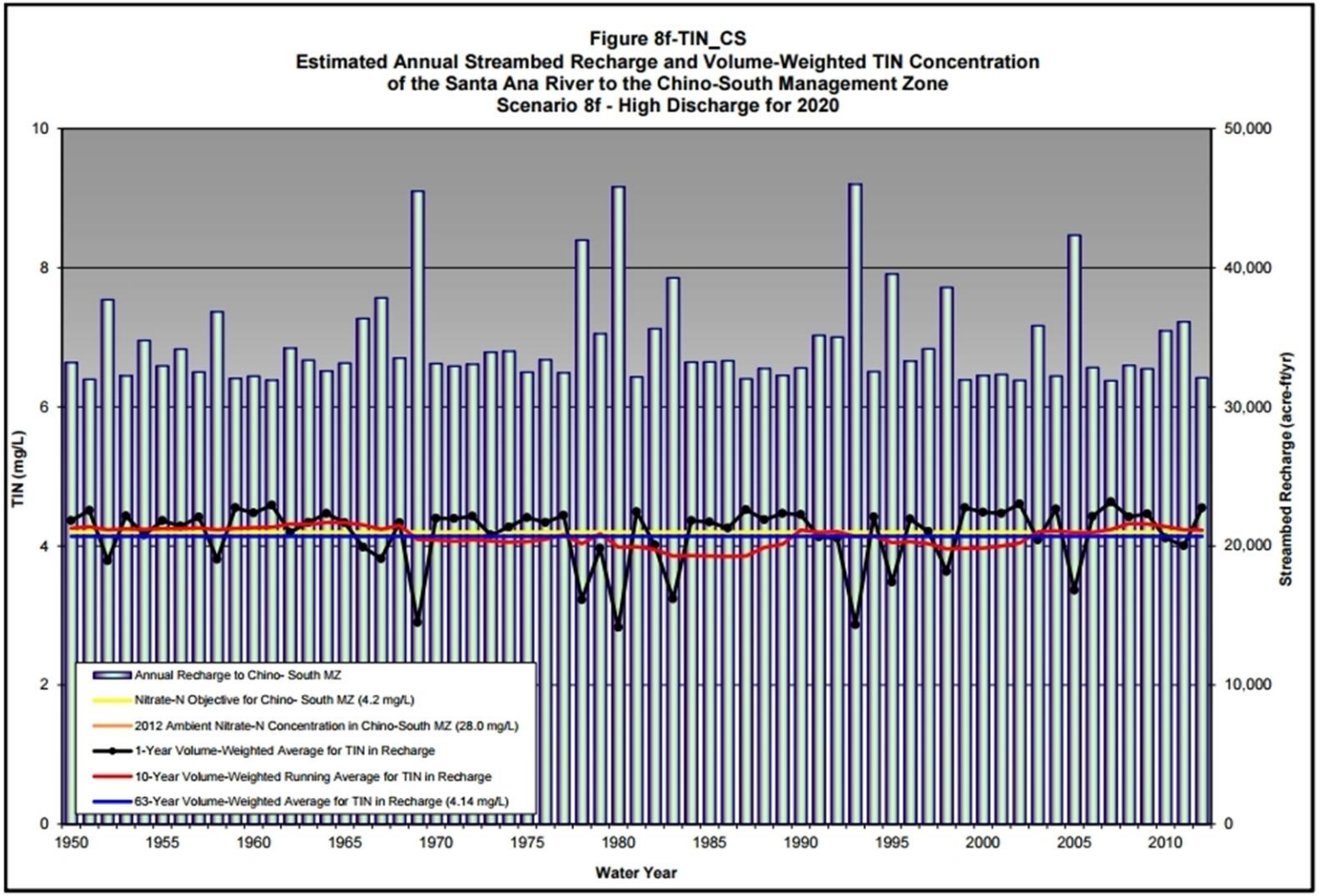
1) Precipitation
2) Land Use
3) Runoff
4) Evaporation
5) Aeration
6) Percolation
7) Water Transfers
8) Discharges
9) Rising Groundwater
10) Nitrogen Loss

Can the discharge(s) be permitted and, if so, what effluent limits should apply?



R_Alt8e_metrics.xlsx -- Fig 2a

WEI
Wildermuth Environmental, Inc.



R_Alt8f_metrics.xlsx -- Fig 1b

Major Accomplishments:

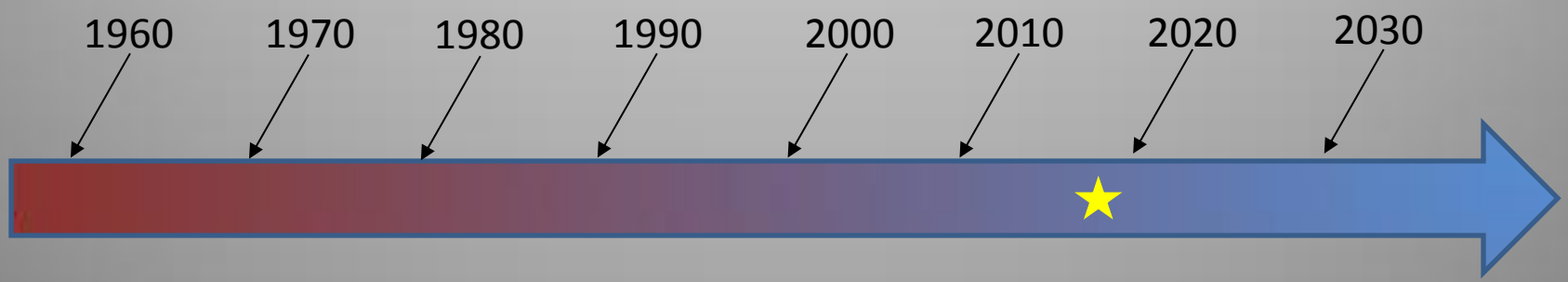
1) Eleven Annual Reports of SAR Water Quality
2) Four Ambient Groundwater Updates
3) Two WLAM Updates
4) Dozens of NPDES Permit Renewals
5) Four Basin Plan Amendments
6) Prevented New 303(d) Listings
7) ZERO Litigation

Near Term Priorities

1) Complete WLAM Update (2018)
2) Develop a Draft Drought & Conservation Policy
3) Next AWQU = 2019
4) Index Task Force's On-Line Resource Library
5) Consider Expanding Task Force Membership

Long-Term Goals

1) Clarify Water Quality Assessment Procedures
2) Validate/Update TDS Objectives @ Prado Dam
3) Investigate Other Sources of TDS @ Prado Dam
4) Recycled Water Policy Updates



New Challenges

1) EPA's New Conductivity Guidance
2) State Board's New Biocriteria Policy
3) 303(d) Assessment in 2020-22
4) Minimum Flow Requirements?
5) Mass-based Effluent Limits?

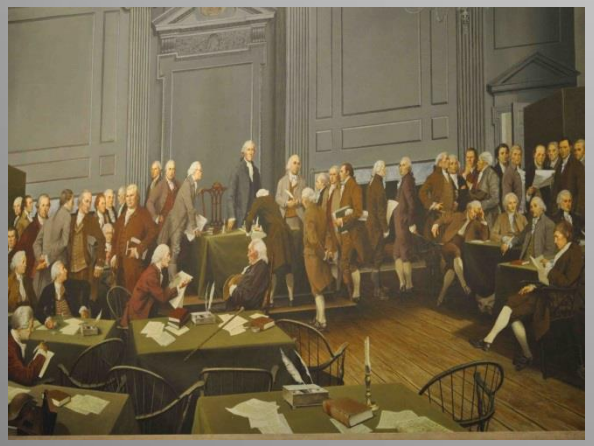

Phone

Those who cannot remember the past…

…are condemned to repeat it.

Basin Monitoring Program Task Force

“101 Workshop”



March 14, 2018