SANTA ANA RIVER WATERMASTER

ORANGE COUNTY WATER DISTRICT v. CITY OF CHINO, et al.
CASE NO. 117628--COUNTY OF ORANGE

WATERMASTER
P. Joseph Grindstaff
Douglas D. Headrick
Roy L. Herndon
Michael R. Markus
John V. Rossi

MAILING ADDRESS
c/o SBVMWD
380 East Vanderbilt Way
San Bernardino CA 92408-3593
Telephone (909) 387-9200
FAX (909) 387-9247

April 30, 2015

To: Clerk of Superior Court of Orange County and all Parties

Re: Watermaster Report for Water Year October 1, 2013 - September 30, 2014

Ladies and Gentlemen:

We have the honor of submitting herewith the Forty-Fourth Annual Report of the Santa Ana River Watermaster. The supporting Basic Data Appendices are bound separately.

The principal findings of the Watermaster for the Water Year 2013-14 are as follows:

<u>At Prado</u>

1	Measured Outflow at Prado	86,486	acre-feet
2	Base Flow at Prado	63,536	acre-feet
3	Annual Weighted TDS in Base and Storm Flows	582	mg/L
4	Annual Adjusted Base Flow	69,784	acre-feet
5	Cumulative Adjusted Base Flow	5,282,666	acre-feet
6	Other Credits (Debits)	0	acre-feet
7	Cumulative Entitlement of OCWD	1,848,000	acre-feet
8	Cumulative Credit	3,474,674	acre-feet
9	One-Third of Cumulative Debit	0	acre-feet
10	Minimum Required Base Flow in 2013-14	34,000	acre-feet

At Riverside Narrows

1	Base Flow at Riverside Narrows	32,313 acre-feet
2	Annual Weighted TDS in Base Flow	646 mg/L
3	Annual Adjusted Base Flow	32,313 acre-feet
4	Cumulative Adjusted Base Flow	1,958,244 acre-feet
5	Cumulative Entitlement of IEUA and WMWD	671,000 acre-feet
6	Cumulative Credit	1,287,244 acre-feet
7	One-Third of Cumulative Debit	0 acre-feet
8	Minimum Required Base Flow in 2013-14	12,420 acre-feet

Based on these findings, the Watermaster concludes that there was full compliance with the provisions of the Stipulated Judgment in 2013-14.

At the end of the 2013-14 Water Year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit 3,474,674 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 1,287,244 acre-feet to its Base Flow obligation at Riverside Narrows.

The Watermaster continued to exercise surveillance over the many active and proposed projects within the watershed for their potential effect on Base Flow.

Sincerely yours,
Santa Ana River Watermaster

By:

P. Joseph Grindstaff

Michael R. Markus

Douglas D. Headrick

John V. Rossi

Roy L. Herndon

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO, et al.

CASE NO. 117628 - COUNTY OF ORANGE

FORTY- FOURTH

ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2013 - SEPTEMBER 30, 2014

APRIL 30, 2015

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The following appendices are bound separately and available for review at the office of the Secretary of the Santa Ana River Watermaster.

CHAPTER I

WATERMASTER ACTIVITIES AND WATER CONDITIONS

Introduction

This Forty-Fourth Annual Report of the Santa Ana River Watermaster covers Water Year 2013-14. The annual report is required by the Stipulated Judgment (Judgment) in the case of Orange County Water District v. City of Chino, et al., Case No. 117628-County of Orange, entered by the court on April 17, 1969. The Judgment became effective on October 1, 1970. It contains a declaration of rights of the water users and other entities in the Lower Area of the Santa Ana River Basin downstream of Prado Dam as against those in the Upper Area tributary to Prado Dam, and provides a physical solution to satisfy those rights. Chapter IV presents a history of the litigation and a summary of the Judgment.

The physical solution accomplishes, in general, a regional intrabasin allocation of the surface flow of the Santa Ana River System. The Judgment leaves to each of the major hydrologic units within the basin the determination and regulation of individual rights therein and the development and implementation of its own water management plan subject only to compliance with the physical solution.

The Judgment designates four public agencies to represent the interests of the Upper and Lower Areas and gives them the responsibility to fulfill the obligations set forth in the Judgment, including the implementation of the physical solution. The Lower Area is represented by Orange County Water District (OCWD). The Upper Area is represented by San Bernardino Valley Municipal Water District (SBVMWD), Western Municipal Water District of Riverside County (WMWD), and Inland Empire Utilities Agency (IEUA), formerly the Chino Basin Municipal Water District (CBMWD). The locations of the districts are shown on Plate 1, "Santa Ana River Watershed".

The court appoints a five-member Watermaster Committee (Watermaster) to administer the provisions of the Judgment. The duties of the Watermaster are to maintain a continuous accounting of each of the items listed in the letter of transmittal at the front of this report and to report thereon annually for each water year to the court and the parties. The water year begins October 1 and ends the following September 30. The time for submission of the annual report was amended by the court (dated December 24, 1981) to be seven months after the end of the water year (April 30).

For the Water Year 2013-14 the Watermaster consisted of P. Joseph Grindstaff, Douglas D. Headrick, Roy L. Herndon, Michael R. Markus, and John V. Rossi. Mr. Herndon served as Chairman and Mr. Headrick served as Secretary/Treasurer. The history of the Watermaster Committee membership is presented in Chapter IV.

Compilation of Basic Data

The Watermaster annually compiles the basic hydrologic and water quality data necessary to determine compliance with the provisions of the Judgment. The data include records of stream discharge (flow) and quality for the Santa Ana River (River) at Prado Dam and at Riverside Narrows as well as discharges for most tributaries; flow and quality of nontributary water entering the River; rainfall records at locations in or adjacent to the Watershed; and other data that may be used to support the determinations of the Watermaster.

For Water Year 2013-14 the United States Geological Survey (USGS) provided discharge and water quality data for the River at two gaging stations, “Santa Ana River Below Prado” (Prado) and “Santa Ana River at Metropolitan Water District (MWD) Crossing” (Riverside Narrows). The discharge data at both stations consist of computed daily mean discharges, expressed in cubic feet per second (cfs), and are based on continuous recordings. The water quality data at Prado consist of daily maximum and minimum and mean values for electrical conductivity (EC), measured as specific conductance and expressed in microsiemens per centimeter (μs/cm) based on a continuous recording, and twice-monthly measured values for total dissolved solids (TDS), expressed in milligrams per liter (mg/L). The water quality data at Riverside Narrows consist of twice-monthly values for both EC and TDS. The USGS also provided discharge data for other gaging stations for streams tributary to Prado, including, among others, the Santa Ana River at E Street in San Bernardino, Chino Creek at Schaefer Avenue, Cucamonga Creek near Mira Loma, and Temescal Creek in the City of Corona (see Appendix A). Based on a determination by the Watermaster in Water Year 2011-12, the USGS was requested to establish a new gaging station at the spillway at Lee Lake. The expenses associated with the installation and measurements at this gage were added to the Watermaster costs paid by the Parties. Beginning in Water Year 2012-13, the new Temescal Creek at Corona Lake “Lee Lake” (near Corona) gage provided useful data to assist in the determination of the amount of water discharged from the San Jacinto Watershed that arrived at Prado. At times the USGS must estimate daily mean discharges due to damaged or malfunctioning recording equipment.

The Water Year 2013-14 daily mean discharge record at Prado is considered by the USGS to be "fair”. Daily mean discharges at the station are controlled at times by storage operations in the reservoir behind Prado Dam just upstream. The maximum and minimum daily mean discharge values during the water year were, respectively, 399 cfs on March 3, 2014 and 43 cfs on July 8, 2014. The maximum and minimum daily flow-weighted mean EC values reported by the USGS at Prado were 1,260 μs/cm on May 26, 2014 and 412 μs/cm on March 1, 2014, respectively. The corresponding calculated TDS concentrations were 770 and 252 mg/L. EC records were rated “excellent” except for October 4 to11, November 8 to14, March 28 to April 15, May 3 to 21 and June 12 to19, which are considered by the USGS to be “good”; October 12 to16, which are considered by the USGS to be “fair”; and October 17 and December 2 to January 30, which are considered to be “poor” by the USGS.

The Water Year 2013-14 daily mean discharge record at Riverside Narrows was rated by the USGS to be "poor." The maximum and minimum daily mean discharge values during the year were 1,670 cfs on February 28, 2014 and 27 cfs on July 7 and September 17 to 19 in 2014, respectively. The maximum and minimum EC values reported by the USGS were 1,060 μs/cm on August 20, 2014 and 278 μs/cm on March 1, 2014, respectively. The corresponding measured TDS concentrations were 660 mg/L and 172 mg/L.

To assist in making its determinations each year the Watermaster refers to the records of many precipitation stations located in or near the Santa Ana River Watershed. The record for the former Perris Hill Station 163 in the Bunker Hill-San Timoteo area, operated by the San Bernardino County Flood Control District, was used to define the hydrologic base period for the physical solution in the Judgment. The record for San Bernardino County Department of Public Works (SBCDPW) Station 2146, which was located very near to Station 163 at the San Bernardino County Hospital, was used until Water Year 2000-01 in the Annual Reports of the Watermaster in order to provide a comparison with historical conditions.

During Water Year 2000-01 Station 2146 was destroyed when the hospital buildings were demolished. For several years the Watermaster used estimated precipitation data based on the records for three nearby stations. The SBCDPW established a new station 2146-A near the location of the former Station 2146. During the preparation of the report for Water Year 2004-05, the precipitation total recorded at station 2146-A was sufficiently close to the estimate prepared from the three nearby stations that the Watermaster used the record for station 2146-A.

The USGS established a precipitation gage network during the Water Year 2003-04 to assist local flood control agencies with flood prediction in the area of the "Old Fire", which burned a large portion of the northerly mountains of the Santa Ana River Watershed area during October and November 2003. When the flood control agencies declined to fund the ongoing operation of the precipitation gage network, the Parties to the Judgment agreed to add the precipitation gage program to the ongoing stream gage program. The Parties also added a gage designated as "Gilbert Street Precipitation Gage" (USGS No. 340742117161701) at the same location as SBCDPW Station 2146-A. The Gilbert Street Gage was placed into operation in October 2005.

The Watermaster has compared the record from the USGS Gilbert Street Gage to the record from the Station 2146-A gage and has found them to be virtually identical. The Watermaster has accepted the Gilbert Street Gage in this report as the most accurate and reliable of the two gages. Because of the Watermaster's finding of suitability of the Gilbert Street Gage, in Water Year 2011-12 the Parties determined that funding of the other precipitation gages was no longer a necessary Watermaster expense.

For Water Year 2013-14, the total precipitation recorded at the Gilbert Street gage was 12.42 inches, or 69% of the average of 17.98 inches that occurred during the 26-year base period (1934-35 through 1959-60) that was used in the formulation of the physical solution. Plate 3 graphically portrays the annual precipitation from 1934-35 through 2013-14.

Watermaster Determinations

Each year the Watermaster uses its long-established procedures to analyze the basic hydrologic and water quality data in order to determine, at Riverside Narrows and at Prado, the Base Flow, the Adjusted Base Flow, the Cumulative Credits or Debits to Upper Area parties, and the Minimum Required Base Flow for the following water year. The procedures include determining, for both locations, the amounts of Nontributary Flow or other non-storm flow to be excluded from Base Flow.

During Water Year 2013-14 there were no sources of Nontributary Flow in the River at Riverside Narrows or at Prado.

The determinations of the Watermaster for Water Year 2013-14 are explained in detail for Prado in Chapter II and for Riverside Narrows in Chapter III. A summary of annual determinations by the Watermaster for both locations for the period 1970-71 through 2013-14 is presented in Table 1. Note that the Base Flow obligations set forth in the Judgment at both Prado and Riverside Narrows have been met and cumulative credits have accrued to the upper respective Districts.

TABLE 1

SUMMARY OF FINDINGS AT PRADO

Water Year	Rainfall (in)[1]	USGS Measured Flow (ac-ft)	Total Flow (ac-ft)[2]	Base Flow (ac-ft)[3]	Weighted TDS (mg/L)[4]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)[5]
1970-71	11.97	51,864	51,864	38,402	727	38,402	-3,598
1971-72	9.62	51,743	51,743	40,416	707	40,416	-5,182
1972-73	18.46	76,848	77,484	48,999	638	51,531	4,349
1973-74	12.72	128,436	62,511	43,106	633	45,513	7,862
1974-75	13.49	93,397	61,855	50,176	694	51,263	17,125
1975-76	15.86	120,590	59,209	45,627	635	48,098	23,223
1976-77	11.95	72,278	62,953	48,387	660	50,000	31,223
1977-78	30.47	255,043	252,850	58,501	383	73,955	63,178
1978-79	17.51	145,198	134,506	71,863	580	79,049	100,227
1979-80	30.93	536,174	527,760	82,509	351	106,505	164,732
1980-81	10.45	118,300	117,888	74,875	728	74,875	205,652
1981-82	18.34	143,702	143,367	81,548	584	89,431	253,083
1982-83	32.36	426,273	426,750	111,692	411	138,591	353,036
1983-84	10.81	178,730	177,606	109,231	627	115,876	431,514
1984-85	12.86	163,247	162,912	125,023	617	133,670	523,184
1985-86	17.86	196,900	197,373	127,215	567	141,315	622,499
1986-87	8.08	140,872	143,191	119,848	622	127,638	708,137
1987-88	13.78	176,292	166,818	124,104	582	136,308	802,445
1988-89	12.64	159,659	152,743	119,572	583	131,230	891,675
1989-90	8.53	144,817	143,463	119,149	611	127,986	977,661
1990-91	15.48	195,186	186,426	111,151	514	128,379	1,064,040
1991-92	16.54	198,280	189,677	106,948	499	124,862	1,146,902
1992-93	30.92	571,138	566,630	128,067	368	163,499	1,268,401
1993-94	11.62	159,560	152,808	111,186	611	119,432	1,345,833
1994-95	25.14	429,270	422,816	123,468	415	152,792	1,458,387
1995-96	11.92	217,160	190,553	131,861	514	152,299	1,568,686
1996-97	18.64	249,685	198,459	136,676	514	157,861	1,684,547
1997-98[6]	33.41	462,646	456,316	155,711	392	195,677	1,838,224
1998-99	8.02	184,998	182,310	158,637	581	174,369	1,970,593
1999-00	11.09	207,850	188,538	148,269	527	169,644	2,098,237
2000-01	16.13	222,559	208,535	153,914	525	176,360	2,232,597
2001-02	5.08	174,968	156,596	145,981	587	159,728	2,350,325
2002-03	16.22	256,157	245,947	146,113	463	174,970	2,484,182
2003-04[7]	10.80	214,102	201,967	143,510	502	167,190	2,609,619
2004-05	29.89	638,513	637,568	154,307	348	199,570	2,769,555
2005-06	13.23	247,593	246,101	147,736	517	170,266	2,901,383
2006-07	4.61	156,147	153,823	129,830	604	140,216	3,005,130
2007-08	13.70	199,690	194,309	116,483	495	136,382	3,103,677
2008-09	10.14	162,698	161,026	102,711	527	117,519	3,181,385
2009-10	17.79	243,776	243,690	103,099	443	125,179	3,266,053
2010-11[7]	23.50	324,892	313,018	102,031	522	117,166	3,342,412
2011-12	9.01	121,123	121,123	93,068	597	101,056	3,401,833
2012-13	9.53	100,003	99,735	81,452	621	86,814	3,446,890
2013-14	12.42	86,486	86,486	63,536	582	69,784	3,474,674

TABLE 1 (Continued)

SUMMARY OF FINDINGS AT RIVERSIDE NARROWS

Water Year	Rainfall (in)[1]	USGS Measured Flow (ac-ft)	Total Flow (ac-ft)[2]	Base Flow (ac-ft)[3]	Weighted TDS (mg/L)[4]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)[5]
1970-71	11.97	42,732	24,112	17,061	704	17,012	1,762
1971-72	9.62	41,257	22,253	16,157	712	16,017	2,529
1972-73	18.46	33,048	32,571	17,105	700	17,105	4,384
1973-74	12.72	25,494	24,494	16,203	700	16,203	5,337
1974-75	13.49	20,970	19,644	15,445	731	15,100	5,187
1975-76	15.86	27,627	26,540	17,263	723	16,977	6,914
1976-77	11.95	24,871	23,978	18,581	722	18,286	9,950
1977-78	30.47	182,500	181,760	22,360	726	21,941	16,641
1978-79	17.51	47,916	47,298	26,590	707	26,456	27,847
1979-80	30.93	254,333	253,817	25,549	676	25,549	38,146
1980-81	10.45	34,698	34,278	19,764	715	19,550	42,446
1981-82	18.34	83,050	82,708	32,778	678	32,778	59,974
1982-83	32.36	279,987	279,645	57,128	610	57,128	101,852
1983-84	10.81	83,087	82,745	56,948	647	56,948	143,550
1984-85	12.86	79,113	78,771	69,772	633	69,772	198,072
1985-86	17.86	99,600	99,258	68,220	624	68,220	251,042
1986-87	8.08	78,093	77,752	59,808	649	59,808	295,600
1987-88	13.78	80,047	79,706	55,324	620	55,324	335,674
1988-89	12.64	62,717	62,376	52,259	607	52,259	372,683
1989-90	8.53	58,500	58,159	53,199	590	53,583	411,016
1990-91	15.48	74,525	73,790	45,041	616	45,041	440,807
1991-92	16.54	71,768	71,427	40,306	620	40,306	465,863
1992-93	30.92	267,384	267,043	41,434	634	41,434	492,047
1993-94	11.62	45,477	45,006	31,278	677	31,278	508,075
1994-95	25.14	245,617	243,411	45,562	646	45,562	538,387
1995-96	11.92	83,256	81,786	54,548	625	54,548	577,685
1996-97	18.64	107,280	104,518	62,618	624	62,618	625,053
1997-98	33.41	214,375	213,033	65,013	601	65,013	674,816
1998-99	8.02	76,294	76,294	73,094	603	73,094	732,660
1999-00	11.09	75,572	75,572	63,499	602	63,499	780,909
2000-01	16.13	78,091	75,331	61,872	603	61,872	827,531
2001-02	5.08	68,844	59,434	58,705	606	58,705	870,986
2002-03	16.22	92,166	88,502	57,747	617	57,747	913,483
2003-04	10.80	77,336	75,799	54,788	634	54,788	953,021
2004-05	29.89	355,503	355,503	65,760	616	65,760	1,003,531
2005-06	13.23	111,840	111,113	67,161	608	67,161	1,055,442
2006-07	4.61	57,868	56,022	56,123	635	56,123	1,096,315
2007-08[8]	13.70	78,619	74,554	46,776	674	46,776	1,127,841
2008-09	10.14	69,027	67,567	43,902	663	43,902	1,156,493
2009-10	17.79	112,631	112,631	45,887	643	45,887	1,187,130
2010-11	23.50	174,075	174,075	49,753	654	49,753	1,221,633
2011-12	9.01	45,049	45,049	42,641	664	42,641	1,249,024
2012-13	9.53	41,337	41,337	36,407	662	36,407	1,270,181
2013-14	12.42	42,766	42,766	32,313	646	32,313	1,287,244

TABLE 1 (Continued)

(1) Measured at San Bernardino County Department of Public Works (SBCDPW) Station 2146 (former San Bernardino County Hospital) until Water Year 2000-01. Estimated for that location for Water Years 2000-01 through 2003-04. Measured at SBCDPW Station 2146-A for Water Year 2004-05. Measured at USGS Gilbert Street Precipitation Gage at San Bernardino for Water Year 2005-06. For 2006-07, measured at SBCDPW 2146 from Oct. 1 to Dec. 21 and at USGS Gilbert Street Precipitation Gage for the remainder of the year. Measured at USGS Gilbert Street Precipitation Gage at San Bernardino since Water Year 2007-08.

(2) As determined by the Watermaster, Total Flow based on Computed Inflow at Prado or measured flow at Riverside Narrows in any year may be exclusive of any Nontributary Flow, Exchange Water or other "water management" flows and, at Prado, may include discharges from Lake Elsinore or the San Jacinto Watershed that reach the Santa Ana River.

(3) As determined by the Watermaster: (a) Base Flow at Prado in any year is exclusive of Storm Flow and may be exclusive of any Nontributary Flow, Exchange Water or other "water management" flows as well as any discharges from Lake Elsinore or the San Jacinto Watershed that reach the Santa Ana River; (b) Base Flow at Riverside Narrows in any year is exclusive of Storm Flow and may be exclusive of any Nontributary Flow, Exchange Water or other "water management" flows and, beginning in 1979-80, includes wastewater from Rubidoux CSD that is treated at the Riverside Regional WWTP.

(4) For Base and Storm Flow at Prado and Base Flow only at Riverside Narrows.

(5) As determined by the Watermaster, Cumulative Credit at Prado in any year may include credit for a portion of any water discharged from Lake Elsinore or the San Jacinto Watershed that reach the Santa Ana River.

(6) The Base Flow and Adjusted Base flow for Water Year 1997-98 were returned to their originally published values to correct an error in the adjustment to account for San Jacinto Watershed flows arriving at Prado. This correction is also reflected in the Cumulative Credit for this and subsequent years.

(7) A correction was made for Water Years 2003-04 and 2010-11 in the calculation of Weighted TDS based on an adjustment to account for OC-59 water that arrived at Prado. This correction is reflected in the Weighted TDS and Adjusted Base Flow for these years. This correction is also reflected in the Cumulative Credit for these and subsequent years.

(8) The Base Flow amount for Water Year 2007-08 at Riverside Narrows was published as 47,760 acre-feet in the Thirty-Eighth Annual Report. The correct amount is 46,776 acre-feet.

Notable Watershed Programs and Activities

Each year when the Watermaster is compiling and analyzing the information it needs to prepare its report to the court, it also takes notice of programs and activities in the Watershed that, while they do not directly enter into the determinations of the Watermaster, do have significant potential to affect River flow or quality. The following are brief descriptions of such items.

Upper Area Treated Wastewater Discharges

Data on treated wastewater discharged in the Upper Area are compiled annually because wastewater is a major contributor to Base Flow in the River. The historical data on treated wastewater discharged are summarized in Table 2. The locations of wastewater treatment plants are shown on Plate 2.

Salt Exports from the Upper Area

High salinity water, mostly from groundwater desalters, is exported from the Upper Area to the ocean through Santa Ana Watershed Project Authority's Santa Ana Regional Interceptor (SARI) in Orange County and Inland Empire Brine Line (IEBL) in San Bernardino and Riverside Counties and IEUA's Non-Reclaimable Wastewater System (NRWS). This salt export helps to protect River water quality and, therefore, helps the Upper Area parties comply with the Judgment. The available historical data on salt export are summarized in Table 3. The SARI/IEBL first went into service in Water Year 1985-86. The NRWS went into service prior to 1970, but records of NRWS flow data are only available beginning with Water Year 1981-82.

The locations of the SARI/IEBL and NRWS pipelines are shown on Plate 2.

Arundo donax Eradication

Arundo donax is a non-native species of reed that has invaded many waterways in California. It displaces native vegetation, resulting in undesirable habitat for animals. *Arundo* also consumes water at the rate of about 5.6 acre-feet per acre per year compared to only about 1.9 for native plants, a net water loss of about 3.7 acre-feet per year per acre of *Arundo*. By the early 1990s there were about 10,000 acres of *Arundo* in the Santa Ana River Watershed. In 1997 a consortium of local, state and federal agencies launched a long term eradication program in the watershed for reasons of both habitat restoration and water savings. *Arundo* spreads quickly downstream as roots and rhizomes break off during high streamflows. Therefore the eradication program began at the farthest upstream locations and is working toward the River mouth. Each location requires multiyear retreatment. To date the consortium has eradicated 5,200 acres of *Arundo* in the watershed.

TABLE 2
TREATED WASTEWATER EFFLUENT DISCHARGED ABOVE PRADO

(acre-feet)

Water Year	Treated wastewater discharges upstream from Colton that generally do not flow continuously to Santa Ana River above E Street				Treated wastewater discharges to Santa Ana River and its tributaries that have hydraulic continuity to the Santa Ana River above Riverside Narrows					Treated wastewater discharges to Santa Ana River between Riverside Narrows and Prado Dam								Treated wastewater discharges to Temescal Creek or its tributaries which have hydraulic continuity to the Santa Ana River					Total Discharge to Surface Flow of the Santa Ana River	Total Treated Wastewater Discharged in Watershed
	Redlands	Beaumont	Yucaipa	Subtotal (A)	San Bernardino	Colton	Rialto	RIX[1]	Subtotal (B)	Riverside	Corona[2]	IEUA RP 1[3]	IEUA RP 2	IEUA RP 5	IEUA CCWRF[4]	WRCRW[5]	Subtotal (C)	EMWD Discharge (1)	Est. EMWD Arriving at Prado (2)	Elsinore Valley MWD (3)	Lee Lake WRP (4)	Subtotal (D) (2 + 3 + 4)	(B + C + D)	(A + B + C + D + 1 - 2)
1970-71	2,650	no record	--	2,650	17,860	2,520	2,270	--	22,650	18,620	3,190	--	--	--	--	--	21,810	--	--	--	--	--	44,460	47,110
1971-72	2,830	no record	--	2,830	16,020	2,230	2,400	--	20,650	19,010	3,230	6,740	--	--	--	--	28,980	--	--	--	--	--	49,630	52,460
1972-73	2,810	450	--	3,260	18,670	2,530	2,260	--	23,460	19,060	3,340	10,380	--	--	--	--	32,780	--	--	--	--	--	56,240	59,500
1973-74	2,770	600	--	3,370	17,680	2,530	2,320	--	22,530	19,560	3,510	11,440	2,320	--	--	--	36,830	--	--	--	--	--	59,360	62,730
1974-75	2,540	570	--	3,110	16,750	1,980	2,320	--	21,050	19,340	4,020	14,960	2,280	--	--	--	40,600	--	--	--	--	--	61,650	64,760
1975-76	2,450	620	--	3,070	17,250	2,540	2,240	--	22,030	19,580	4,700	15,450	2,950	--	--	--	42,680	--	--	--	--	--	64,710	67,780
1976-77	3,170	580	--	3,750	17,650	3,260	2,330	--	23,240	18,770	5,010	14,640	3,380	--	--	--	41,800	--	--	--	--	--	65,040	68,790
1977-78	3,280	620	--	3,900	18,590	3,810	2,380	--	24,780	20,310	5,200	14,650	4,060	--	--	--	44,220	--	--	--	--	--	69,000	72,900
1978-79	3,740	670	--	4,410	19,040	3,850	3,050	--	25,940	21,070	5,390	15,040	5,070	--	--	--	46,570	--	--	--	--	--	72,510	76,920
1979-80	4,190	690	--	4,880	20,360	4,190	2,990	--	27,540	22,910	5,360	14,410	5,520	--	--	--	48,200	--	--	--	--	--	75,740	80,620
1980-81	4,410	690	--	5,100	20,550	3,930	3,370	--	27,850	24,180	5,590	17,270	5,260	--	--	--	52,300	--	--	--	--	--	80,150	85,250
1981-82	4,420	700	--	5,120	23,340	3,780	3,470	--	30,590	25,640	5,410	19,580	5,360	--	--	--	55,990	--	--	--	--	--	86,580	91,700
1982-83	4,530	710	--	5,240	24,160	3,600	3,620	--	31,380	25,020	5,860	20,790	4,290	--	--	--	55,960	--	--	--	--	--	87,340	92,580
1983-84	5,150	800	--	5,950	22,080	3,700	3,830	--	29,610	26,090	6,200	20,950	3,950	--	--	--	57,190	--	--	--	--	--	86,800	92,750
1984-85	4,990	840	--	5,830	23,270	3,830	4,070	--	31,170	27,750	6,250	25,160	4,280	--	--	--	63,440	--	--	--	--	--	94,610	100,440
1985-86	5,200	820	--	6,020	24,720	4,010	4,720	--	33,450	28,820	5,900	28,240	2,660	--	--	--	65,620	--	--	--	--	--	99,070	105,090
1986-87	5,780	880	800	7,460	26,810	4,170	5,350	--	36,330	30,340	6,170	27,160	5,000	--	--	--	68,670	--	--	--	--	--	105,000	112,460
1987-88	6,060	940	1,850	8,850	27,880	5,240	6,040	--	39,160	34,660	6,050	31,290	5,500	--	--	--	77,500	--	--	--	--	--	116,660	125,510
1988-89	5,250	1,030	2,260	8,540	27,640	5,550	6,280	--	39,470	35,490	8,080	35,510	6,180	--	--	--	85,260	--	--	--	--	--	124,730	133,270
1989-90	6,360	1,100	2,370	9,830	28,350	5,810	6,260	--	40,420	33,210	9,140	34,760	5,730	--	--	--	82,840	--	--	--	--	--	123,260	133,090
1990-91	6,690	1,120	2,490	10,300	27,570	5,670	6,290	--	39,530	32,180	9,110	36,840	6,100	--	--	--	84,230	--	--	--	--	--	123,760	134,060
1991-92	6,230	1,150	2,580	9,960	25,060	5,660	6,360	--	37,080	32,660	9,010	40,360	5,780	--	1,550	--	89,360	--	--	--	--	--	126,440	136,400
1992-93	6,880	1,180	2,580	10,640	25,550	6,210	6,460	--	38,220	34,100	9,600	41,510	5,640	--	4,720	--	95,570	--	--	--	--	--	133,790	144,430
1993-94	6,440	1,150	2,710	10,300	23,800	5,830	6,540	--	36,170	32,640	7,790	37,310	5,430	--	7,010	--	90,180	--	--	--	--	--	126,350	136,650
1994-95	6,720	1,180	2,560	10,460	26,330	5,500	6,820	--	38,650	33,950	7,340	39,680	5,360	--	8,690	--	95,020	--	--	--	--	--	133,670	144,130
1995-96	6,550	1,260	2,640	10,450	13,240	2,770	6,890	20,760	43,660	33,960	7,850	39,590	4,810	--	9,060	--	95,270	--	--	--	--	--	138,930	149,380
1996-97	6,510	1,280	2,780	10,570	0	0	7,160	42,800	49,960	34,240	5,040	39,940	4,790	--	9,750	--	93,760	--	--	--	--	--	143,720	154,290
1997-98	7,022	1,356	3,116	11,494	0	0	7,063	49,683	56,746	35,422	8,718	44,940	4,969	--	9,264	1,461	104,774	1,779	1,690	--	--	1,690	163,210	174,793
1998-99	7,379	1,367	3,128	11,874	0	0	6,524	47,587	54,111	34,844	11,629	43,354	5,345	--	9,534	4,594	109,299	--	--	3,049	--	3,049	166,459	178,333
1999-00	7,670	1,373	3,284	12,327	0	0	7,392	45,012	52,404	35,399	13,152	42,967	4,378	--	9,954	2,371	108,221	--	--	4,159	--	4,159	164,784	177,111
2000-01	7,379	1,377	3,345	12,101	0	0	8,346	49,407	57,753	35,663	13,100	43,863	4,401	--	11,615	2,210	110,852	--	--	4,245	--	4,245	172,850	184,951
2001-02	7,395	1,434	3,285	12,114	0	0	7,952	44,513	52,465	35,586	12,378	40,377	4,056	--	10,677	2,380	105,454	--	--	4,477	352	4,829	162,748	174,862
2002-03	7,499	1,593	3,480	12,572	217	4	8,042	45,570	53,833	36,298	12,027	45,838	4,343	--	10,837	2,409	111,752	2,312	2,024	5,012	444	7,480	173,065	185,925
2003-04	6,625	1,793	3,898	12,316	124	0	8,158	44,526	52,808	36,664	11,394	39,734	2,307	4,821	9,113	2,818	106,851	4,345	1,140	5,037	549	6,726	166,385	181,906
2004-05	7,632	2,051	3,899	13,582	4,406	183	7,815	42,025	54,429	38,123	12,558	40,644	--	8,777	8,637	3,521	112,260	15,195	13,746	7,025	653	21,424	188,113	203,144
2005-06	5,789	2,246	3,945	11,980	1,184	101	7,883	45,259	54,427	37,358	13,021	35,486	--	9,036	8,389	3,311	106,601	14,669	12,631	6,259	701	19,591	180,619	194,637
2006-07	4,991	2,555	4,056	11,602	10	0	7,654	44,011	51,675	36,355	11,727	31,829	--	12,534	6,851	4,376	103,672	13,105	11,092	4,792	691	16,575	171,922	185,537
2007-08	3,665	2,856	4,055	10,576	518	0	7,258	42,476	50,252	35,703	9,408	26,001	--	12,200	8,029	5,952	97,293	10,808	8,930	1,553	811	11,294	158,839	171,293
2008-09	2,386	2,894	3,993	9,273	263	0	6,724	40,310	47,297	33,636	9,062	23,854	--	9,711	8,920	6,374	91,557	6,669	4,653	518	948	6,119	144,973	156,262
2009-10	2,876	2,956	4,105	9,937	298	0	6,658	40,672	47,628	33,731	8,808	21,983	--	8,046	7,258	6,153	85,979	4,961	4,814	876	934	6,624	140,231	150,315
2010-11	3,271	3,050	4,196	10,517	1,292	0	6,710	39,333	47,335	33,487	9,275	18,177	--	7,279	5,987	6,486	80,691	5,680	5,418	4,464	622	10,504	138,530	149,309
2011-12	3,503	3,054	4,112	10,669	76	0	6,703	37,966	44,745	31,622	9,249	14,563	--	7,184	5,137	6,409	74,164	1,225	735	507	786	2,028	120,937	132,096
2012-13	3,652	3,139	4,191	10,982	44	0	6,611	35,390	42,045	31,996	9,406	10,647	--	5,388	5,015	6,994	69,446	2,727	502	502	650	1,654	113,146	126,351
2013-14	3,549	3,345	4,133	11,028	145	0	6,527	33,271	39,943	30,302	8,662	9,898	--	3,188	3,606	6,402	62,057	0	0	533	623	1,156	103,156	114,184

1. RIX = Rapid Infiltration and Extraction Facility for San Bernadino and Colton, including over-extraction of groundwater
2. A portion of the Corona discharge goes to ponds, which are considered tributary to the Santa Ana River.
3. Beginning in 1997-98, includes IEUA Plant #4 flows.
4. CCWRF = Carbon Canyon Water Reclamation Facility
5. WRCRW = Western Riverside County Regional Wastewater Treatment Plant

The amounts shown in this table were determined from data provided by the agencies.

TABLE 3

HIGH SALINITY WATER EXPORTED
FROM THE SANTA ANA RIVER WATERSHED

Water Year	Inland Empire Utility Agency Non-Reclaimable Wastewater	Santa Ana Watershed Project Authority Santa Ana Regional Interceptor (SARI)[1] Inland Empire Brine Line (IEBL)		
	North System (acre-feet)	SARI/IEBL Flow[2] (acre-feet)	Average TDS (mg/L)	Total Flow (acre-feet)
1970-71	NA	---	---	---
1971-72	NA	---	---	---
1972-73	NA	---	---	---
1973-74	NA	---	---	---
1974-75	NA	---	---	---
1975-76	NA	---	---	---
1976-77	NA	---	---	---
1977-78	NA	---	---	---
1978-79	NA	---	---	---
1979-80	NA	---	---	---
1980-81	NA	---	---	---
1981-82	4,236	---	---	4,236
1982-83	4,651	---	---	4,651
1983-84	4,142	---	---	4,142
1984-85	2,346	---	---	2,346
1985-86	2,995	2,791 [3]	NA	5,786 [3]
1986-87	4,943	2,869 [3]	NA	7,813 [3]
1987-88	5,177	2,948 [3]	NA	8,125 [3]
1988-89	5,949	3,622 [3]	NA	9,572 [3]
1989-90	5,240	7,393	1,649	12,633
1990-91	2,847	7,340	1,906	10,187
1991-92	3,421	6,457	2,346	9,878
1992-93	3,774	5,277	2,516	9,051
1993-94	3,764	7,860	2,302	11,624
1994-95	4,131	8,656	1,903	12,787
1995-96	3,863	9,597	2,175	13,460
1996-97	4,191	10,225	2,292	14,417
1997-98	4,575	8,210	2,456	12,785
1998-99	3,666	4,305	2,611	7,971
1999-00	4,272	7,711	2,154	11,983
2000-01	5,075	8,205	2,504	13,280
2001-02	4,297	8,385	3,289	12,682
2002-03	3,926	9,331	3,482	13,257
2003-04	3,950	10,505	3,798	14,455
2004-05	4,220	10,971	3,460	15,191
2005-06	5,085	12,847	4,118	17,932
2006-07	4,609	13,168	4,120	17,777
2007-08	4,658	12,123	4,986	16,781
2008-09	4,284	12,993	5,037	17,277
2009-10	3,865	13,325	5,003	17,190
2010-11	3,443	13,282	5,066	16,725
2011-12	3,668	13,471	5,884	17,139
2012-13	3,862	12,061	5,626	15,923
2013-14	4,190	12,185	5,350	16,375

1. Santa Ana Regional Interceptor began operation in 1985-86.
2. IEUA Non-Reclaimable Wastewater from the South System goes into the SARI/IEBL and is included in SARI/IEBL Flow.
3. SARI flow and Total Flow for 1985-86 through 1988-89 is partial flow.

NA = Data Not Available

Chino Groundwater Basin Hydraulic Control

During most of the twentieth century much of the land overlying the Chino Basin was devoted to irrigated agriculture that obtained its water supply directly from the basin. In more recent times the agriculture is being replaced by urban development, but the agricultural water use left behind a legacy of high concentrations of nitrates and other salts in the groundwater, making it unsuitable for urban use unless treated. As agricultural pumping of groundwater in the lower part of the Basin was cut back, the California Regional Water Quality Control Board, Santa Ana Region ("RWQCB"), and OCWD both became concerned about the outlook for increased amounts of poor quality water rising in the Santa Ana River above Prado Dam.

Under historic anti-degradation water quality standards, the recharge of recycled water in the Chino Basin was impossible because the Basin lacked assimilative capacity. In order to allow for the use and recharge of recycled water, the RWQCB amended the Basin Plan for the Santa Ana Watershed to allow for the use of special "maximum benefit" standards. As a condition of approval of the use of the maximum benefit standards, the RWQCB's Water Quality Control Plan requires that the Chino Basin entities develop and implement a Hydraulic Control Program with the dual objectives of minimizing the loss of groundwater to the River and protecting the River against the salts by increasing pumping from wells low in the Basin. Much of the pumped groundwater is treated in desalination facilities, with the product water being served to municipalities and the brine stream being exported to the ocean via the SARI/IEBL.

The Chino Basin Watermaster files an annual report with RWQCB on the program, water chemistry, hydrologic balance, piezometric groundwater surface elevations, and groundwater modeling.

Santa Ana River Watermaster Action Team

The parties IEUA, OCWD, SBVMWD and WMWD invited EMWD and other water agencies within the Santa Ana River Watershed to work together as the Santa Ana River Watermaster Action Team to explore concepts that may have watershed area-wide benefits and may involve projects that could be eligible for funding through the State of California grant processes. The cooperating agencies contracted a consultant and participated in collaborative discussions on numerous occasions. The current preferred concepts include reuse of water, conjunctive use, habitat enhancement and water conservation. The Santa Ana River Watermaster Action Team agencies are continuing to work together to better define the concepts and develop implementation procedures that may qualify for grant funding.

Watermaster Service Expenses

In accordance with Paragraph 7(d) of the Judgment, the fees and expenses of each of the members of the Watermaster are borne by the parties by whom they were nominated. All other Watermaster service expenses are shared by the parties with OCWD paying 40% of the cost and WMWD, SBVMWD, and IEUA each paying 20% of the cost.

The Watermaster annually adopts a budget for the costs of services other than those provided by the USGS. Table 4 shows the budget and actual expenses incurred for such services during the 2013-14 fiscal year as well as the budget adopted for the 2013-14 fiscal year. A financial review was performed by OCWD and is reported in Appendix C.

TABLE 4

WATERMASTER SERVICE BUDGET AND EXPENSES.

Budget Item	July 1, 2013 to June 30, 2014 Budget	July 1, 2013 to June 30, 2014 Expenses	July 1, 2014 to June 30, 2015 Budget
Support Services	$12,500.00	$14,759.22*	$15,000.00
Reproduction of Annual Report	1,500.00	$726.57*	1,000.00
TOTAL	$14,000.00	$15,485.79*	$16,000.00

* The expenses for Fiscal Year 2013 -14 were paid during Fiscal Year 2014-15.

Stream flow measurements and water quality data required by the Watermaster are, for the most part, furnished by the USGS through a cooperative monitoring program which also includes some precipitation data to supplement data provided by the USGS and other agencies. The costs of the cooperative monitoring program for Water Year 2013-14, and each party's share of the costs, are set forth in Table 5.

TABLE 5

COSTS TO THE PARTIES AND USGS FOR MEASUREMENTS WHICH PROVIDE DATA USED BY THE SANTA ANA RIVER WATERMASTER

October 1, 2013 to September 30, 2014

	Total Cost	USGS Share	Parties' Share
USGS PRECIPITATION GAGING STATIONS			
Gilbert Street Gage at San Bernardino	$7,900	$0	$7,900
Middle Fork Lytle Creek Precipitation Gage	$7,900	$7,900	$0
USGS FLOW AND WATER QUALITY GAGING STATIONS			
Santa Ana River at MWD Crossing (Riverside			
Surface Water Gage)	$28,700	$9,600	$19,100
Water Quality Monitoring/TDS Sampling	$11,900	$4,000	$7,900
Santa Ana River below Prado Dam			
Surface Water Gage	$20,400	$6,850	$13,550
Continuous Temperature and Conductance	$27,250	$9,150	$18,100
Water Quality Conductance Program	$2,500	$0	$2,500
Temescal Creek above Main St., near Corona	$20,400	$6,850	$13,550
Chino Creek at Schaefer	$20,400	$6,850	$13,550
Cucamonga Creek at Mira Loma	$20,400	$6,850	$13,550
Temescal Creek at Corona Lake	$15,200	$0	$15,200
TOTAL COST AND SHARES	$182,950	$58,050	$124,900
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$24,980
Orange County Water District	40%		$49,960
San Bernardino Valley Municipal Water District	20%		$24,980
Western Municipal Water District	20%		$24,980

CHAPTER II

BASE FLOW AT PRADO

This chapter deals with determinations of 1) the components of flow at Prado, which include Nontributary Flow, Arlington Desalter discharge, water discharged from San Jacinto Watershed, Storm Flow, and Base Flow and 2) the Adjusted Base Flow at Prado credited to IEUA and WMWD.

Flow at Prado

During Water Year 2013-14, the flow of the River as measured at the USGS gaging station below Prado Dam amounted to 86,486 acre-feet. There was no water in storage at the beginning of the Water Year, and no water remained in storage at the end of the Water Year. Inflow to the reservoir included 63,536 acre-feet of Base Flow and 22,950 acre-feet of Storm Flow. There was no San Jacinto Watershed water that reached Prado. The monthly components of flow of the River at Prado Dam for Water Year 2013-14 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the River below Prado during Water Years 1934-35 through 2013-14 are presented on Plate 5.

Nontributary Flow

Nontributary Flow includes water that originated outside the watershed and other water that the Watermaster has determined should be excluded from Base Flow. During Water Year 2013-14 there was no nontributary water. There were no flows from the San Jacinto Watershed that were determined to have reached Prado. In the past, nontributary flows have included and may include in the future other water discharged to the River pursuant to water exchange or other such programs.

High Groundwater Mitigation Project

No High Groundwater Mitigation Project water was discharged to the River during Water Year 2013-14.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
WATER YEAR 2013-14
(acre-feet)

	USGS Measured Outflow	Storage Change (1)	Computed Inflow	San Jacinto Watershed Flow at Prado (2)	WMWD Transfer Water (3)	San Antonio Creek (4)	Storm Flow	Base Flow
2013								
October	5,397	3	5,400	0	0	0	765	4,635
November	8,344	588	8,932	0	0	0	2,591	6,341
December	8,701	(588)	8,113	0	0	0	1,081	7,032
2014								
January	6,569	3	6,572	0	0	0	12	6,560
February	7,194	3,454	10,648	0	0	0	3,828	6,820
March	21,444	(3,326)	18,118	0	0	0	10,476	7,642
April	8,586	(131)	8,455	0	0	0	2,181	6,274
May	4,285	(3)	4,282	0	0	0	0	4,282
June	3,683	0	3,683	0	0	0	0	3,683
July	3,367	0	3,367	0	0	0	0	3,367
August	4,864	0	4,864	0	0	0	1,467	3,397
September	4,052	0	4,052	0	0	0	549	3,503
Total	86,486	0	86,486	0	0	0	22,950	63,536

(1) The monthly change in storage is included in the monthly components of flow.

(2) Discharge due to overflow of Lake Elsinore and/or discharge of wastewater by EMWD from the San Jacinto Watershed.

(3) WMWD-OCWD Transfer Program water pumped from the Bunker Hill, Riverside, and Colton basins and discharged to the Santa Ana River above the Riverside Narrows delivered this year.

(4) State Water Project water released into San Antonio Creek from turnout OC-59 for OCWD and calculated to have reached Prado this Water Year.

Releases to San Antonio Creek

During Water Year 2013-14, there was no State Water Project (SWP) water released for OCWD from turnout OC-59 to the Santa Ana River. However, following a recent review of past reporting for Water Years 2003-04, 2004-05, 2005-06, 2010-11, and 2012-13, it was discovered that water quality adjustments associated with evaporative losses were quantified, but water quality adjustments for salt leaching were not calculated to adjust for TDS associated with OC-59 water arriving at Prado. As discussed in the Twelfth Annual Report, a Watermaster study indicated that salts leach from soils into OC-59 water along the unlined portion of Chino Creek above Prado Dam. Therefore, TDS was recalculated for the years indicated. For Water Years 2003-04 and 2010-11, TDS values changed. However for Water Years 2004-05, 2005-06, and 2012-13, the recalculated TDS values did not change due to the low volume of OC-59 water released in those years. In the reporting for the current water year, adjustments were made to Tables 1 and 7 that reflect the updated TDS and the corresponding updated Adjusted Base Flow and Cumulative Credit at Prado. The TDS calculations are shown in Appendix E, Table E-5 for each of the water years.

Arlington Desalter Discharge

Groundwater flowing from the Arlington Basin has historically been a component of the River flow. This groundwater has been degraded through agricultural and other uses. Two parties to the Judgment, WMWD and OCWD, as members of the Santa Ana Watershed Project Authority, constructed a groundwater cleanup project that is designed to reduce the poor quality underflow from the basin. This project is known as the Arlington Desalter and consists of five extraction wells and a treatment facility that reduces salinity. The capacity of the facility is approximately 6 million gallons per day. The facility began operation in July 1990, with OCWD buying the product water delivered through the River. Beginning in 2004, the City of Norco began purchasing a portion of the Arlington Desalter product water for direct potable use.

The Watermaster determined that the flow and TDS of the water delivered to OCWD via the River from this facility would be excluded from the computation of Base Flow and Adjusted Base at Prado. During Water Year 2013-14, no Arlington Desalter flows were discharged to the Arlington drain for OCWD.

WMWD-OCWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Colton and Riverside Basins via the Riverside Canal and the River. During Water Year 2013-14, no WMWD-OCWD Transfer Program water deliveries were made to the River upstream of Riverside Narrows and Prado Dam.

San Jacinto Watershed Discharge

Prior to Water Year 1997-98, discharges from the San Jacinto Watershed reaching Prado Reservoir were due to discharges from Lake Elsinore, and had been accounted for as “Lake Elsinore Discharge.” In 1998 EMWD completed its Reach 4 discharge pipeline to

Wasson Canyon, which is tributary to Temescal Wash. The pipeline discharges tertiary-treated wastewater to Temescal Wash above Lee Lake when flows exceed EMWD's storage facility capacity. The collective discharges from Lake Elsinore and EMWD to Temescal Wash are referred to herein as San Jacinto Watershed discharges. During Water Year 2013-14, there was no water discharged to Temescal Wash by EMWD.

Storm Flow

Portions of storm flows are retained behind Prado Dam for flow regulation and for water conservation purposes. The United States Army Corps of Engineers (USACE) owns and operates the Dam according to a flow release schedule which allows for water to be captured and subsequently released at rates which can be captured and recharged by OCWD. The Dam has a spillway elevation of 543 feet above mean sea level. On April 12, 1995, the USACE, the United States Fish and Wildlife Service (USFWS), and OCWD reached an agreement to increase the seasonal water conservation pool from elevation 494 to elevation 505 feet after March 1 of each year in exchange for a $1 million contribution by OCWD to the USFWS to be used to develop least Bell's vireo habitat by the removal of a non-native plant, *Arundo donax*. In 2006 the USACE and OCWD signed an agreement to increase the winter conservation pool elevation from elevation 494 to 498 in exchange for a $930,000 contribution from OCWD to habitat restoration in the watershed. Monthly and annual quantities of Storm Flow are shown in Table 6.

During Water Year 2013-14, the maximum volume of water stored in Prado Reservoir reached 9,638 acre-feet on March 2, 2014. The maximum daily mean flow released from Prado Dam to the River during the Water Year was 399 cfs on March 3, 2014.

Base Flow

The Base Flow is that portion of the total flow remaining after subtracting Storm Flow, Nontributary Flow, Exchange Water, and certain other flows determined by the Watermaster. Flows affecting the determination of Base Flow in Water Year 2013-14 did not include discharges from the San Jacinto Watershed. The general procedure used by the Watermaster to separate the Water Year 2013-14 flow components was the same as used for previous years and is fully described in the Fifth (1974-75) and the Twelfth (1981-82) Annual Reports. Table 6 shows the monthly and annual quantities of Base Flow.

Water Quality Adjustments

The flow-weighted average TDS for the total flow passing Prado Dam was found to be 582 mg/L. This determination was based on records from a continuous monitoring device operated by the USGS for EC of the River flow below Prado Dam. This record was supplemented by forty-one (41) grab samples for EC collected by the USGS and analyzed for TDS.

For Water Year 2013-14 a correlation between TDS and EC yields the following best fit equation:

$$TDS = EC \times 0.61117$$

(where the units of TDS and EC are mg/L and μs/cm, respectively)

Using the daily EC data, flow-weighted average daily concentrations for TDS were calculated using the above equation. The plot of TDS on Plate 6 shows the average daily TDS concentration of the River flow passing Prado Dam. A summary of daily TDS and EC of the River below Prado Dam is contained in Appendix H. At Prado Dam, the flow-weighted average annual TDS concentration of 582 mg/L represents the quality of the total flow including discharge from the San Jacinto Watershed and OC-59. The Judgment requires that Base Flow shall be subject to adjustment based on the TDS of Base Flow and Storm Flow only. Hence, a determination of the TDS of Base Flow plus Storm Flow only is detailed in the following paragraphs.

Adjustment for High Groundwater Mitigation Project Discharge

During Water Year 2013-14, SBVMWD did not discharge High Groundwater Mitigation Project water. Therefore, no water quality adjustment was necessary.

Adjustment for State Water Project Flow to San Antonio Creek

During Water Year 2013-14 there were no releases from OC-59 to San Antonio Creek for OCWD. Therefore, no water quality adjustment was necessary.

Adjustment for Arlington Desalter Discharge

During Water Year 2013-14, no water was discharged from the Arlington Desalter to the Arlington drain for OCWD. Therefore, no water quality adjustment was necessary.

Adjustment for WMWD-OCWD Transfer Program Discharge

During Water Year 2013-14, no WMWD-OCWD Transfer Program water was delivered. Therefore, no water quality adjustment was necessary.

Adjustment for San Jacinto Watershed Discharge

There was no discharge from the San Jacinto Watershed during Water Year 2013-14 reaching Prado Reservoir. Therefore, no water quality adjustment was necessary.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow X Average TDS
1. Measured Outflow	86,486	582	50,334,852
2. Less High Groundwater Mitigation Project	0	---	---
3. Less Nontributary Flow San Antonio Creek	0	---	---
4. Less Arlington Desalter	0	---	---
5. Less WMWD Transfer Program	0	---	---
6. Less San Jacinto Watershed Discharge	0	---	---
7. Measured Outflow less lines 2 through 6	86,486		50,334,852
Average TDS in Total Base and Storm Flow	50,334,852 ÷ 86,486 = 582 mg/L		

The flow-weighted average annual TDS of Storm Flow and Base Flow for Water Year 2013-14 is 582 mg/L, as shown above.

Adjusted Base Flow at Prado

The Judgment provides that the amount of Base Flow at Prado received during any year shall be subject to adjustment based on flow-weighted average annual TDS of the Base Flow and Storm Flow at Prado as follows:

If the Weighted Average TDS in Base Flow and Storm Flow at Prado is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 800 mg/L	$Q - \frac{35}{42{,}000} Q(TDS-800)$
700 mg/L to 800 mg/L	Q
Less than 700 mg/L	$Q + \frac{35}{42{,}000} Q(700-TDS)$

Where: Q = Base Flow actually received.

The flow-weighted average annual TDS of 582 mg/L is less than 700 mg/L. Therefore, the Base Flow must be adjusted by the above equation for TDS less than 700 mg/L. Thus the Adjusted Base Flow is as follows:

$$(63{,}536 \text{ acre-feet}) + \frac{35}{42{,}000} \times (63{,}536 \text{ acre-feet}) \times (700 - 582) = 69{,}784 \text{ acre-feet}$$

Entitlement and Credit or Debit

Paragraph 5(c) of the Judgment states that "CBMWD (now IEUA) and WMWD shall be responsible for an average annual Adjusted Base Flow of 42,000 acre-feet at Prado. CBMWD (IEUA) and WMWD each year shall be responsible for not less than 37,000 acre-feet of Base Flow at Prado, plus one-third of any cumulative debit; provided, however, that for any year commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 30,000 acre-feet, said minimum shall be 34,000 acre-feet."

The Watermaster agreed that San Jacinto Watershed outflows were not envisioned during the formulation of the Judgment and because of the occurrence of San Jacinto Watershed flows at Prado, the Watermaster decided, as in previous years, to credit one-half of any such outflows recharging the groundwater basin in Orange County to IEUA and WMWD.

The findings of the Watermaster concerning flow at Prado for Water Year 2013-14 required under the Judgment are as follows:

1.	Measured Outflow at Prado	86,486 acre-feet
2.	Base Flow at Prado	63,536 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	582 mg/L
4.	Annual Adjusted Base Flow	69,784 acre-feet
5.	Cumulative Adjusted Base Flow	5,282,666 acre-feet
6.	Other Credits (Debits) [1]	0 acre-feet
7.	Cumulative Entitlement of OCWD	1,848,000 acre-feet
8.	Cumulative Credit [2]	3,474,674 acre-feet
9.	One-Third of Cumulative Debit	0 acre-feet
10.	Minimum Required Base Flow in 2013-14	34,000 acre-feet

1. Other Credits (Debits) are comprised of San Jacinto Watershed outflow.
2. Cumulative Credit includes 40,008 acre-feet of San Jacinto Watershed outflow.

TABLE 7
HISTORICAL WATERMASTER FINDINGS AT PRADO DAM
(acre-feet)

Water Year	Base Flow	Annual Adjusted Base Flow	Cumulative Adjusted Base Flow	Other Credits (Debits)[1]	Cumulative Entitlement of OCWD	Cumulative Credit[2]
1970-71	38,402	38,402	38,402	0	42,000	-3,598
1971-72	40,416	40,416	78,818	0	84,000	-5,182
1972-73	48,999	51,531	130,349	0	126,000	4,349
1973-74	43,106	45,513	175,862	0	168,000	7,862
1974-75	50,176	51,263	227,125	0	210,000	17,125
1975-76	45,627	48,098	275,223	0	252,000	23,223
1976-77	48,387	50,000	325,223	0	294,000	31,223
1977-78	58,501	73,955	399,178	0	336,000	63,178
1978-79	71,863	79,049	478,227	0	378,000	100,227
1979-80	82,509	106,505	584,732	0	420,000	164,732
1980-81	74,875	74,875	659,607	8,045	462,000	205,652
1981-82	81,548	89,431	749,038	0	504,000	253,083
1982-83	111,692	138,591	887,629	3,362	546,000	353,036
1983-84	109,231	115,876	1,003,505	4,602	588,000	431,514
1984-85	125,023	133,670	1,137,175	0	630,000	523,184
1985-86	127,215	141,315	1,278,490	0	672,000	622,499
1986-87	119,848	127,638	1,406,128	0	714,000	708,137
1987-88	124,104	136,308	1,542,436	0	756,000	802,445
1988-89	119,572	131,230	1,673,666	0	798,000	891,675
1989-90	119,149	127,986	1,801,652	0	840,000	977,661
1990-91	111,515	128,379	1,930,031	0	882,000	1,064,040
1991-92	106,948	124,862	2,054,893	0	924,000	1,146,902
1992-93	128,067	163,499	2,218,392	0	966,000	1,268,401
1993-94	111,186	119,432	2,337,824	0	1,008,000	1,345,833
1994-95	123,468	152,792	2,490,616	1,762	1,050,000	1,458,387
1995-96	131,861	152,299	2,642,915	0	1,092,000	1,568,686
1996-97	136,676	157,861	2,800,776	0	1,134,000	1,684,547
1997-98[3]	155,711	195,677	2,996,453	0	1,176,000	1,838,224
1998-99	158,637	174,369	3,170,822	0	1,218,000	1,970,593
1999-00	148,269	169,644	3,340,466	0	1,260,000	2,098,237
2000-01	153,914	176,360	3,516,826	0	1,302,000	2,232,597
2001-02	145,981	159,728	3,676,554	0	1,344,000	2,350,325
2002-03	146,113	174,970	3,851,524	887	1,386,000	2,484,182
2003-04[4]	143,510	167,190	4,018,714	247	1,428,000	2,609,619
2004-05	154,307	199,570	4,218,284	2,366	1,470,000	2,769,555
2005-06	147,736	170,266	4,388,550	3,562	1,512,000	2,901,383
2006-07	129,830	140,216	4,528,766	5,531	1,554,000	3,005,130
2007-08	116,483	136,382	4,665,148	4,165	1,596,000	3,103,677
2008-09	102,711	117,519	4,782,667	2,189	1,638,000	3,181,385
2009-10	103,099	125,179	4,907,846	1,489	1,680,000	3,266,053
2010-11[4]	102,031	117,166	5,025,012	1,193	1,722,000	3,342,412
2011-12	93,068	101,056	5,126,068	365	1,764,000	3,401,833
2012-13	81,452	86,814	5,212,882	243	1,806,000	3,446,890
2013-14	63,536	69,784	5,282,666	0	1,848,000	3,474,674

TABLE 7 (Continued)

(1) Other Credits (Debits) are comprised of San Jacinto Watershed outflow which is the sum of discharge from Lake Elsinore and wastewater discharged by EMWD.

(2) Cumulative Credit includes 40,008 acre-feet of San Jacinto Watershed outflow.

(3) The Base Flow and Adjusted Base Flow for Water Year 1997-98 were returned to their originally published values to correct an error in the adjustment to account for San Jacinto Watershed flow arriving at Prado. This correction is also reflected in the Cumulative Credit for this and subsequent years.

(4) A correction was made for Water Years 2003-04 and 2010-11 in the calculation of Weighted TDS based on an adjustment to account for OC-59 water that arrived at Prado. This correction is reflected in the Weighted TDS and Adjusted Base Flow for these years. This correction is also reflected in the Cumulative Credit for these and subsequent years.

CHAPTER III

BASE FLOW AT RIVERSIDE NARROWS

This chapter deals with determinations of 1) the components of flow at Riverside Narrows, which include Storm Flow and Base Flow and 2) the Adjusted Base Flow at Riverside Narrows credited to SBVMWD.

Flow at Riverside Narrows

The flow of the River at Riverside Narrows was to 42,766 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 32,313 acre-feet and Storm Flow was 12,683 acre-feet. Included in Base Flow is 2,230 acre-feet of treated wastewater from Rubidoux Community Services District that now bypasses the USGS gaging station. The Storm and Base Flow components of the flow of the River at Riverside Narrows for each month in the Water Year 2013-14 are listed in Table 8 and shown graphically on Plate 7. The components of flow of the River at Riverside Narrows during the period 1934-35 through 2013-14 are presented on Plate 8.

Nontributary Flow

Nontributary Flow includes water that originated outside the watershed, as well as other water that the Watermaster has determined should be excluded from Base Flow. During Water Year 2013-14 no nontributary flow was delivered to the River upstream of Riverside Narrows and Prado Dam.

High Groundwater Mitigation Project

No High Groundwater Mitigation Project water was discharged to the River during Water Year 2013-14.

WMWD-OCWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Colton and Riverside Basins to OCWD via the Riverside Canal and the River. During Water Year 2013-14, no WMWD-OCWD Transfer Program water was delivered to the River.

TABLE 8

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
WATER YEAR 2013-14
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	SBVMWD HGMP Water (1)	WMWD Transfer Program (2)	Rubidoux Waste-water	Base Flow (3)
2013	October	2,901	294	0	0	193	2,800
	November	6,916	3,694	0	0	182	3,404
	December	2,834	236	0	0	187	2,785
2014	January	2,275	0	0	0	184	2,459
	February	5,748	3,250	0	0	166	2,664
	March	5,189	1,720	0	0	185	3,654
	April	3,542	770	0	0	184	2,956
	May	2,612	24	0	0	184	2,772
	June	1,916	0	0	0	185	2,101
	July	1,843	0	0	0	193	2,036
	August	3,933	1,656	0	0	195	2,472
	September	3,057	1,039	0	0	192	2,210
Total		42,766	12,683	0	0	2,230	32,313

(1) HGMP water pumped from the Bunker Hill groundwater basin and discharged into the Santa Ana River less 1% for evapotranspiration above Riverside Narrows.

(2) WMWD-OCWD Transfer Program water pumped from the Bunker Hill, Riverside, and Colton basins and discharged to the Santa Ana River above the Riverside Narrows.

(3) Base Flow equals USGS measured flow, minus storm flow, minus HGMP, and minus WMWD-OCWD Transfer water, plus Rubidoux Wastewater.

Base Flow

Based on the hydrograph shown on Plate 7 a separation was made between Storm Flow and the sum of Base Flow and Nontributary Flow utilizing in general the procedures reflected in the Work Papers of the engineers (as referenced in Paragraph 2 of the Engineering Appendix of the Judgment).

In April 1980, Rubidoux Community Services District made the first delivery of treated wastewater to the regional treatment plant at Riverside. Prior to that time, Rubidoux had discharged to the River upstream of the Riverside Narrows gaging station. Treated wastewater from Rubidoux during Water Year 2013-14, in the amount of 2,230 acre-feet, has been added to the Base Flow as measured at the gaging station. A summary of Rubidoux discharges is contained in Appendix I.

Water Quality Adjustments

The determination of water quality at the Riverside Narrows Gaging Station was made using periodic grab samples taken and analyzed for TDS by the USGS and the City of Riverside. A summary of TDS and EC data of the River at Riverside Narrows is contained in Appendix J.

In October 2013, the City of Riverside changed the TDS and EC location for sampling. The new sampling location is further upstream and is not representative of stream flow at the Riverside Narrows. Therefore, no samples from the City of Riverside are used in the water quality adjustments after October 24, 2013.

Water quality data based on samples taken during storm flow periods were not used in the calculations. During the month of August 2014, both USGS samples were taken near storm events. The sample taken on August 20, 2014 was used for the monthly water quality calculation. This was the first day of the storm cycle and the sample was taken before the storm flow reached the sampling location; therefore, water quality was not impacted by the event.

Adjustment for High Groundwater Mitigation Project Discharge

During Water Year 2013-14, there was no discharge of High Groundwater Mitigation Project water. Therefore, no water quality adjustment was required.

Adjustment for WMWD-OCWD Transfer Program Flows

During Water Year 2013-14, no WMWD-OCWD Transfer Program water was delivered to the River. Therefore, no water quality adjustment was required.

Adjustment for Treated Wastewater Discharges from the Rubidoux Community Services District

The flow-weighted quality of treated wastewater from Rubidoux was 767 mg/L. A monthly summary of discharges and quality is contained in Appendix I.

The Base Flow quality adjustments resulting from exclusion of the Nontributary Flow and inclusion of the Rubidoux treated wastewater are shown in the following table, and resulted in a Base Flow TDS of 646 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS
1. Base Flow plus Nontributary Flow	30,083	637	19,162,871
2. Less Nontributary Flow HGMP Pumped Water	0	---	---
3. Less WMWD Transfer Flow	0	---	---
4. Plus Rubidoux Treated Wastewater	2,230	767	1,710,410
5. Base Flow (line 1 less lines 2 and 3 plus line 4)	32,313		20,873,281
Average TDS of Base Flow	20,873,281 ÷ 32,313 = 646 mg/L		

Adjusted Base Flow at Riverside Narrows

The Judgment provides that the amount of Base Flow at Riverside Narrows credited during any year shall be subject to adjustment based on weighted average annual TDS in the Base Flow as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 700 mg/L	$Q - \frac{11}{15,250} Q(TDS-700)$
600 mg/L to 700 mg/L	Q
Less than 600 mg/L	$Q + \frac{11}{15,250} Q(600-TDS)$

Where: Q = Base Flow actually received.

From the previous subsection, the weighted average annual TDS in the Base Flow at Riverside Narrows for Water Year 2013-14 was 646 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for Water Year 2013-14 is 32,313 acre-feet.

Entitlement and Credit or Debit

Paragraph 5(b) of the Judgment states that "SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre-feet at Riverside Narrows. SBVMWD each year shall be responsible for not less than 13,420 acre-feet of Base Flow plus one-third of any cumulative debit, provided, however, that for any year commencing on or after October 1, 1986, when there is no cumulative debit, or for any year prior to 1986 whenever the cumulative credit exceeds 10,000 acre-feet, said minimum shall be 12,420 acre-feet."

The findings of the Watermaster concerning flow at Riverside Narrows for Water Year 2013-14 required under the Judgment are as follows:

1.	Base Flow at Riverside Narrows	32,313 acre-feet
2.	Annual Weighted TDS of Base Flow	646 mg/L
3.	Annual Adjusted Base Flow	32,313 acre-feet
4.	Cumulative Adjusted Base Flow	1,958,244 acre-feet
5.	Cumulative Entitlement of IEUA and WMWD	671,000 acre-feet
6.	Cumulative Credit	1,287,244 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2013-14	12,420 acre-feet

CHAPTER IV

HISTORY AND SUMMARY OF THE JUDGMENT in the case of Orange County Water District v. City of Chino, et al. (Case No. 117628-County of Orange)

History of Litigation

The complaint in the case was filed by Orange County Water District on October 18, 1963, seeking an adjudication of water rights against substantially all water users in the area tributary to Prado Dam within the Santa Ana River Watershed, but excluding the area tributary to Lake Elsinore. Thirteen cross-complaints were filed in 1968, extending the adjudication to include substantially all water users in the area downstream from Prado Dam. With some 4,000 parties involved in the case (2,500 from the Upper Area and 1,500 from the Lower Area), it became obvious that every effort should be made to arrive at a settlement and physical solution in order to avoid enormous and unwieldy litigation.

Efforts to arrive at a settlement and physical solution were pursued by public officials, individuals, attorneys, and engineers. Attorneys for the parties organized in order to facilitate settlement discussions and, among other things, provided guidance for the formation and activities of an engineering committee to provide information on the physical facts.

An initial meeting of the engineers representing the parties was held on January 10, 1964. Agreement was reached that it would be beneficial to undertake jointly the compilation of basic data. Liaison was established with the Department of Water Resources, State of California, to expedite the acquisition of data. Engineers representing the parties were divided into subcommittees which were given the responsibility of investigating such things as the boundary of the Santa Ana River Watershed and its subareas, standardization of the terminology, the location and description of wells and diversion facilities, waste disposal and transfer of water between subareas.

In response to a request from the attorneys' committee at a meeting held April 17, 1964, on April 30, 1964, the joint engineering committee prepared a list of preliminary engineering studies directed toward settlement of the Santa Ana River water rights litigation. Special assignments were made to individual engineers on selected items requested by the attorneys' committee.

The attorneys and engineers for the defendants then commenced a series of meetings separate from the representatives of the plaintiffs in order to consolidate their positions and to determine a course of action. On October 7, 1964, engineers for the defendants presented the results of the studies made by the joint engineering committee. The defendants' attorneys requested that additional information be provided on the methods of measuring flow at Prado Dam, the historical supply and disposal of water passing Prado Dam, segregation of flow into components, and determination of the amount of supply which was usable by the downstream area. On December 11, 1964, the supplemental information was presented to the defendants' attorneys.

During 1965, engineers and attorneys for the defendants held numerous conferences and conducted additional studies in an attempt to determine their respective positions in the case. Early in 1966, the plaintiff and defendants exchanged drafts of possible principles for settlement. Commencing March 22 and ending April 13, 1966, four meetings were held by the engineers to discuss the draft of principles for settlement.

On February 25, 1968, the defendants submitted a request to the Court that the Order of Reference be issued requesting the California Department of Water Resources to determine the physical facts. On May 9, 1968, the plaintiffs' attorney submitted motions opposing the Order of Reference and requested that a preliminary injunction be issued. In the meantime, every effort was being made to come to an agreement on the Judgment. Commencing on February 28, 1968 and extending until May 14, 1968, six meetings were held to determine the scope of physical facts on which agreement could be reached so that if an Order of Reference were to be approved by the Court, the work under the proposed reference would not repeat the extensive basic data collection and compilation which had already been completed and on which engineers for both plaintiffs and defendants had reached substantial agreement. Such basic data were compiled and published in two volumes under date of May 14, 1968 entitled "Appendix A, Basic Data."

On May 21, 1968, an outline of a proposal for settlement of the case was prepared and a committee of attorneys and engineers for the parties commenced preparation of the settlement documents. On June 16, 1968, the Court held a hearing on the motions it had received requesting a preliminary injunction and an Order of Reference. The parties requested that the Court delay the preliminary hearings on these motions in view of the efforts toward settlement that were underway. The plaintiff, however, was concerned regarding the necessity of bringing the case to trial within the statutory limitation and, accordingly, on July 15, 1968, submitted a motion to set the complaint in the case for trial. On October 15, 1968, the trial was commenced and was adjourned after one-half day of testimony on behalf of the plaintiff. Thereafter, the parties filed with the Court the necessary Settlement Documents including a Stipulation for Judgment. The Court entered the Judgment on April 17, 1969, along with Stipulations and Orders dismissing all defendants and cross-defendants except for the four major public water districts overlying, in aggregate, substantially all of the major areas of water use in the watershed. The districts, the locations of which are shown on Plate 1, "Santa Ana River Watershed", are as follows:

(1) Orange County Water District (OCWD), representing all lower basin entities located within Orange County downstream of Prado Dam.

(2) Western Municipal Water District (WMWD), representing middle basin entities located within Riverside County on both sides of the Santa Ana River primarily upstream from Prado Dam.

(3) Inland Empire Utilities Agency (IEUA), formerly Chino Basin Municipal Water District (CBMWD), located in the San Bernardino County Chino Basin area, representing middle basin entities within its boundaries and located primarily upstream from Prado Dam.

(4) San Bernardino Valley Municipal Water District (SBVMWD), representing all entities within its boundaries, and embraced within the upper portion of the Riverside Basin area, the Colton Basin area (being an upstream portion of the middle basin) and the San Bernardino Basin area, being essentially the upper basin.

Summary of Judgment

Declaration of Rights. The Judgment sets forth a declaration of rights. Briefly stated, the Judgment provides that the water users in the Lower Area have rights, as against the water users in the Upper Area, to receive certain average and minimum annual amounts of non-storm flow ("Base Flow") at Prado Dam, together with the right to all storm flow reaching Prado Dam. The amount of the Lower Area entitlement is variable based on the quality of the water received by the Lower Area. Water users in the Upper Area have the right as against the water users in the Lower Area to divert, pump, extract, conserve, store and use all surface and groundwater supplies originating within the Upper Area, so long as the Lower Area receives the water to which it is entitled under the Judgment and there is compliance with all of its provisions.

Physical Solution. The Judgment also sets forth a comprehensive "physical solution" for satisfying the rights of the Lower Area. To understand the physical solution it is necessary to understand the following terms that are used in the Judgment:

Storm Flow – That portion of the total flow which originates from precipitation and runoff and which passes a point of measurement (either Riverside Narrows or Prado Dam) without having first percolated to groundwater storage in the zone of saturation, calculated in accordance with procedures referred to in the Judgment.

Base Flow - That portion of the total surface flow passing a point of measurement (either Riverside Narrows or Prado Dam) which remains after deduction of storm flow, nontributary flows, exchange water purchased by OCWD, and certain other flows as determined by the Watermaster.

Adjusted Base Flow - Actual Base Flow in each year adjusted for water quality pursuant to formulas specified in the Judgment. The adjustment of Base Flow for water quality is intended to provide an incentive to the Upper Area to maintain a better quality of water in the River. When the TDS is lower than a specified value at one of the measuring points, the water quantity obligation is lower. When the TDS is higher than a specified value, the water quantity obligation is higher. This is the first comprehensive adjudication in Southern California in which the quality of water is taken into consideration in the quantification of water rights.

Credits and Debits - Under the accounting procedures provided for in the Judgment, credits accrue to SBVMWD in any year when the Adjusted Base Flow exceeds 15,250 acre-feet at Riverside Narrows and jointly to IEUA and WMWD when the Adjusted Base Flow exceeds 42,000 acre-feet at Prado Dam. Debits accrue in any

year when the Adjusted Base Flows falls below those levels. Credits or debits accumulate year to year.

Obligation at Riverside Narrows. SBVMWD has an obligation to assure an average annual Adjusted Base Flow of 15,250 acre-feet at Riverside Narrows, subject to the following:

(1) A minimum Base Flow of 13,420 acre-feet plus one-third of any cumulative debit.

(2) After October 1, 1986, if no cumulative debit exists, the minimum Base Flow shall be 12,420 acre-feet.

(3) Prior to 1986, if the cumulative credits exceed 10,000 acre-feet, the minimum Base Flow shall be 12,420 acre-feet.

(4) All cumulative debits shall be removed by the discharge of a sufficient Base Flow at Riverside Narrows at least once in any ten consecutive years following October 1, 1976. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits or until otherwise disposed of by SBVMWD.

(5) The Base Flow at Riverside Narrows shall be adjusted using weighted average annual TDS in such Base Flow in accordance with the formula set forth in the Judgment.

Obligation at Prado Dam. IEUA and WMWD have a joint obligation to assure an average annual Adjusted Base Flow of 42,000 acre-feet at Prado Dam, subject to the following:

(1) Minimum Base Flow at Prado shall not be less than 37,000 acre-feet plus one-third of any cumulative debit.

(2) After October 1, 1986, if no cumulative debit exists, the minimum Base Flow quantity shall be 34,000 acre-feet.

(3) Prior to 1986, if the cumulative credit exceeds 30,000 acre-feet, the minimum Base Flow shall be 34,000 acre-feet.

(4) Sufficient quantities of Base Flow shall be provided at Prado to discharge completely any cumulative debits at least once in any ten consecutive years following October 1, 1976. Any cumulative credits shall remain on the books of account until used to offset any debits, or until otherwise disposed of by IEUA and WMWD.

(5) The Base Flow at Prado during any year shall be adjusted using the weighted average annual TDS in the total flow at Prado (Base Flow plus Storm Flow) in accordance with the formula set forth in the Judgment.

Other Provisions. SBVMWD, IEUA and WMWD are enjoined from exporting water from the Lower Area to the Upper Area, directly or indirectly. OCWD is enjoined from exporting or "directly or indirectly causing water to flow" from the Upper Area to the Lower Area. Any inter-basin acquisition of water rights will have no effect on Lower Area entitlements. OCWD is prohibited from enforcing two prior judgments so long as the Upper Area Districts are in compliance with the physical solution. The composition of the Watermaster and the nomination and appointment process for members are described along with a definition of the Watermaster's duties and a formula for sharing its costs. The court retains continuing jurisdiction over the case. There are provisions for appointment of successor parties and rules for dealing with future actions that might conflict with the physical solution.

History of the Watermaster Committee Membership

The Santa Ana River Watermaster is a committee composed of five members nominated by the parties and appointed by the court. SBVMWD, IEUA (formerly CBMWD), and WMWD nominate one member each and OCWD nominates two. The Watermaster members annually elect a Chairman, Secretary, and Treasurer.

The original five members were appointed at the time of entry of the Judgment. They prepared a *pro forma* annual report for the 1969-70 Water Year. The first annual report required by the Judgment was prepared for the 1970-71 Water Year and reports have been prepared annually since then.

The membership of the Watermaster has changed over the years. The historical listing of members and officers shown in Table 9 reflects the signatories to each annual report.

TABLE 9
HISTORY OF THE WATERMASTER COMMITTEE MEMBERSHIP

Water Year	SBVMWD	IEUA	WMWD	OCWD	OCWD
1969-70	Clinton O. Henning	William J. Carroll	Albert A. Webb, Secretary	Max Bookman, Chairman	John M. Toups
1970-71 through 1973-74	James C. Hanson	William J. Carroll	Albert A. Webb, Secretary	Max Bookman, Chairman	John M. Toups
1974-75 through 1977-78	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman, Chairman	John M. Toups, Secretary
1978-79 through 1981-82	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman, Chairman	William R. Mills, Jr., Secretary
1982-83 through 1983-84	James C. Hanson	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr., Secretary
1984-85 through 1988-89	Robert L. Reiter	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr., Secretary
1989-90 through 1994-95	Robert L. Reiter, Secretary/Treasurer	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr.
1995-96	Robert L. Reiter, Secretary/Treasurer	William J. Carroll, Chairman	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr.
1996-97	Robert L. Reiter, Secretary/Treasurer	William J. Carroll	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
1997-98	Robert L. Reiter, Secretary/Treasurer	Robb D. Quincey	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
1998-99 through 2000-01	Robert L. Reiter, Secretary/Treasurer	Richard W. Atwater	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
2001-02 through 2002-03	Robert L. Reiter, Secretary/Treasurer	Richard W. Atwater	Donald L. Harriger, Chairman	Bill B. Dendy	Virginia L. Grebbien
2003-04 through 2005-06	Robert L. Reiter, Chairman/Treasurer	Richard W. Atwater	John V. Rossi	Bill B. Dendy, Secretary	Virginia L. Grebbien
2006-07 through 2007-08	Samuel H. Fuller, Secretary/Treasurer	Richard W. Atwater	John V. Rossi	Bill B. Dendy, Chairman	Craig D. Miller
2008-09	Samuel H. Fuller, Secretary/Treasurer	Richard W. Atwater	John V. Rossi	Robert C. Wagner	Craig D. Miller, Chairman
2009-10	Samuel H. Fuller, Secretary/Treasurer	Thomas A. Love	John V. Rossi, Chairman	Michael R. Markus	Roy L. Herndon
2010-11	Samuel H. Fuller, Secretary/Treasurer	Thomas A. Love, Chairman	John V. Rossi	Michael R. Markus	Roy L. Herndon

TABLE 9 (Continued)
HISTORY OF THE WATERMASTER COMMITTEE MEMBERSHIP

Water Year	SBVMWD	IEUA	WMWD	OCWD	OCWD
2011-12	Samuel H. Fuller, Secretary/Treasurer	Thomas A. Love	John V. Rossi	Michael R. Markus	Roy L. Herndon, Chairman
2012-13 through 2013-14	Douglas D. Headrick Secretary/Treasurer	P. Joseph Grindstaff	John V. Rossi	Michael R. Markus	Roy L. Herndon, Chairman

Santa Ana River Watershed

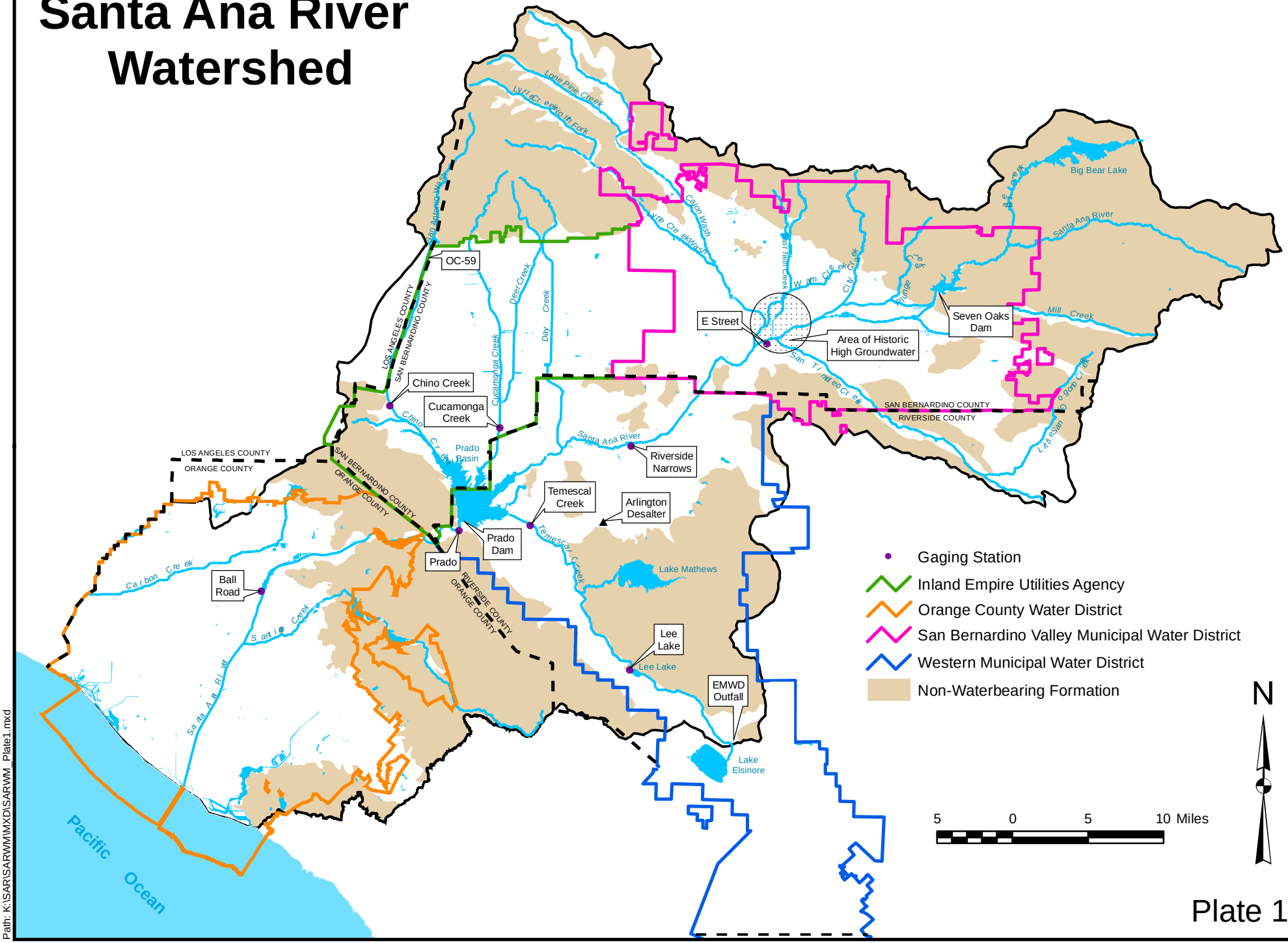

Plate 1

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Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

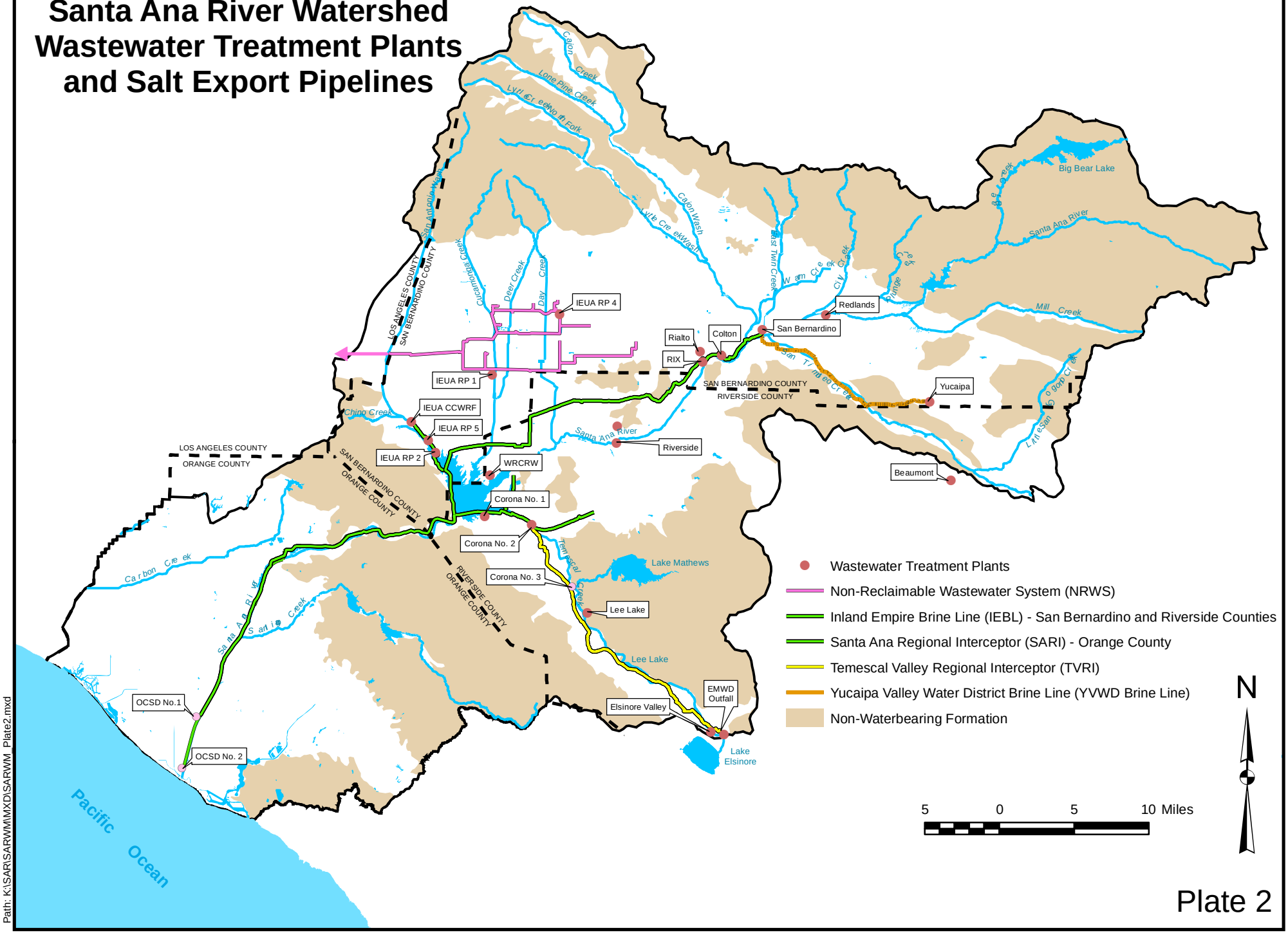

Plate 2

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PRECIPITATION AT SAN BERNARDINO STARTING WITH 1934-35

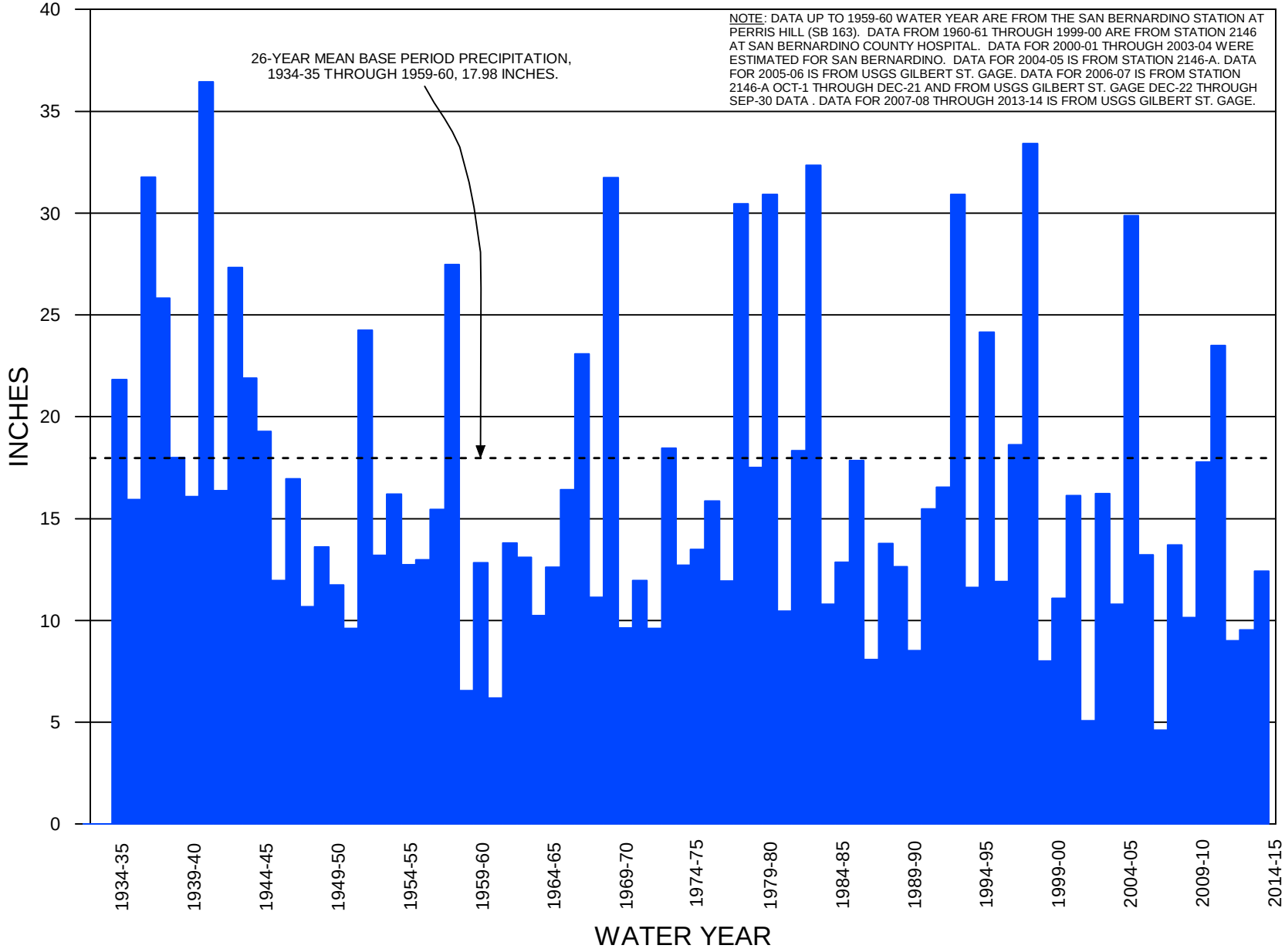


PLATE 3

DISCHARGE OF SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2013-14

Plate 4

DISCHARGE OF SANTA ANA RIVER AT PRADO STARTING WITH 1934-35

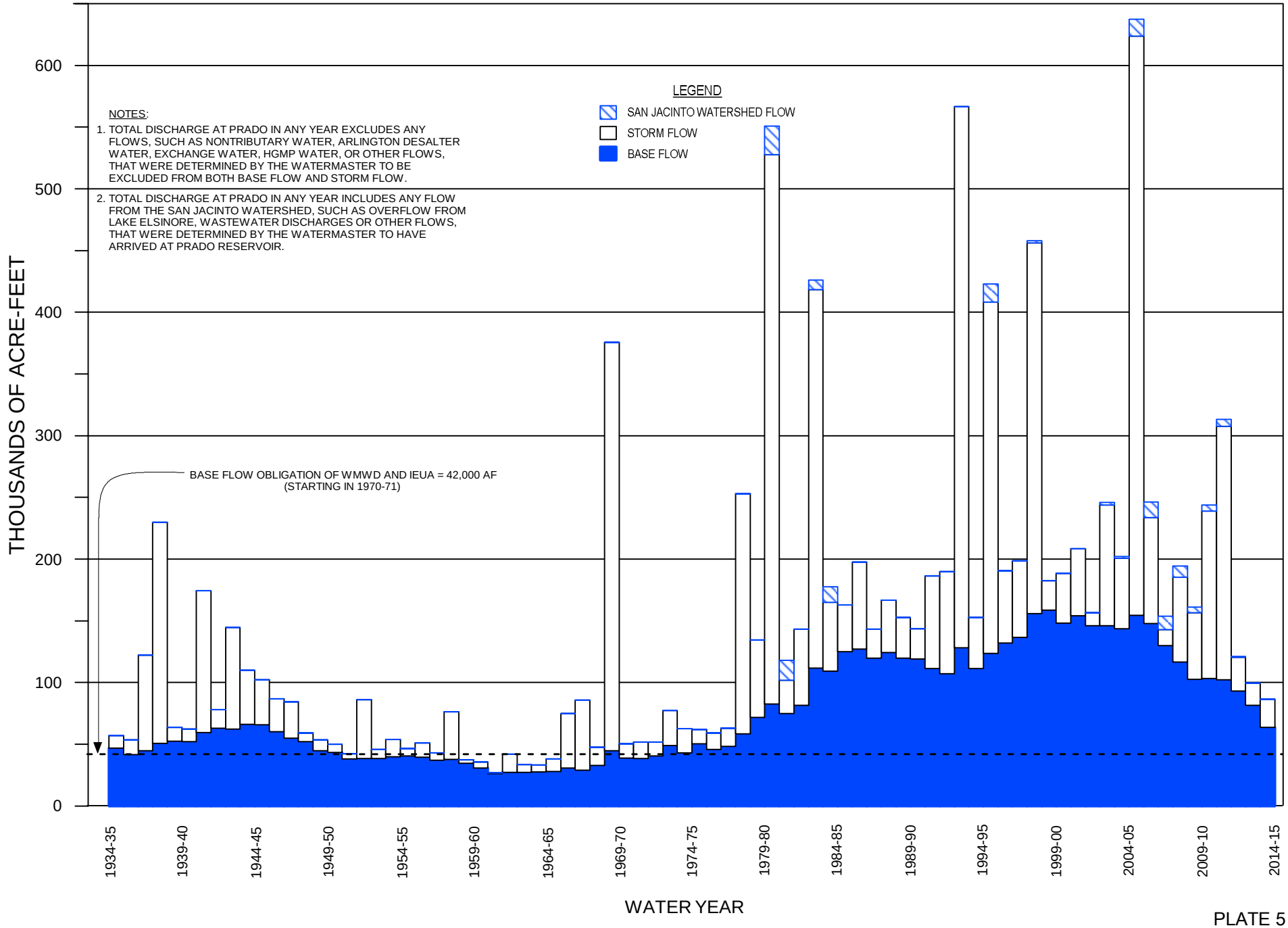
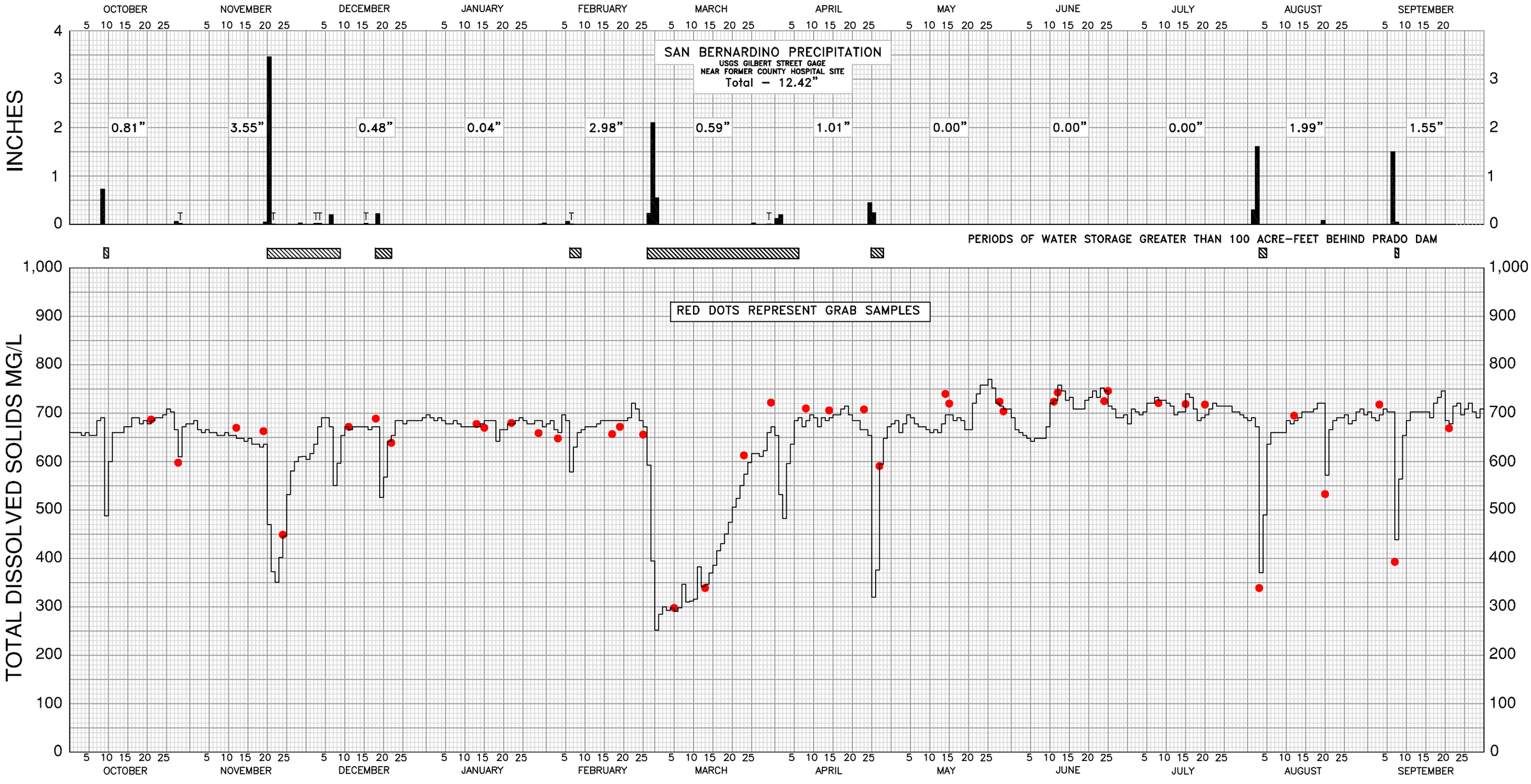
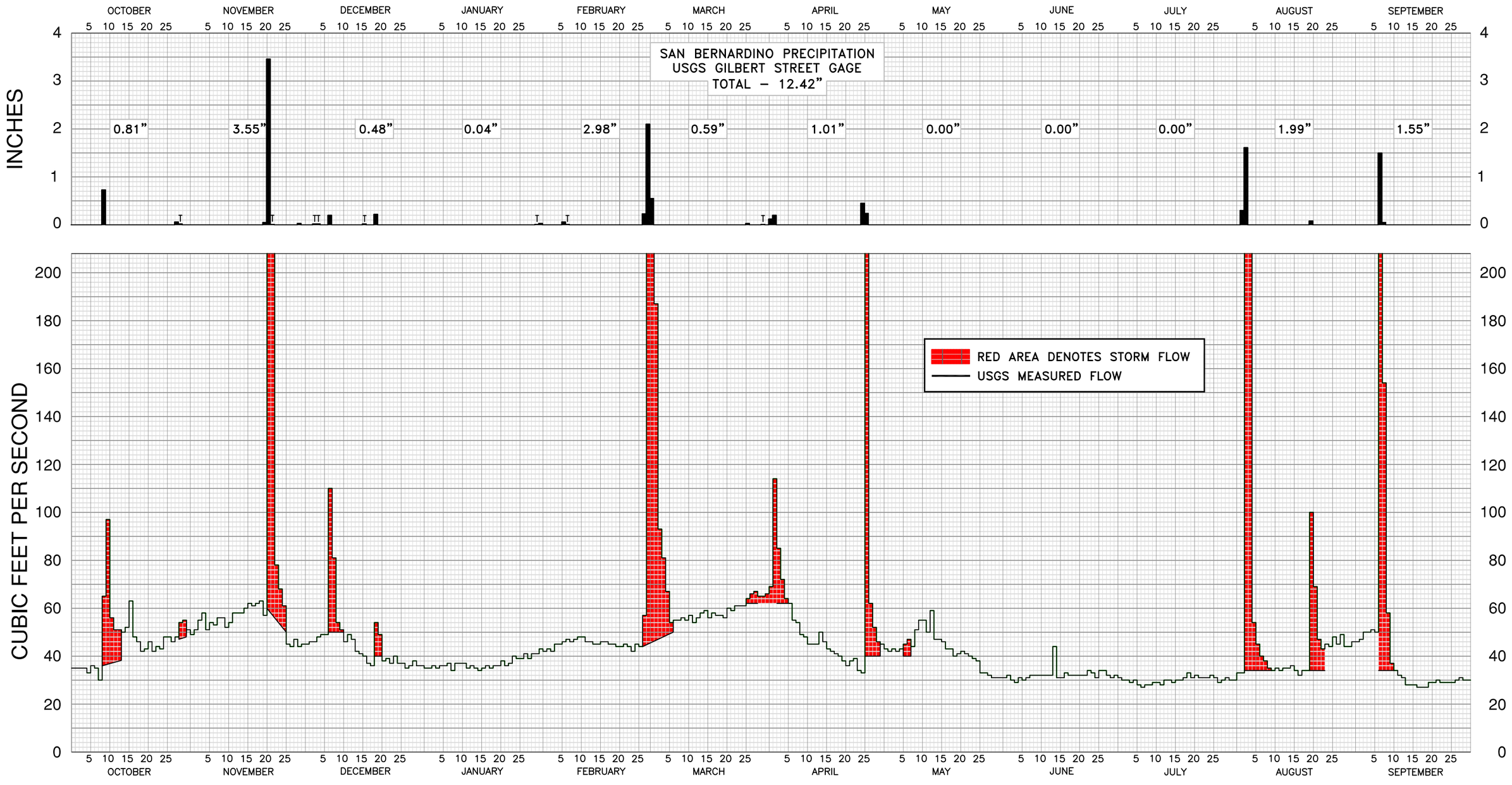


PLATE 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2013-14

Plate 6



DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2013-14

Plate 7

DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS STARTING WITH 1934-35

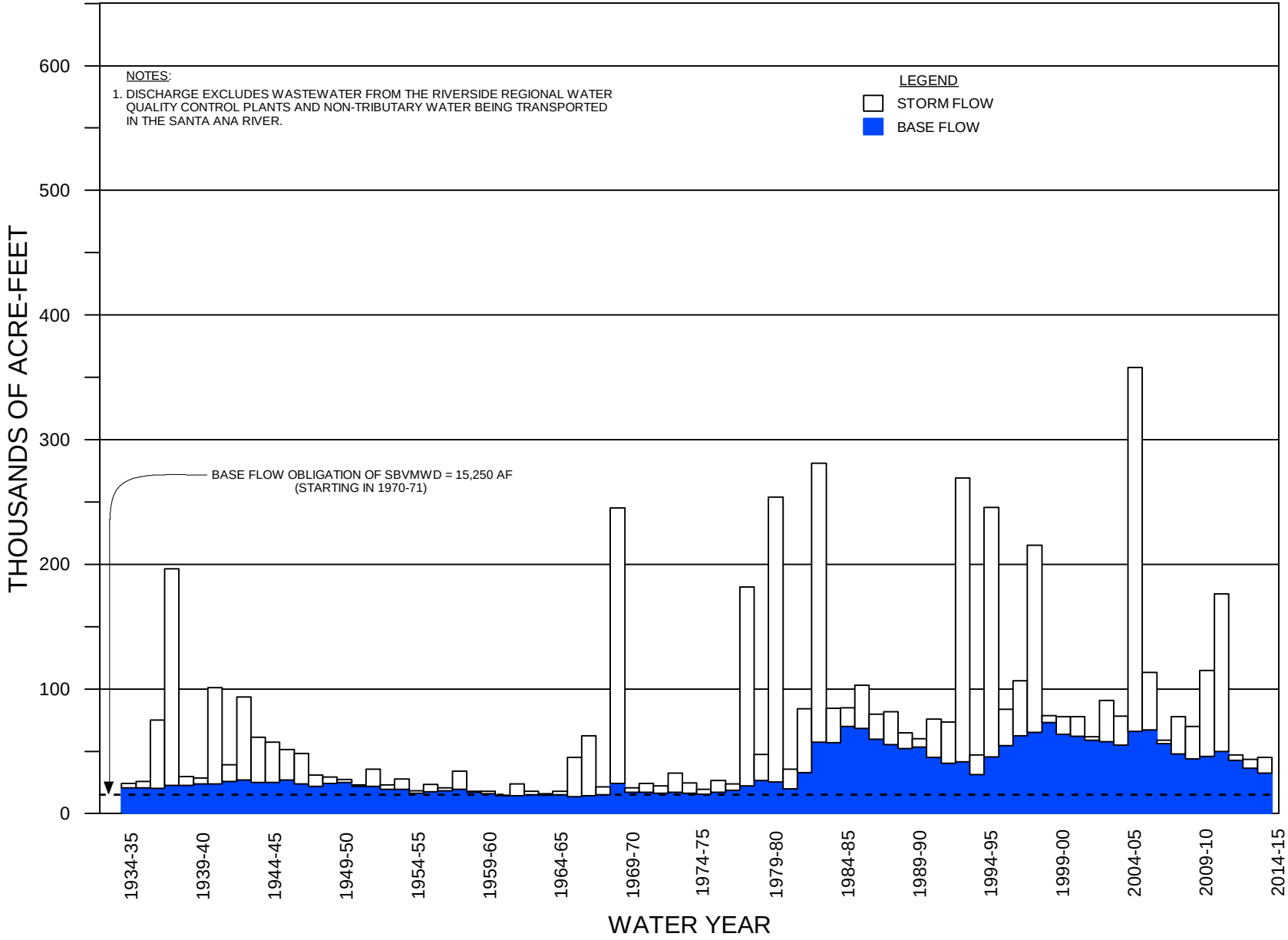


PLATE 8

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO et al.

CASE NO. 117628 - COUNTY OF ORANGE

BASIC DATA

FOR THE

FORTY- FOURTH ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2013 - SEPTEMBER 30, 2014

April 30, 2015

APPENDIX A

USGS FLOW MEASUREMENTS OF THE SANTA ANA RIVER FLOWS BELOW PRADO, AT MWD CROSSING, AND WATER QUALITY RECORDS FOR THE SANTA ANA RIVER AT PRADO DAM AND AT MWD CROSSING; USGS FLOW MEASUREMENTS AT E STREET, OF TEMESCAL CREEK ABOVE MAIN STREET (AT CORONA), TEMESCAL CREEK AT CORONA LAKE “LEE LAKE” (NEAR CORONA), CUCAMONGA CREEK (NEAR MIRA LOMA), CHINO CREEK AT SCHAEFER AVENUE (NEAR CHINO),LYTLE CREEK, WARM CREEK, AND SAN TIMOTEO CREEK NEAR LOMA LINDA

WATER YEAR 2013-14

USGS Water-Year Summary 2014

11074000 Santa Ana River below Prado Dam, CA

LOCATION - Lat 33°53'00", long 117°38'40" referenced to North American Datum of 1927, Riverside County, CA, Hydrologic Unit 18070203, in La Sierra Grant, on left bank of outlet channel, 2,500 ft downstream from axis of Prado Dam, and 4.5 mi west of Corona.

DRAINAGE AREA - 2,258 mi² of which 768 mi² probably is noncontributing, above Lake Elsinore.

SURFACE-WATER RECORDS

PERIOD OF RECORD - May 1930 to November 1939 (irrigation seasons only), March 1940 to current year. Published as "at Santa Fe Railroad Bridge, near Prado" May 1930 to November 1931, as "at Atchison, Topeka, and Santa Fe Railroad Bridge, near Prado" May 1932 to November 1939, and as "below Prado Dam, near Prado" March 1940 to September 1950.

GAGE - Water-stage recorder and concrete control August 1944 through Apr. 25, 2005, and since Nov. 14, 2005. Datum of gage is approximately 449 ft above NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to Mar. 18, 1940, at about same site at various datums. From Apr. 26, 2005, to Nov. 13, 2005, gage was located on right bank of a temporary bypass (diversion) channel, in use during the construction of an improved outlet channel from Prado Dam. Temporary gage was at a different datum. From Nov. 14, 2005 to Oct. 7, 2008, gage was located on right bank of reconstructed outlet channel. Since Oct. 7, 2008, gage is located on left bank of channel.

REMARKS - Records fair. Flow regulated since 1940 by Prado Flood-Control Reservoir, capacity, 196,200 acre-ft. Natural streamflow affected by extensive ground-water withdrawals, diversion for irrigation, discharges of treated effluent, and return flow from irrigated areas. Releases of imported water are made to the basin by the California Water Project at times in some years, via San Antonio Creek from Rialto Pipeline below San Antonio Dam. During the current year, no California Water Project releases were made. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES OUTSIDE PERIOD OF RECORD - Flood of Mar. 2, 1938, reached a discharge of 100,000 ft³/s, on basis of slope-area measurement of peak flow at site 2.5 mi downstream.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 13,200 ft³/s, Jan. 15, 2005, gage height, 8.73 ft, site and datum then in use, from rating curve extended above 11,600 ft³/s; minimum daily, 2.4 ft³/s, July 29 to Aug. 3, Sept. 20, 1978 (result of gate closure).

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=002_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11074000&agency_cd=USGS

Water-Data Report 2014

11074000 Santa Ana River below Prado Dam, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	61	106	210	80	123	194	168	84	72	63	58	54
2	63	103	205	88	128	346	184	82	70	57	61	56
3	67	106	200	87	149	399	191	84	68	53	91	58
4	61	108	192	92	140	394	186	77	67	57	211	60
5	54	105	181	93	122	392	178	81	67	53	198	58
6	62	113	167	96	129	392	169	84	62	46	157	57
7	66	99	159	92	149	386	210	71	60	46	102	58
8	67	102	177	94	151	375	129	72	60	43	81	138
9	74	95	175	98	148	372	108	70	61	45	75	171
10	185	96	232	91	202	383	104	75	59	46	71	98
11	181	99	137	97	157	392	106	77	61	48	68	74
12	99	104	127	100	132	386	110	72	57	49	63	68
13	85	101	122	99	125	383	111	70	58	51	59	67
14	95	100	121	97	118	378	121	66	58	55	62	65
15	79	97	123	95	126	373	116	63	64	56	57	63
16	79	100	119	111	118	367	117	59	63	58	53	58
17	64	105	122	109	115	361	109	57	58	59	50	63
18	66	106	121	114	117	364	103	59	60	61	53	47
19	75	110	99	127	114	360	100	62	61	59	51	48
20	80	113	133	125	108	360	106	60	60	61	52	51
21	84	153	141	124	104	354	106	58	59	60	115	56
22	79	208	141	124	99	350	94	56	56	56	77	62
23	81	227	222	121	102	344	98	64	62	55	73	54
24	85	228	131	112	111	339	97	59	55	57	74	55
25	86	227	96	107	124	331	98	60	60	58	70	60
26	86	225	93	119	118	324	285	59	58	57	65	59
27	89	222	90	121	129	317	280	73	62	61	66	64
28	116	219	90	125	169	306	250	75	64	59	64	74
29	132	216	93	117		295	192	80	66	56	63	75
30	108	214	95	122		278	103	80	69	56	57	72
31	112		73	135		216		71		57	55	
Total	2,721	4,207	4,387	3,312	3,627	10,810	4,329	2,160	1,857	1,698	2,452	2,043
Mean	87.8	140	142	107	130	349	144	69.7	61.9	54.8	79.1	68.1
Max	185	228	232	135	202	399	285	84.0	72.0	63.0	211	171
Min	54.0	95.0	73.0	80.0	99.0	194	94.0	56.0	55.0	43.0	50.0	47.0
Ac-ft	5,397	8,344	8,701	6,569	7,194	21,440	8,586	4,284	3,683	3,368	4,863	4,052

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	130	151	238	387	438	396	262	189	154	126	108	102
Max	910	322	1,300	3,543	2,733	2,556	1,101	915	736	446	403	372
(WY)	(2005)	(1997)	(2011)	(1993)	(1998)	(1980)	(1980)	(1998)	(1983)	(1998)	(2005)	(1997)
Min	22.4	33.5	39.5	49.2	49.8	54.3	43.3	35.2	29.0	17.7	14.8	16.2
(WY)	(1962)	(1963)	(1963)	(1963)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)	(1960)	(1960)

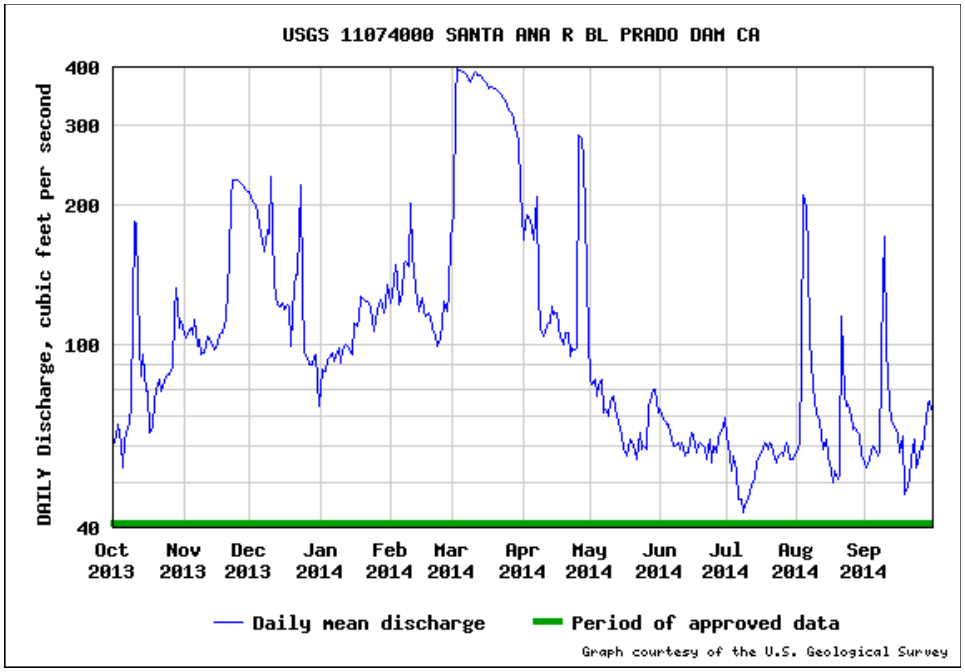
Water-Data Report 2014

11074000 Santa Ana River below Prado Dam, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1941 - 2014	
Annual total	43,600			
Annual mean	119.5		222.3	
Highest annual mean			882.1	2005
Lowest annual mean			36.4	1961
Highest daily mean	399.0	Mar 03	11,400	Jan 16, 2005
Lowest daily mean	43.0	Jul 08	2.40	Jul 29, 1978
Annual 7-day minimum	46.1	Jul 06	3.0	Sep 24, 1973
Maximum peak flow			13,200[a]	Jan 15, 2005
Maximum peak stage			8.73	Jan 15, 2005
Annual runoff (cfsm)	0.053		0.098	
Annual runoff (inches)	0.718		1.34	
10 percent exceeds	225.8		383.0	
50 percent exceeds	95.0		138.0	
90 percent exceeds	57.0		42.0	

[a] Discharge affected by Regulation or Diversion



USGS Water-Year Summary 2014

11074000 Santa Ana River below Prado Dam, CA

LOCATION - Lat 33°53'00", long 117°38'40" referenced to North American Datum of 1927, Riverside County, CA, Hydrologic Unit 18070203, in La Sierra Grant, on left bank of outlet channel, 2,500 ft downstream from axis of Prado Dam, and 4.5 mi west of Corona.

DRAINAGE AREA - 2,258 mi² of which 768 mi² probably is noncontributing, above Lake Elsinore.

WATER-QUALITY RECORDS

PERIOD OF RECORD - Water years 1967 to current year. CHEMICAL DATA: Water years 1967 to current year. BIOLOGICAL DATA: Water years 1975-81. SEDIMENT DATA: Water years 1974-94, 1999 to current year.

PERIOD OF DAILY RECORD - SPECIFIC CONDUCTANCE: February 1968 to current year. WATER TEMPERATURE: October 1969 to current year. CHLORIDE: October 1970 to September 1971. SUSPENDED-SEDIMENT DISCHARGE: October 1973 to June 1982.

INSTRUMENTATION - Water-quality monitor recording specific conductance and water temperature since October 1969.

REMARKS - Specific conductance and water temperature records are affected by releases from Prado Dam. Interruptions in record at times due to malfunction of recording or sensing equipment. Sediment data and a portion of chemical data collected for the National Water-Quality Assessment (NAWQA) Program. Specific conductance records excellent except for Oct. 4-11, Nov. 8-14, Mar. 28 to Apr. 15, May 3-21, June 12-19, which are good; Oct. 12-16, which are fair; and Oct. 17, Dec. 2 to Jan. 30, which are poor. Temperature records excellent except for Dec. 2 to Jan. 30, which are poor.

EXTREMES FOR PERIOD OF DAILY RECORD - SPECIFIC CONDUCTANCE: Maximum recorded, 1,830 microsiemens, Apr. 30, 1971; minimum recorded, 150 microsiemens, Jan. 5, 2008. WATER TEMPERATURE: Maximum recorded, 36.0°C, Sept. 4, 1972, Sept. 8, 1984; minimum recorded, 2.5°C, Dec. 30, 1969. SEDIMENT CONCENTRATION: Maximum daily mean, 2,870 mg/L, Mar. 5, 1978; minimum daily mean, 3 mg/L, Apr. 2, 1980, and several days during 1982. SEDIMENT LOAD: Maximum daily, 18,900 tons, Mar. 5, 1978; minimum daily, 0.58 ton, Sept. 20, 1978.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 9, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=004_00095&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11074000&agency_cd=USGS

Water-Data Report 2014

11074000 Santa Ana River below Prado Dam, CA -- Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
YEAR 2013-10-01 to 2014-09-30
DAILY VALUES

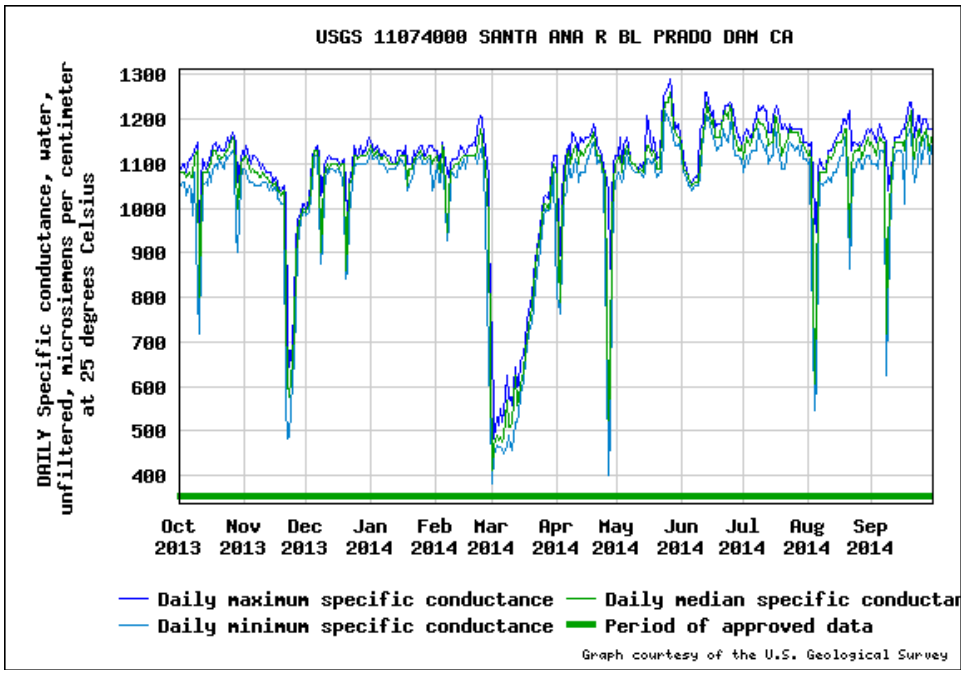
Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
	October			November			December			January			February		
1	1,090	1,050	1,080	1,120	1,090	1,110	995	984	990	1,150	1,130	1,140	1,130	1,050	1,110
2	1,100	1,060	1,080	1,140	1,080	1,120	1,020	991	1,010	1,140	1,110	1,130	1,130	1,100	1,120
3	1,100	1,060	1,080	1,110	1,060	1,090	1,060	1,020	1,040	1,130	1,110	1,120	1,110	1,060	1,090
4	1,080	1,030	1,070	1,100	1,060	1,080	1,120	1,060	1,100	1,140	1,120	1,130	1,100	1,060	1,080
5	1,110	1,050	1,080	1,120	1,060	1,090	1,130	1,120	1,130	1,130	1,100	1,120	1,150	1,100	1,140
6	1,110	1,040	1,070	1,120	1,050	1,080	1,140	1,120	1,130	1,120	1,100	1,110	1,130	1,080	1,120
7	1,120	985	1,070	1,110	1,050	1,080	1,120	1,030	1,100	1,120	1,100	1,110	1,080	927	947
8	1,130	1,080	1,120	1,100	1,050	1,070	1,030	874	902	1,130	1,100	1,120	1,070	963	1,030
9	1,150	803	1,130	1,090	1,050	1,070	1,040	916	977	1,120	1,080	1,110	1,100	1,070	1,080
10	887	718	799	1,100	1,060	1,080	1,100	1,040	1,070	1,120	1,090	1,100	1,110	1,080	1,090
11	1,060	885	981	1,080	1,060	1,070	1,110	1,090	1,100	1,110	1,090	1,100	1,110	1,070	1,100
12	1,110	1,050	1,080	1,080	1,050	1,070	1,120	1,080	1,090	1,100	1,090	1,100	1,110	1,070	1,100
13	1,090	1,060	1,080	1,080	1,040	1,060	1,110	1,090	1,100	1,100	1,090	1,100	1,120	1,100	1,100
14	1,100	1,050	1,080	1,080	1,050	1,060	1,110	1,090	1,100	1,130	1,100	1,100	1,140	1,090	1,110
15	1,110	1,080	1,100	1,060	1,040	1,050	1,110	1,080	1,100	1,130	1,100	1,110	1,130	1,110	1,120
16	1,120	1,060	1,100	1,070	1,050	1,060	1,110	1,090	1,100	1,130	1,110	1,120	1,120	1,090	1,120
17	1,140	1,090	1,130	1,060	1,020	1,040	1,100	1,080	1,090	1,120	1,100	1,120	1,130	1,110	1,120
18	1,150	1,100	1,130	1,040	1,020	1,040	1,100	1,080	1,100	1,140	1,090	1,120	1,140	1,120	1,120
19	1,130	1,090	1,110	1,040	1,010	1,030	1,110	1,040	1,100	1,100	1,040	1,050	1,140	1,120	1,120
20	1,140	1,110	1,120	1,050	1,010	1,040	1,050	842	861	1,100	1,050	1,090	1,150	1,120	1,120
21	1,130	1,100	1,110	1,020	558	769	979	858	930	1,100	1,070	1,090	1,140	1,120	1,120
22	1,130	1,090	1,120	724	483	611	1,060	979	1,050	1,130	1,080	1,110	1,180	1,100	1,130
23	1,140	1,120	1,130	643	487	575	1,090	1,060	1,070	1,120	1,110	1,110	1,210	1,130	1,180
24	1,160	1,110	1,130	695	615	657	1,140	1,090	1,120	1,130	1,110	1,120	1,200	1,140	1,160
25	1,150	1,120	1,140	780	660	730	1,130	1,100	1,120	1,140	1,120	1,130	1,160	1,080	1,120
26	1,170	1,130	1,160	915	780	870	1,110	1,100	1,110	1,140	1,100	1,120	1,130	995	1,100
27	1,160	1,120	1,150	971	915	950	1,140	1,100	1,120	1,120	1,100	1,110	1,070	647	971
28	1,150	940	1,090	992	971	982	1,120	1,100	1,120	1,120	1,100	1,110	684	555	646
29	1,060	900	998	1,010	987	998	1,130	1,100	1,120	1,140	1,110	1,120			
30	1,110	1,060	1,100	1,010	993	1,000	1,130	1,100	1,120	1,140	1,110	1,120			
31	1,130	1,090	1,110				1,160	1,110	1,130	1,140	1,040	1,100			
Max	1,170	1,130	1,160	1,140	1,090	1,120	1,160	1,120	1,130	1,150	1,130	1,140	1,210	1,140	1,180
Min	887	718	799	643	483	575	979	842	861	1,100	1,040	1,050	684	555	646

Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
	March			April			May			June			July		
1	746	383	412	1,120	802	1,070	1,120	1,080	1,110	1,150	1,110	1,130	1,160	1,080	1,110
2	484	444	467	924	785	871	1,160	1,070	1,120	1,110	1,080	1,090	1,180	1,120	1,160
3	533	467	491	893	764	791	1,100	1,060	1,080	1,090	1,070	1,080	1,170	1,100	1,150
4	513	463	479	1,020	893	975	1,140	1,070	1,110	1,070	1,050	1,070	1,160	1,120	1,140
5	552	464	488	1,090	1,020	1,040	1,160	1,130	1,140	1,060	1,050	1,060	1,160	1,130	1,150
6	520	456	476	1,130	1,040	1,120	1,140	1,100	1,130	1,060	1,040	1,050	1,200	1,130	1,180
7	543	451	487	1,140	1,110	1,130	1,110	1,100	1,110	1,070	1,050	1,060	1,200	1,130	1,180
8	624	465	567	1,120	1,070	1,100	1,100	1,090	1,100	1,070	1,050	1,060	1,230	1,180	1,200
9	572	490	508	1,170	1,070	1,120	1,100	1,080	1,100	1,080	1,050	1,060	1,220	1,160	1,190
10	576	463	510	1,160	1,110	1,140	1,090	1,080	1,090	1,180	1,070	1,100	1,230	1,140	1,190
11	558	457	517	1,140	1,100	1,130	1,090	1,080	1,080	1,190	1,170	1,180	1,220	1,130	1,180
12	643	519	626	1,130	1,060	1,100	1,100	1,080	1,090	1,260	1,180	1,190	1,220	1,140	1,170
13	597	522	559	1,160	1,080	1,130	1,090	1,070	1,080	1,260	1,210	1,240	1,170	1,100	1,140
14	601	534	567	1,150	1,080	1,120	1,120	1,080	1,110	1,240	1,200	1,220	1,170	1,120	1,150
15	659	581	606	1,160	1,080	1,130	1,210	1,110	1,140	1,210	1,170	1,190	1,210	1,120	1,150
16	668	612	632	1,160	1,110	1,140	1,190	1,110	1,140	1,220	1,160	1,200	1,220	1,200	1,210
17	701	662	680	1,160	1,110	1,140	1,130	1,100	1,120	1,180	1,150	1,160	1,230	1,140	1,200
18	743	687	705	1,170	1,140	1,160	1,160	1,110	1,130	1,190	1,130	1,160	1,200	1,120	1,160
19	767	724	738	1,190	1,150	1,170	1,140	1,090	1,120	1,190	1,140	1,160	1,180	1,090	1,120
20	804	743	777	1,180	1,130	1,140	1,110	1,070	1,090	1,190	1,140	1,190	1,180	1,090	1,130
21	847	777	828	1,140	1,100	1,120	1,120	1,080	1,090	1,210	1,180	1,200	1,190	1,090	1,140
22	882	823	858	1,130	1,110	1,120	1,190	1,080	1,180	1,230	1,160	1,220	1,170	1,140	1,160
23	910	858	902	1,120	1,090	1,090	1,250	1,170	1,210	1,230	1,150	1,200	1,190	1,150	1,180
24	953	910	939	1,090	1,070	1,090	1,260	1,220	1,240	1,240	1,180	1,230	1,180	1,140	1,170
25	990	948	978	1,080	905	1,070	1,270	1,200	1,240	1,230	1,210	1,220	1,180	1,140	1,170
26	1,020	981	1,010	1,040	400	524	1,290	1,190	1,260	1,220	1,140	1,170	1,180	1,130	1,170
27	1,030	1,000	1,010	864	507	616	1,260	1,180	1,230	1,190	1,120	1,160	1,180	1,140	1,170
28	1,020	997	1,000	1,020	864	973	1,210	1,160	1,180	1,160	1,120	1,130	1,180	1,120	1,150
29	1,050	1,000	1,020	1,100	1,020	1,060	1,180	1,140	1,170	1,160	1,110	1,130	1,180	1,140	1,150
30	1,090	1,050	1,080	1,120	1,060	1,100	1,190	1,140	1,160	1,140	1,110	1,140	1,150	1,110	1,140
31	1,120	1,080	1,100				1,160	1,150	1,160				1,150	1,110	1,130
Max	1,120	1,080	1,100	1,190	1,150	1,170	1,290	1,220	1,260	1,260	1,210	1,240	1,230	1,200	1,210
Min	484	383	412	864	400	524	1,090	1,060	1,080	1,060	1,040	1,050	1,150	1,080	1,110

Day	Max	Min	Median	Max	Min	Median
	August			September		
1	1,140	1,100	1,120	1,180	1,100	1,150
2	1,140	1,110	1,130	1,160	1,100	1,130
3	1,150	901	1,100	1,150	1,100	1,120
4	982	547	607	1,170	1,090	1,140
5	947	619	801	1,190	1,130	1,160
6	1,080	945	1,040	1,160	1,130	1,150
7	1,110	1,060	1,080	1,160	1,120	1,150
8	1,090	1,050	1,080	1,150	625	718
9	1,090	1,060	1,080	1,040	775	923
10	1,090	1,060	1,080	1,090	1,040	1,070
11	1,130	1,070	1,120	1,120	1,090	1,120
12	1,130	1,060	1,110	1,160	1,120	1,150
13	1,140	1,080	1,120	1,160	1,130	1,150
14	1,150	1,080	1,130	1,160	1,130	1,150
15	1,160	1,080	1,150	1,170	1,130	1,150
16	1,170	1,110	1,150	1,180	1,120	1,150
17	1,170	1,120	1,150	1,180	1,010	1,130
18	1,200	1,120	1,160	1,200	1,160	1,180
19	1,200	1,160	1,180	1,240	1,170	1,200
20	1,190	1,140	1,180	1,240	1,190	1,220
21	1,220	863	936	1,210	1,090	1,120
22	1,130	961	1,090	1,160	1,060	1,110
23	1,150	1,090	1,120	1,210	1,100	1,170
24	1,150	1,080	1,130	1,210	1,150	1,180
25	1,140	1,110	1,130	1,170	1,100	1,140
26	1,150	1,110	1,140	1,200	1,120	1,160
27	1,140	1,090	1,110	1,200	1,170	1,180
28	1,150	1,090	1,120	1,180	1,140	1,150
29	1,170	1,120	1,150	1,180	1,100	1,130
30	1,180	1,120	1,160	1,180	1,140	1,160
31	1,170	1,120	1,140			
Max	1,220	1,160	1,180	1,240	1,190	1,220
Min	947	547	607	1,040	625	718

Water-Data Report 2014

11074000 Santa Ana River below Prado Dam, CA -- Continued



USGS Water-Year Summary 2014

11066460 Santa Ana River at Metropolitan Water District Crossing, near Arlington, CA

LOCATION - Lat 33°58'07", long 117°26'51" referenced to North American Datum of 1927, in NE 1/4 SW 1/4 sec.30, T.2 S., R.5 W., Riverside County, CA, Hydrologic Unit 18070203, near center of Metropolitan Water District pipeline crossing, 0.8 mi downstream from Union Pacific Railroad Bridge, 1.1 mi upstream from bridge on Van Buren Boulevard, and 3.3 mi north of Arlington.

DRAINAGE AREA - 852 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - March 1970 to current year.

REVISED RECORDS - WDR CA-83-1: Drainage area.

GAGE - Water-stage recorder and crest-stage gage. Elevation of gage is 685 ft above NGVD of 1929, from topographic map. Prior to Apr. 15, 1985, water-stage recorder at site 300 ft upstream on left bank at different datum. From Apr. 15 to Sept. 30, 1985, water-stage recorder near right bank (atop pier 9 of Metropolitan Water District pipeline crossing), at same site and datum. From Oct. 1, 1985, to June 16, 1993, water-stage recorder and crest-stage gage on right bank at same site and datum. From June 17, 1993, to Sept. 30, 2003, water-stage recorder and crest-stage gage on left bank at same site and datum. From Oct. 1, 2003 to Oct. 17, 2005, water-stage recorder in reach-in shelter on pipeline catwalk, near pier #13 at same site and datum. Since Oct. 18, 2005, water-stage recorder is situated in reach-in shelter on upper deck platform, near pier #13 at same site and datum.

REMARKS - Records poor. Flow partly regulated by Big Bear Lake (station 11049000) and, since November 1999, by Seven Oaks Flood-Control Reservoir, capacity, 145,600 acre-ft. Natural streamflow affected by ground-water withdrawals, diversions for irrigation, return flows from irrigated areas, and discharges of treated effluent. The records at this station are equivalent to those collected at "Santa Ana River at Riverside Narrows, near Arlington" minus the flow at "Riverside Water-Quality Control Plant at Riverside Narrows, near Arlington". See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES OUTSIDE PERIOD OF RECORD - Maximum discharge since at least 1927, 100,000 ft³/s, Mar. 2, 1938, on basis of slope-area measurement, at site 1.1 mi downstream. Flood of Jan. 22, 1862, 320,000 ft³/s, on basis of slope-conveyance study, at site 8.2 mi upstream. Stage at that site was 5 ft higher than that of Mar. 2, 1938.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 49,100 ft³/s, Dec. 21, 2010, gage height, 16.83 ft, from rating curve extended above 21,900 ft³/s on basis of area-velocity studies; maximum gage height, 20.23 ft, site and datum then in use, Mar. 4, 1978; minimum daily, 15 ft³/s, Sept. 7, 8, 1980.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web
(USGS Water Data for the Nation), accessed [March 13, 2015],
at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?
dd_parm_cds=002_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11066460&agency_cd=USGS

Water-Data Report 2014

11066460 Santa Ana River at Metropolitan Water District Crossing, near Arlington, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	35	49	45	35	e42	650	69	43	31	31	33	46
2	35	51	46	35	e43	187	114	42	32	30	33	47
3	35	55	46	36	e42	93	85	43	30	30	402	50
4	35	58	48	35	e45	81	72	42	29	29	336	50
5	33	51	49	36	e45	67	64	43	31	30	54	51
6	36	54	49	36	e46	54	62	45	30	28	45	50
7	35	53	110	37	e47	55	55	47	31	27	40	411
8	30	56	81	34	e46	55	54	44	32	28	38	154
9	65	56	54	37	e47	56	49	51	32	28	35	58
10	97	52	51	37	e48	55	48	55	32	29	34	37
11	56	54	46	37	e48	57	45	55	32	29	35	34
12	51	58	49	35	e46	54	45	50	32	28	34	32
13	51	58	47	36	e46	56	45	59	32	30	35	31
14	50	58	42	35	e45	58	50	47	44	30	35	28
15	52	60	41	34	45	59	46	47	31	29	36	28
16	63	62	40	35	46	56	43	46	31	30	34	28
17	48	61	37	36	46	58	42	43	33	30	32	27
18	46	62	36	35	45	57	41	43	32	31	34	27
19	42	63	54	36	45	57	40	40	32	33	34	27
20	43	57	49	36	44	56	38	41	32	31	100	29
21	46	1,350	38	38	44	60	36	42	32	32	69	29
22	42	577	39	36	45	59	38	41	32	31	47	30
23	44	78	37	e37	44	61	39	40	34	31	43	29
24	43	68	40	e40	42	61	34	39	33	31	45	29
25	48	61	37	e39	45	61	33	38	31	32	44	29
26	48	45	37	e39	44	64	294	33	34	31	48	29
27	46	44	35	e41	57	66	62	33	34	29	45	30
28	48	47	36	e39	1,670	67	52	32	32	30	49	31
29	54	44	38	e41		65	46	31	31	31	44	30
30	55	45	36	e41		65	45	31	32	30	44	30
31	51		36	e43		66		31		30	46	
Total	1,463	3,487	1,429	1,147	2,898	2,616	1,786	1,317	966	929	1,983	1,540
Mean	47.2	116	46.1	37.0	104	84.4	59.5	42.5	32.2	30.0	64.0	51.4
Max	97.0	1,350	110	43.0	1,670	650	294	59.0	44.0	33.0	402	411
Min	30.0	44.0	35.0	34.0	42.0	54.0	33.0	31.0	29.0	27.0	32.0	27.0
Ac-ft	2,902	6,916	2,834	2,275	5,748	5,189	3,542	2,612	1,916	1,843	3,933	3,057

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	103	94.3	242	307	228	154	147	93.8	73.4	64.2	70.2	62.9
Max	498	141	1,729	2,350	756	498	501	314	192	137	201	86.6
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	47.2	51.5	46.1	37.0	72.2	69.9	55.4	42.5	32.2	30.0	32.3	34.3
(WY)	(2014)	(2010)	(2014)	(2014)	(2012)	(2013)	(2013)	(2014)	(2014)	(2014)	(2013)	(2013)

Water-Data Report 2014

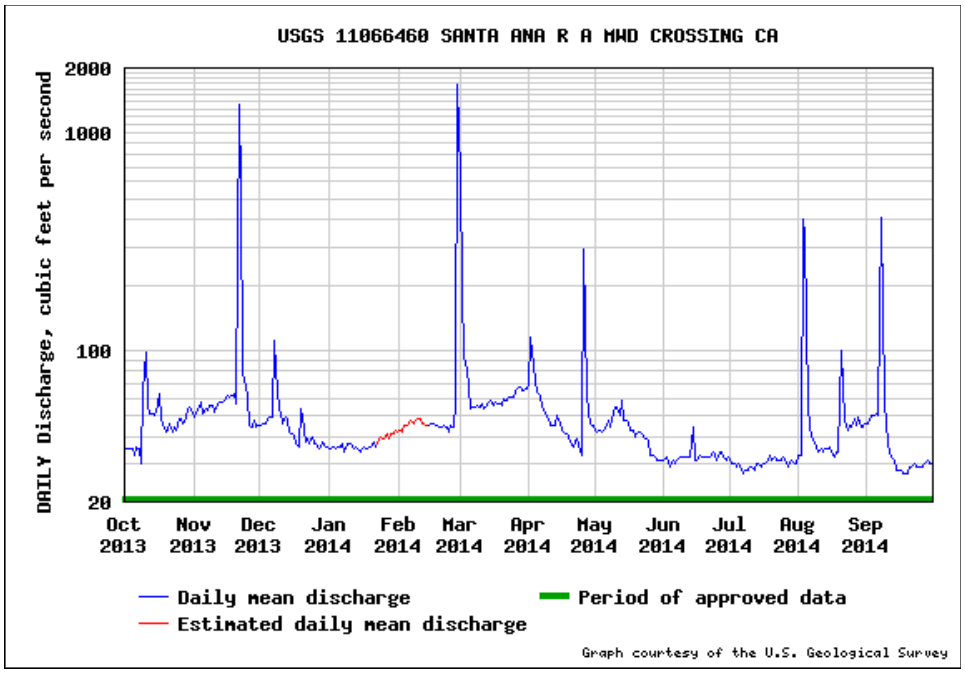
11066460 Santa Ana River at Metropolitan Water District Crossing, near Arlington, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 2000 - 2014	
Annual total	21,560			
Annual mean	59.1		136.3	
Highest annual mean			491.1	2005
Lowest annual mean			57.0	2013
Highest daily mean	1,670	Feb 28	22,000	Jan 11, 2005
Lowest daily mean	27.0	Jul 07	21.0	Aug 24, 2013
Annual 7-day minimum	27.7	Sep 14	23.1	Aug 22, 2013
Maximum peak flow	7,640[a,b]	Nov 21	49,100[a,b]	Dec 21, 2010
Maximum peak stage	10.73	Nov 21	16.83	Dec 21, 2010
Annual runoff (cfsm)	0.069		0.160	
Annual runoff (inches)	0.941		2.17	
10 percent exceeds	62.0		131.0	
50 percent exceeds	43.0		75.0	
90 percent exceeds	30.0		45.0	

[a] Discharge affected to unknown degree by Regulation or Diversion

[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



Water-Data Report 2014

11066460 Santa Ana River at Metropolitan Water District Crossing, near Arlington, CA

LOCATION - Lat 33°58'07", long 117°26'51" referenced to North American Datum of 1927, in NE 1/4 SW 1/4 sec.30, T.2 S., R.5 W., Riverside County, CA, Hydrologic Unit 18070203, near center of Metropolitan Water District pipeline crossing, 0.8 mi downstream from Union Pacific Railroad Bridge, 1.1 mi upstream from bridge on Van Buren Boulevard, and 3.3 mi north of Arlington.

DRAINAGE AREA - 852 mi^2.

WATER-QUALITY RECORDS

PERIOD OF RECORD - Water years 1970 to current year. CHEMICAL DATA: Water years 1970 to current year. SPECIFIC CONDUCTANCE: Water years 1970-78, 1999-2000. WATER TEMPERATURE: Water years 1999-2000. SEDIMENT DATA: Water years 1999-2000.

SAR@MWDXing Water Quality

Date	TDS (mg/L)	EC (um/cm)	TDS/EC Ratio	Source
10/24/2013	604	981	0.62	USGS
11/13/2013	589	981	0.60	USGS
11/27/2013	631	1030	0.61	USGS
12/4/2013	639	1040	0.61	USGS
12/18/2013	632	1020	0.62	USGS
1/15/2014	641	1010	0.63	USGS
1/24/2014	645	1000	0.65	USGS
2/6/2014	637	1000	0.64	USGS
2/26/2014	645	1000	0.65	USGS
3/1/2014	172	278	0.62	USGS
3/10/2014	615	966	0.64	USGS
3/20/2014	639	990	0.65	USGS
4/10/2014	634	1010	0.63	USGS
4/24/2014	637	1020	0.62	USGS
5/15/2014	655	1040	0.63	USGS
5/29/2014	629	1030	0.61	USGS
6/12/2014	648	1040	0.62	USGS
7/9/2014	647	1040	0.62	USGS
7/21/2014	634	1010	0.63	USGS
8/4/2014	385	579	0.66	USGS
8/20/2014	660	1060	0.62	USGS
9/8/2014	431	703	0.61	USGS
9/22/2014	647	1040	0.62	USGS
Average	595	951	0.63	

USGS Water-Year Summary 2014

11059300 Santa Ana River at E Street, near San Bernardino, CA

LOCATION - Lat 34°03'54", long 117°17'58" referenced to North American Datum of 1927, San Bernardino County, CA, Hydrologic Unit 18070203, in San Bernardino Grant, on left bank, 0.4 mi downstream from E Street Bridge, 0.4 mi upstream from Warm Creek, 1.2 mi downstream from San Timoteo Creek, 2.8 mi south of San Bernardino, and 26 mi downstream from Big Bear Lake.

DRAINAGE AREA - 541 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - March 1939 to September 1954, October 1966 to current year.

GAGE - Water-stage recorder and crest-stage gage. Elevation of gage is 940 ft above NGVD of 1929, from topographic map. Prior to Nov. 10, 1950, on right bank 0.4 mi upstream at datum 24.50 ft higher. Nov. 11, 1950, to September 1954, on both banks 0.4 mi upstream at datum 24.50 ft higher. October 1966 to September 1976, on right bank 0.4 mi upstream at datum 14.50 ft higher. October 1976 to September 1977, gage was removed for channel construction. October 1977 to Jan. 28, 1981, on right bank, 0.5 mi upstream at elevation 10 ft higher.

REMARKS - Records poor. Flow partly regulated by Big Bear Lake (station 11049000) and, since November 1999, by Seven Oaks Flood-Control Reservoir, capacity, 145,600 acre-ft. Natural flow of stream affected by ground-water withdrawals and diversion for domestic use and irrigation upstream from station. Effluent from sewage reclamation plant 1.0 mi upstream caused sustained flow past gage from 1967 to Mar. 21, 1996. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 35,700 ft³/s, Jan. 11, 2005, gage height, 9.04 ft, current site and datum, from rating curve extended above 5,930 ft³/s on basis of critical-depth computations; maximum gage height, 11.9 ft, Feb. 25, 1969, site and datum then in use; no flow for many days many years prior to 1967 and since Mar. 21, 1996.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=003_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11059300&agency_cd=USGS

Water-Data Report 2014

11059300 Santa Ana River at E Street, near San Bernardino, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	e0.00	e0.00	e0.64	e2.2	0.42	768	1.7	e0.00	e0.00	e0.00	e0.00	0.00
2	e0.00	e0.00	e0.70	e2.2	0.65	124	16	e0.00	e0.00	e0.00	e0.40	0.00
3	e0.00	e0.00	e0.70	e2.1	0.60	15	0.78	e0.00	e0.00	e0.00	e420	0.00
4	e0.00	e0.00	e0.58	e2.2	0.23	6.6	0.00	e0.00	e0.00	e0.00	e300	0.00
5	e0.00	e0.00	e0.52	e2.1	0.04	5.7	0.00	e0.00	e0.00	e0.31	0.00	0.00
6	e0.00	e0.00	e0.51	e2.1	0.78	6.1	0.00	e0.00	e0.00	e0.00	0.00	0.00
7	e0.00	0.52	14	e2.0	1.1	e2.5	0.00	e0.00	e0.00	e0.00	0.00	104
8	e0.00	0.78	e2.9	e2.0	0.01	e2.5	0.00	e0.00	e0.00	e0.00	0.00	0.78
9	e52	0.00	e1.7	e2.0	0.00	2.3	0.00	e0.00	e0.00	e0.00	0.00	0.02
10	e0.00	2.0	e0.97	e2.0	0.08	2.2	0.00	e0.28	e0.00	e0.00	0.02	0.02
11	e0.00	2.2	e0.78	e2.0	0.32	0.34	0.00	e0.00	e0.00	e0.00	0.01	0.00
12	e0.00	2.8	e1.2	e2.0	0.41	0.42	0.00	e0.28	e0.00	e0.00	0.01	0.04
13	e0.00	1.6	e1.5	e2.0	0.02	0.33	0.20	e0.00	e0.00	e0.00	0.03	0.02
14	e0.00	3.9	e1.6	e1.9	0.89	0.60	0.18	e0.00	e0.00	e0.00	0.01	0.00
15	e0.00	3.7	e1.8	e2.0	1.8	0.15	0.00	e0.00	e0.00	e0.00	0.05	0.00
16	e0.00	6.7	e1.9	e2.0	2.8	0.11	0.00	e0.00	e0.00	e0.00	0.00	0.00
17	e0.00	3.2	e2.0	e1.9	2.7	0.35	0.00	e0.00	e0.00	e0.00	0.00	0.00
18	e0.00	1.6	e4.1	e1.9	3.1	1.0	0.00	e0.00	e0.00	e0.00	0.00	0.00
19	e0.00	4.0	19	e1.9	3.1	0.79	0.10	e0.00	e0.00	e0.00	0.00	0.00
20	e0.00	3.4	e14	e1.9	3.4	0.25	0.01	e0.00	e0.00	e0.00	0.00	0.00
21	e0.00	1,230	e5.2	e1.9	2.6	0.34	0.00	e0.00	e0.00	e0.00	0.00	0.00
22	e0.00	119	e2.9	3.4	1.7	0.00	e0.06	e0.00	e0.00	e0.00	0.00	0.00
23	e0.00	e14	e2.7	2.8	2.2	0.01	e0.42	e0.00	e0.00	e0.00	0.00	0.00
24	e0.00	e6.0	e2.4	3.9	2.6	0.18	e0.07	e0.00	e0.00	e0.00	0.00	0.00
25	e0.00	e2.4	e2.4	1.9	2.7	0.00	e0.70	e0.28	e0.00	e0.00	0.00	0.00
26	e0.00	e1.7	e2.3	2.8	4.9	0.24	224	e0.00	e0.00	e0.00	0.00	0.00
27	e0.00	e1.3	e2.3	2.4	16	0.13	1.8	e0.00	e0.00	e0.00	0.00	0.00
28	e0.00	e0.99	e2.2	1.7	1,770	0.00	e1.2	e0.00	e0.00	e0.00	0.00	0.00
29	e0.00	e0.93	e2.2	0.93		0.00	e0.28	e0.00	e0.00	e0.00	0.00	0.00
30	e0.00	e0.70	e2.2	1.00		0.31	e0.00	e0.00	e0.00	e0.00	0.00	0.00
31	e0.00		e2.2	1.3		0.25		e0.00		e0.00	0.00	
Total	52.0	1,413	100	64.4	1,825	941	248	.84	.000	.31	721	105
Mean	1.68	47.1	3.23	2.08	65.2	30.3	8.25	.027	.000	.010	23.2	3.50
Max	52.0	1,230	19.0	3.90	1,770	768	224	.28	.000	.31	420	104
Min	.000	.000	.51	.93	.000	.000	.000	.000	.000	.000	.000	.000
Ac-ft	103	2,803	199	128	3,620	1,865	491	1.67	.000	.61	1,429	208

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	18.1	14.5	79.6	115	91.5	64.6	60.5	26.1	7.77	5.91	8.92	3.87
Max	200	47.1	764	1,185	376	398	351	247	112	52.9	102	40.6
(WY)	(2005)	(2014)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	.000	.67	1.16	.000	.82	4.10	.040	.000	.000	.000	.000	.000
(WY)	(2003)	(2001)	(2001)	(2003)	(2002)	(2008)	(2002)	(2002)	(2002)	(2002)	(2002)	(2002)

Water-Data Report 2014

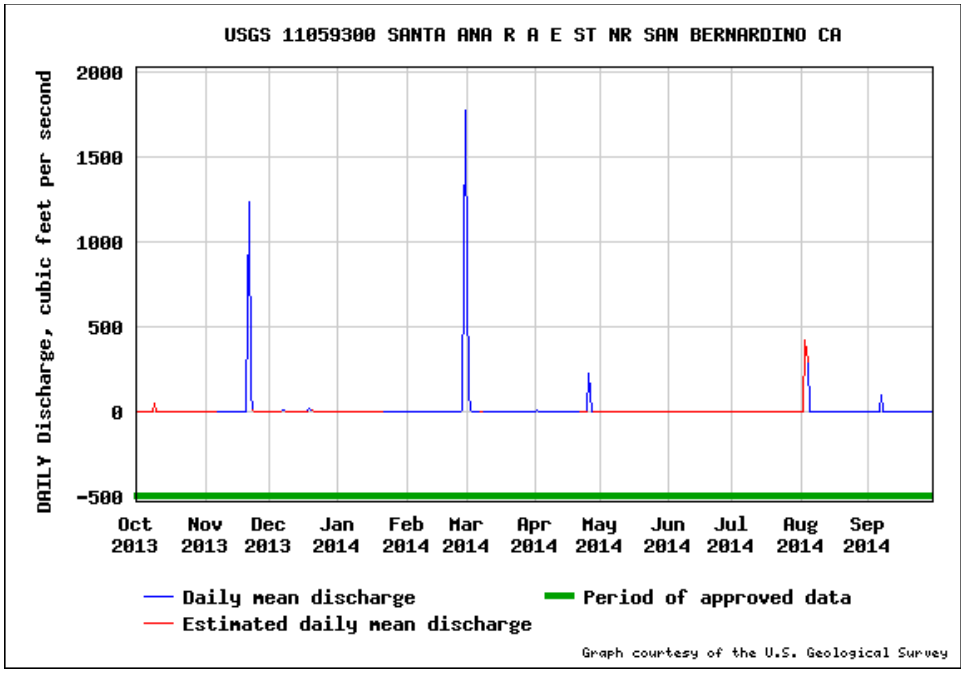
11059300 Santa Ana River at E Street, near San Bernardino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 2000 - 2014	
Annual total	5,470			
Annual mean	15.0		41.2	
Highest annual mean			264.9	2005
Lowest annual mean			1.70	2002
Highest daily mean	1,770	Feb 28	12,500	Jan 11, 2005
Lowest daily mean	0.0	Oct 01	0.0	May 14, 2000
Annual 7-day minimum	0.0	Oct 01	0.0	Jul 08, 2009
Maximum peak flow			35,700[a,b]	Jan 11, 2005
Maximum peak stage			9.04	Jan 11, 2005
Annual runoff (cfsm)	0.028		0.076	
Annual runoff (inches)	0.376		1.03	
10 percent exceeds	2.90		48.0	
50 percent exceeds	0.0		0.780	
90 percent exceeds	0.0		0.0	

[a] Discharge affected by Regulation or Diversion

[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11072100 Temescal Creek above Main Street, at Corona, CA

LOCATION - Lat 33°53'21", long 117°33'43" referenced to North American Datum of 1927, Riverside County, CA, Hydrologic Unit 18070203, in La Sierra Grant, on right bank, 500 ft upstream from Main Street Bridge in Corona, and 1.5 mi upstream from topographic boundary of Prado Flood-Control Basin.

DRAINAGE AREA - 224 mi², excludes 768 mi² above Lake Elsinore.

SURFACE-WATER RECORDS

PERIOD OF RECORD - October 1980 to July 1983, February 1984 to current year.

REVISIONS - On January 23, 2015, discharge records were revised for the period of September 10, 2013 to October 5, 2014.

GAGE - Water-stage recorder and concrete-lined flood-control channel. Elevation of gage is 600 ft above NGVD of 1929, from topographic map. December 1967 to September 1974, water-stage recorder at site 1.2 mi downstream at different datum (published as station 11072200, "Temescal Creek at Corona"). October 1980 to July 1983 at site 500 ft downstream at different datum.

REMARKS - Records fair above 500 ft³/s and poor below. Flow regulated by several small storage reservoirs. Many diversions upstream from station for irrigation. Water discharged to channel from Arlington Desalter at times since September 1990; records for water years 1981 to 1990 and 1991 to current year are not equivalent. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES OUTSIDE PERIOD OF RECORD - Maximum discharge, 8,850 ft³/s, Feb. 25, 1969, gage height, 8.17 ft, from floodmark, at old site (station 11072200) 1.2 mi downstream on basis of slope-area measurement of peak flow.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 5,290 ft³/s, Dec. 22, 2010, gage height, 7.27 ft, from rating curve extended above 305 ft³/s, on basis of step-backwater analysis; minimum daily, 0.27 ft³/s, Sept. 25, 1981.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11072100&agency_cd=USGS

Water-Data Report 2014

11072100 Temescal Creek above Main Street, at Corona, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	3.7	2.2	2.3	2.0	2.4	126	3.7	1.8	1.7	1.8	1.8	1.6
2	4.5	2.6	2.4	2.4	2.3	6.1	35	2.1	2.1	1.9	2.5	1.6
3	5.0	3.5	3.4	3.8	2.8	2.5	3.6	2.0	1.6	1.6	56	2.3
4	4.4	4.5	2.9	2.2	2.9	2.2	3.7	2.1	2.3	1.7	5.2	1.8
5	3.4	4.0	1.6	2.2	3.1	1.8	2.6	2.9	2.1	2.2	1.9	2.2
6	3.4	3.8	2.1	2.4	10	1.8	3.8	3.3	2.0	1.5	1.8	2.1
7	3.5	4.2	35	2.3	5.4	1.9	4.3	2.4	1.5	1.8	2.4	6.4
8	2.6	4.2	2.5	2.3	3.8	1.8	3.7	2.4	1.8	1.9	1.7	4.0
9	26	4.9	1.1	2.6	3.0	1.8	4.4	2.4	2.2	1.6	2.1	2.3
10	7.4	4.4	1.5	2.4	2.9	1.9	3.9	2.2	1.7	1.7	1.5	2.0
11	2.5	3.6	3.0	2.1	2.8	1.9	3.4	2.3	1.5	2.6	3.8	1.6
12	2.8	3.9	3.3	2.2	2.8	1.7	3.3	1.8	1.6	1.5	2.9	1.7
13	3.0	4.8	2.8	2.7	3.2	2.1	3.7	1.9	1.6	1.9	1.8	1.9
14	3.0	3.5	2.5	2.0	4.0	2.2	5.8	2.1	1.5	2.1	1.8	1.8
15	2.7	3.8	2.1	1.6	4.5	2.0	4.3	2.3	1.9	2.0	2.5	3.0
16	2.9	4.2	3.2	2.0	2.9	1.9	4.5	2.0	2.2	2.0	1.3	2.7
17	2.7	4.1	3.0	2.3	2.5	3.3	4.8	2.0	1.7	2.5	1.6	1.8
18	3.9	3.2	2.8	1.9	2.7	2.3	3.2	2.2	3.3	1.9	2.0	1.6
19	3.1	3.7	57	2.1	2.6	2.7	3.2	3.5	1.8	2.9	1.5	1.6
20	2.8	6.4	3.6	2.3	2.4	2.1	3.4	3.3	1.8	1.7	1.7	1.6
21	3.0	139	2.2	2.3	2.4	2.9	3.3	3.7	1.5	2.9	2.0	1.6
22	2.1	16	2.3	2.5	2.4	2.9	3.4	3.2	1.8	2.2	1.7	1.9
23	2.4	3.4	2.1	2.0	2.2	2.6	3.1	2.9	2.1	1.9	1.8	1.8
24	3.5	2.9	2.3	2.6	2.4	3.3	2.7	3.0	1.9	2.4	2.0	2.0
25	2.9	3.3	2.1	2.5	2.7	3.5	4.7	3.2	1.6	3.2	2.2	1.3
26	2.3	3.3	2.7	2.9	2.9	4.8	41	2.3	1.5	2.7	1.9	1.2
27	3.2	3.0	2.3	3.1	23	3.1	2.2	2.5	1.4	2.6	3.1	1.7
28	7.1	4.2	2.7	3.6	394	2.9	2.0	2.2	1.4	3.9	1.5	1.2
29	7.9	6.2	3.2	3.2		2.9	1.9	2.2	1.9	2.1	1.9	2.0
30	2.7	3.1	2.4	3.5		2.8	1.8	2.3	1.8	2.9	1.3	2.0
31	4.2		2.7	3.8		2.5		1.8		2.9	1.5	
Total	135	264	165	77.8	501	204	174	76.3	54.8	68.5	119	62.3
Mean	4.34	8.80	5.33	2.51	17.9	6.59	5.81	2.46	1.83	2.21	3.83	2.08
Max	26.0	139	57.0	3.80	394	126	41.0	3.70	3.30	3.90	56.0	6.40
Min	2.10	2.20	1.10	1.60	2.20	1.70	1.80	1.80	1.40	1.50	1.30	1.20
Ac-ft	267	523	327	154	994	405	346	151	109	136	235	124

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	13.4	16.5	28.4	55.0	84.9	57.4	33.9	18.4	11.2	9.67	9.27	9.76
Max	52.5	58.2	222	335	400	349	190	100	34.3	24.9	20.7	30.4
(WY)	(2005)	(2006)	(2011)	(2005)	(2005)	(1995)	(1995)	(1995)	(1995)	(1993)	(2005)	(2005)
Min	3.70	4.30	5.33	2.51	9.10	5.19	2.71	1.36	1.75	2.21	2.01	2.08
(WY)	(2013)	(2013)	(2014)	(2014)	(2013)	(2001)	(2013)	(2013)	(2013)	(2014)	(2012)	(2014)

Water-Data Report 2014

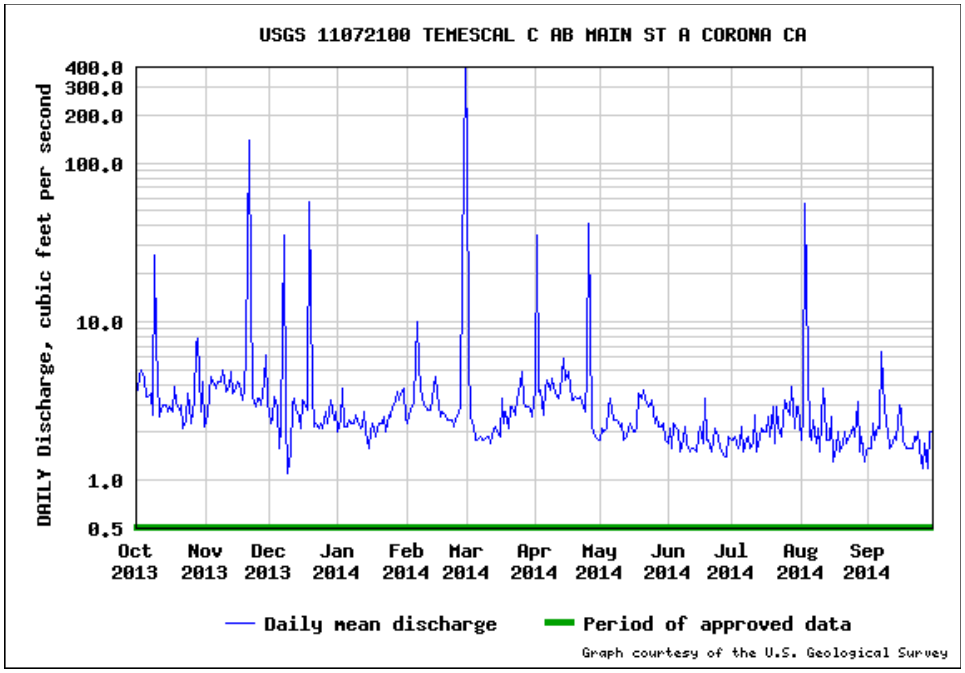
11072100 Temescal Creek above Main Street, at Corona, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1991 - 2014	
Annual total	1,902			
Annual mean	5.21		28.6	
Highest annual mean			104.5	2005
Lowest annual mean			5.10	2013
Highest daily mean	394.0	Feb 28	2,870	Dec 22, 2010
Lowest daily mean	1.10	Dec 09	0.340	Jul 03, 1992
Annual 7-day minimum	1.59	Sep 22	0.513	May 08, 2013
Maximum peak flow			5,290[a,b]	Dec 22, 2010
Maximum peak stage			7.27	Dec 22, 2010
Annual runoff (cfsm)	0.023		0.128	
Annual runoff (inches)	0.316		1.74	
10 percent exceeds	4.30		58.0	
50 percent exceeds	2.40		11.0	
90 percent exceeds	1.66		2.70	

[a] Discharge affected by Regulation or Diversion

[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11071900 Temescal Creek at Corona Lake, near Corona, CA

LOCATION - Lat 33°45'01", long 117°26'45" referenced to North American Datum of 1983, in SE 1/4 NW 1/4 sec.07, T.5 S., R.5 W., Riverside County, CA, Hydrologic Unit 18070203, on left bank, 10 ft upstream from Corona Lake Weir Control into Temescal Creek, 9.3 mi downstream of Lake Elsinore, and 12.3 mi south of Corona.

DRAINAGE AREA - 57.9 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - November 5, 2012 to current year.

GAGE - Water-stage recorder and concrete spillway control. Elevation of gage is 1,190 ft above NGVD of 1929, from a topographic map.

REMARKS - No flow for water year 2014. Gage established for the purpose of monitoring discharges from concrete weir on spill way of Corona Lake flowing into Temescal Creek.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 35 ft³/s, Feb. 23, 2013, gage height, 37.35 ft; minimum discharge, 0.00 ft³/s, on many days, gage height, 31.72 ft. No peaks greater than 35 ft³/s occurred outside of period of published record during this water year.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=002_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11071900&agency_cd=USGS

Water-Data Report 2014

11071900 Temescal Creek at Corona Lake, near Corona, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Mean	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Max	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Ac-ft	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2013 - 2014, BY WATER YEAR (WY)

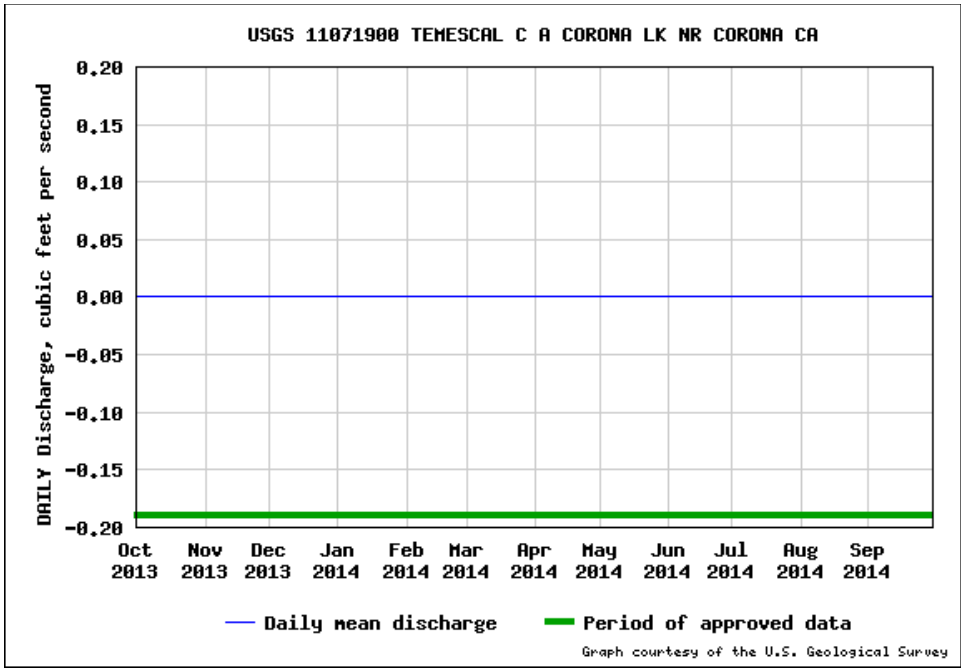
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	.000	.000	.000	.95	6.50	.94	.000	.000	.000	.000	.000	.000
Max	.000	.000	.000	1.90	13.0	1.87	.000	.000	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2014)	(2014)	(2014)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)

Water-Data Report 2014

11071900 Temescal Creek at Corona Lake, near Corona, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 2013 - 2014	
Annual total	0.0			
Annual mean	0.0		0.692	
Highest annual mean			1.45	2013
Lowest annual mean			0.0	2014
Highest daily mean	0.0	Sep 30	32.0	Feb 23, 2013
Lowest daily mean	0.0	Oct 01	0.0	Nov 06, 2012
Annual 7-day minimum	0.0	Oct 01	0.0	Mar 17, 2013
Maximum peak flow			35	Feb 23, 2013
Maximum peak stage			37.35	Feb 23, 2013
Annual runoff (cfsm)	0.0		0.012	
Annual runoff (inches)	0.0		0.162	
10 percent exceeds	0.0		0.0	
50 percent exceeds	0.0		0.0	
90 percent exceeds	0.0		0.0	



USGS Water-Year Summary 2014

11073495 Cucamonga Creek near Mira Loma, CA

LOCATION - Lat 33°58'58", long 117°35'55" referenced to North American Datum of 1927, in SW 1/4 NE 1/4 sec.22, T.2 S., R.7 W., San Bernardino County, CA, Hydrologic Unit 18070203, on right bank, 300 ft upstream from Merrill Avenue Bridge, and 4.6 mi west of Mira Loma.

DRAINAGE AREA - 75.8 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - January 1968 to July 1977, December 1978 to current year. CHEMICAL DATA: Water years 1999-2000. SPECIFIC CONDUCTANCE: Water years 1999-2000. WATER TEMPERATURE: Water years 1999-2000. SEDIMENT DATA: Water years 1999-2000.

GAGE - Water-stage recorder, crest-stage gage, and concrete-lined flood-control channel. Elevation of gage is 660 ft above NGVD of 1929, from topographic map. Prior to July 1977 at site 100 ft downstream at different datum.

REMARKS - Records fair above 100 ft³/s and poor below. Channel is a trapezoidal concrete floodway; records for low and medium flows prior to July 31, 1977, are not equivalent (channel concrete lined since July 31, 1977). Inland Empire Utilities Agency Tertiary Plant No. 1 began discharging effluent 3.3 mi upstream from station on May 8, 1985. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 17,300 ft³/s, Oct. 20, 2004, gage height, 6.58 ft, from rating curve extended above 617 ft³/s on basis of step-backwater computations; maximum gage height, 7.85 ft, Feb. 27, 1983. Prior to operation of Plant No. 1, no flow for most of some years. Minimum daily since 1985, 1.3 ft³/s, May 28, 2010.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11073495&agency_cd=USGS

Water-Data Report 2014

11073495 Cucamonga Creek near Mira Loma, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	4.0	4.8	30	8.7	17	298	79	32	7.5	4.4	5.8	4.9
2	3.3	4.7	19	10	34	59	51	31	4.8	5.5	7.8	3.9
3	4.3	9.1	8.4	4.5	36	47	13	27	3.6	5.7	28	3.4
4	5.4	11	10	6.9	24	41	16	11	2.9	6.1	13	3.0
5	19	5.6	11	14	11	38	11	6.6	2.7	4.5	2.4	3.1
6	27	9.7	20	14	42	40	9.0	16	3.5	5.4	9.5	5.3
7	14	4.9	44	9.5	36	41	8.5	3.7	3.7	3.5	7.5	9.2
8	7.4	6.9	30	11	31	41	8.4	2.2	3.4	1.9	5.4	11
9	75	3.7	20	16	33	39	6.1	2.0	2.6	2.1	4.7	8.6
10	42	8.1	19	17	32	33	5.3	2.1	2.9	2.8	6.9	5.9
11	16	3.5	6.6	16	22	34	7.1	3.4	2.4	5.7	6.3	5.3
12	15	13	13	20	15	32	5.1	1.7	1.8	6.0	6.0	5.4
13	19	3.4	8.4	20	8.6	28	8.7	1.6	1.8	7.9	3.7	6.6
14	11	3.5	10	26	8.8	28	7.6	2.3	2.0	6.2	6.0	9.3
15	9.2	3.3	14	20	8.3	24	8.1	2.5	4.1	6.6	6.3	5.4
16	6.3	5.5	9.4	18	12	21	12	1.6	2.1	7.1	5.7	21
17	6.7	7.4	16	17	9.6	18	3.3	5.0	2.0	11	6.8	5.0
18	6.1	8.4	12	26	10	18	3.5	4.6	2.5	5.8	3.8	5.5
19	6.6	9.3	53	32	12	19	8.0	2.6	1.9	4.9	2.0	7.1
20	10	15	29	22	12	16	20	2.3	2.3	6.3	5.7	16
21	8.4	112	10	22	7.3	13	10	2.7	2.3	3.3	3.7	18
22	4.5	33	16	11	12	15	9.8	5.7	2.2	2.4	3.9	9.4
23	8.6	29	9.2	14	14	17	6.0	3.3	1.6	2.3	5.4	6.5
24	5.0	26	11	10	29	18	5.9	1.9	2.3	1.9	9.3	14
25	5.3	22	17	7.1	38	16	13	4.6	3.6	3.1	5.7	6.0
26	7.0	30	11	16	46	27	117	3.3	3.3	4.8	5.5	5.4
27	11	21	13	14	116	11	29	2.1	4.5	6.5	3.6	16
28	54	29	12	14	680	11	18	4.8	6.1	5.4	3.9	28
29	17	20	17	9.4		16	6.2	8.0	6.4	5.3	4.1	13
30	4.5	19	13	13		15	30	1.8	6.5	5.1	7.0	6.3
31	11		5.7	24		17		4.4		5.4	6.0	
Total	444	482	518	483	1,356	1,091	536	204	99.3	155	201	268
Mean	14.3	16.1	16.7	15.6	48.5	35.2	17.9	6.57	3.31	5.00	6.50	8.92
Max	75.0	112	53.0	32.0	680	298	117	32.0	7.50	11.0	28.0	28.0
Min	3.30	3.30	5.70	4.50	7.30	11.0	3.30	1.60	1.60	1.90	2.00	3.00
Ac-ft	880	956	1,027	958	2,691	2,164	1,062	404	197	307	399	531

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	43.3	42.6	63.8	86.3	103	64.5	45.4	34.8	31.9	30.0	29.8	33.2
Max	223	102	328	442	350	198	114	69.4	57.1	53.4	51.8	52.0
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(1995)	(2006)	(2003)	(1992)	(2004)	(1992)	(1986)
Min	14.3	12.5	16.7	15.6	19.1	13.3	6.28	6.57	3.31	5.00	6.50	6.36
(WY)	(2014)	(2013)	(2014)	(2014)	(2013)	(2013)	(2013)	(2014)	(2014)	(2014)	(2014)	(2013)

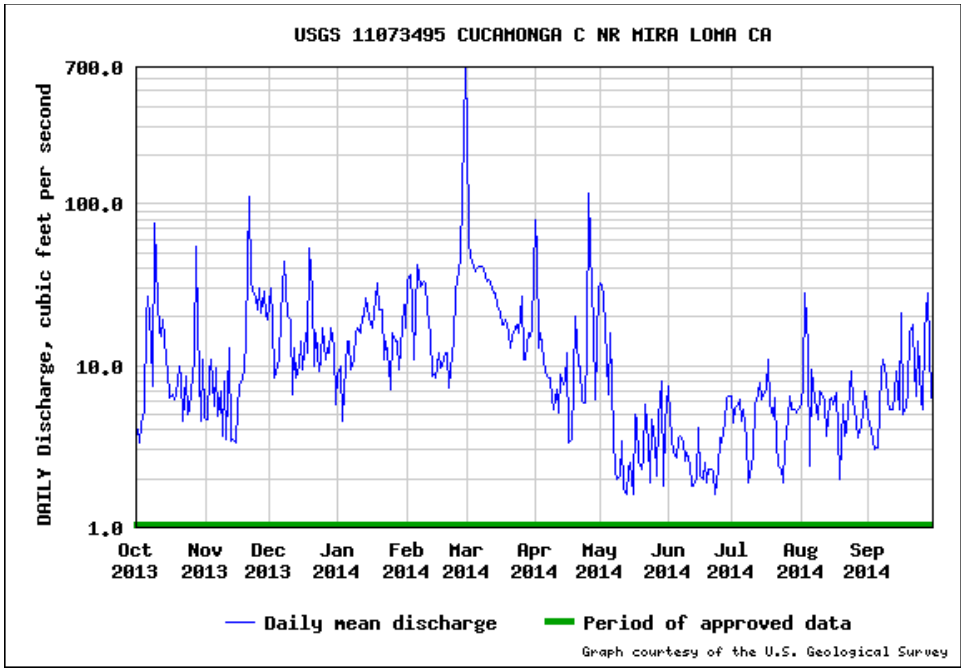
Water-Data Report 2014

11073495 Cucamonga Creek near Mira Loma, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1986 - 2014	
Annual total	5,836			
Annual mean	16.0		50.4	
Highest annual mean			137.4	2005
Lowest annual mean			15.8	2013
Highest daily mean	680.0	Feb 28	5,200	Jan 09, 2005
Lowest daily mean	1.60	May 13	1.30	May 28, 2010
Annual 7-day minimum	2.11	Jun 17	2.11	Jun 17, 2014
Maximum peak flow			17,300[a]	Oct 20, 2004
Maximum peak stage			6.58	Oct 20, 2004
Annual runoff (cfsm)	0.211		0.665	
Annual runoff (inches)	2.86		9.04	
10 percent exceeds	30.4		61.0	
50 percent exceeds	8.50		35.0	
90 percent exceeds	2.76		16.0	

[a] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11073360 Chino Creek at Schaefer Avenue, near Chino, CA

LOCATION - Lat 34°00'14", long 117°43'34" referenced to North American Datum of 1927, San Bernardino County, CA, Hydrologic Unit 18070203, in Santa Ana del Chino Grant, on right bank, 300 ft downstream from old Schaefer Avenue Bridge, 0.8 mi downstream from San Antonio Creek, and 1.5 mi southwest of Chino.

DRAINAGE AREA - 48.9 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - October 1969 to current year. CHEMICAL DATA: Water year 1998. SEDIMENT DATA: Water year 1998.

REVISED RECORDS - WDR CA-84-1: 1983 (instantaneous maximum discharge). WDR CA-95-1: 1992, 1993.

GAGE - Water-stage recorder and concrete-lined flood-control channel. Concrete dikes formed low-water control from October 1975 to Apr. 16, 1991. Elevation of gage is 685 ft above NGVD of 1929, from topographic map.

REMARKS - Records rated good. Since 1997, due to construction in area of gage, Schaefer Avenue no longer extends to the Chino Creek crossing. The Schaefer Avenue Bridge, however, remains. Flow mostly regulated by San Antonio Flood-Control Reservoir, capacity, 7,700 acre-ft. Natural streamflow affected by extensive ground-water withdrawals, diversions for power, domestic use, irrigation, and return flow from irrigated areas. Releases of imported water are made to the basin by the California Water Project at times in some years, via San Antonio Creek from Rialto Pipeline below San Antonio Dam, at a site approximately 11 mi upstream. During the current year, there were no reported releases from the California Water Project into the basin. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES OUTSIDE PERIOD OF RECORD - Flood of Jan. 25, 1969, reached a stage of 9.23 ft, present datum, discharge, 9,200 ft³/s, on basis of contracted-opening measurement at site 6.1 mi downstream.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 12,700 ft³/s, Feb. 27, 1983, gage height, 10.32 ft, from rating curve extended above 560 ft³/s, on basis of slope-conveyance study; no flow May 21, June 30, July 1, Oct. 30, Nov. 3, 1977.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11073360&agency_cd=USGS

Water-Data Report 2014

11073360 Chino Creek at Schaefer Avenue, near Chino, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	0.33	0.35	0.58	0.27	0.45	83	12	0.32	0.24	0.32	0.38	0.18
2	0.33	0.43	0.43	0.29	1.7	1.9	19	0.35	0.31	0.32	0.39	0.22
3	0.32	0.39	0.58	0.31	1.2	0.58	0.37	0.29	0.30	0.32	1.6	0.16
4	0.36	0.49	0.29	0.31	0.43	0.59	0.35	0.26	0.27	0.34	0.56	0.20
5	0.31	0.61	0.24	0.27	0.41	0.53	0.34	0.34	0.28	0.31	0.41	0.20
6	0.27	0.64	0.21	0.29	9.3	0.30	0.35	0.31	0.25	0.25	0.39	0.19
7	0.33	0.60	7.9	0.32	0.81	0.28	0.38	0.41	0.28	0.32	0.34	0.17
8	0.33	0.58	0.86	0.36	0.38	0.28	0.39	0.31	0.23	0.32	0.30	0.33
9	9.5	0.31	0.36	0.33	0.37	0.27	0.37	0.33	0.25	0.45	0.25	0.20
10	0.50	0.48	0.27	0.39	0.46	0.27	0.37	0.29	0.26	0.23	0.22	0.20
11	0.45	0.66	0.34	0.37	0.45	0.31	0.37	0.28	0.25	0.23	0.29	0.23
12	0.39	0.49	0.27	0.37	0.45	0.28	0.38	0.28	0.25	0.23	0.29	0.24
13	0.37	0.33	0.22	0.43	0.43	0.31	0.35	0.28	0.28	0.22	0.29	0.19
14	0.41	0.35	0.22	0.35	0.46	0.30	0.38	0.30	0.24	0.30	0.47	0.18
15	0.35	0.35	0.22	0.35	0.41	0.30	0.40	0.28	0.23	0.35	0.41	0.26
16	0.66	0.31	0.27	0.33	0.43	0.27	0.38	0.36	0.28	0.35	0.26	0.23
17	0.32	0.29	0.33	0.36	0.43	0.30	0.37	0.30	0.29	0.35	0.19	0.23
18	0.33	0.34	0.31	0.33	0.49	0.32	0.37	0.26	0.33	0.36	0.16	0.37
19	0.32	0.34	8.4	0.38	0.52	0.31	0.35	0.37	0.32	0.33	0.11	0.24
20	0.31	0.46	0.43	0.39	0.44	0.29	0.35	0.27	0.33	0.32	0.12	0.13
21	0.42	30	0.30	0.38	0.48	0.30	0.38	0.27	0.29	0.38	0.12	0.12
22	0.34	0.52	0.28	0.39	0.44	0.28	0.42	0.25	0.27	0.39	0.13	0.16
23	0.36	0.87	0.30	0.37	0.44	0.31	0.30	0.28	0.34	0.43	0.11	0.17
24	0.40	1.0	0.28	0.38	0.45	0.31	0.30	0.25	0.37	0.44	0.13	0.16
25	0.39	0.47	0.26	0.35	0.49	0.29	16	0.26	0.30	0.39	0.18	0.17
26	0.40	0.52	0.27	0.35	0.47	3.1	59	0.31	0.29	0.39	0.16	0.17
27	0.35	0.30	0.32	0.37	57	0.31	0.33	0.30	0.30	0.38	0.16	0.16
28	6.7	0.27	0.28	0.41	365	0.31	0.36	0.29	0.28	0.57	0.18	0.11
29	1.1	9.6	0.27	0.41		0.31	0.36	0.27	0.26	0.43	0.16	0.14
30	0.44	0.75	0.26	1.3		0.31	0.32	0.27	0.34	0.42	0.16	0.19
31	0.39		0.26	3.5		0.31		0.26		0.41	0.12	
Total	27.8	53.1	25.8	15.0	445	97.1	115	9.20	8.51	10.9	9.04	5.90
Mean	.90	1.77	.83	.48	15.9	3.13	3.85	.30	.28	.35	.29	.20
Max	9.50	30.0	8.40	3.50	365	83.0	59.0	.41	.37	.57	1.60	.37
Min	.27	.27	.21	.27	.37	.27	.30	.25	.23	.22	.11	.11
Ac-ft	55.1	105	51.2	29.8	882	193	229	18.2	16.9	21.5	17.9	11.7

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	15.5	14.6	24.4	32.9	36.4	24.3	8.95	10.9	14.6	16.7	14.4	12.5
Max	126	113	189	221	193	257	68.6	104	184	176	191	198
(WY)	(1979)	(1976)	(1976)	(2005)	(1980)	(1978)	(1974)	(1997)	(1976)	(1974)	(1974)	(1997)
Min	.061	.23	.53	.48	.33	.30	.14	.22	.062	.069	.14	.13
(WY)	(1978)	(1978)	(1970)	(2014)	(1972)	(1972)	(1977)	(1973)	(1977)	(1977)	(1976)	(1977)

Water-Data Report 2014

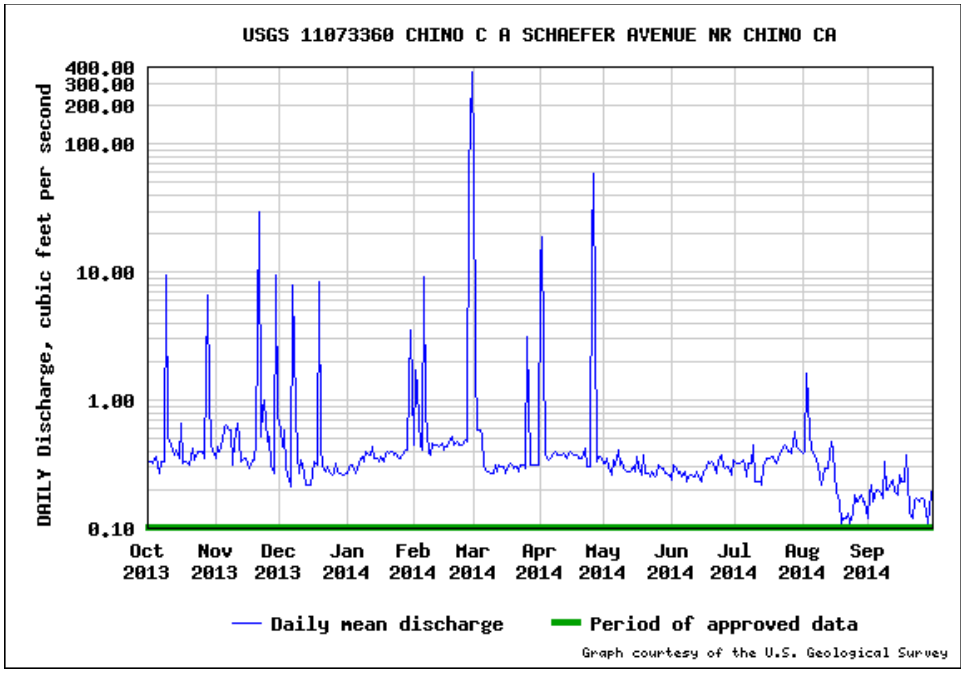
11073360 Chino Creek at Schaefer Avenue, near Chino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1970 - 2014	
Annual total	822.5			
Annual mean	2.25		18.8	
Highest annual mean			92.7	1974
Lowest annual mean			2.26	2014
Highest daily mean	365.0	Feb 28	2,060	Mar 01, 1978
Lowest daily mean	0.110	Aug 19	0.0	May 21, 1977
Annual 7-day minimum	0.126	Aug 18	0.024	Oct 29, 1977
Maximum peak flow			13,100[a,b]	Feb 27, 1983
Maximum peak stage			10.32	Feb 27, 1983
Annual runoff (cfsm)	0.046		0.384	
Annual runoff (inches)	0.626		5.22	
10 percent exceeds	0.580		58.3	
50 percent exceeds	0.330		1.30	
90 percent exceeds	0.206		0.350	

[a] Discharge affected by Regulation or Diversion

[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11065000 Lytle Creek at Colton, CA

LOCATION - Lat 34°04'44", long 117°18'17" referenced to North American Datum of 1927, San Bernardino County, CA, Hydrologic Unit 18070203, in San Bernardino Grant, on right bank, 400 ft downstream from Colton Avenue, 1,930 ft upstream from outlet end of channel, and 1.3 mi northeast of Colton.

DRAINAGE AREA - 186 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - October 1957 to September 1983, October 1984 to current year.

REVISED RECORDS - WDR CA-83-1: Drainage area.

GAGE - Water-stage recorder and concrete-lined flood-control channel. Datum of gage is 974.67 ft above NGVD of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS - Records fair. Estimated daily vaules are considered poor. Flow partly regulated by Lytle Creek spreading grounds 3.2 mi upstream. Diversions upstream from station for irrigation, power development, domestic use, and ground-water replenishment. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 17,500 ft³/s, Mar. 4, 1978, gage height, 14.8 ft, from rating curve extended above 4,200 ft³/s, on basis of discharge for design flood at gage height 21.4 ft; no flow for many days most years.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web
(USGS Water Data for the Nation), accessed [February 10, 2015],
at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?
dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11065000&agency_cd=USGS

Water-Data Report 2014

11065000 Lytle Creek at Colton, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	0.00	0.00	e0.00	e0.00	e0.00	28	0.49	1.6	0.32	0.34	0.72	0.00
2	0.00	0.00	e0.00	e0.00	e0.00	0.42	1.9	0.96	0.36	0.33	1.0	0.05
3	0.00	0.00	e0.00	e0.00	e0.00	0.13	0.27	1.4	0.38	0.37	e76	0.18
4	0.00	0.00	e0.00	e0.00	e0.00	0.18	e0.72	0.52	0.37	0.27	e1.1	0.00
5	0.00	0.00	e0.00	e0.00	e0.00	0.05	0.59	0.48	0.44	0.19	0.00	0.00
6	0.00	0.00	e0.00	e0.00	e0.00	0.18	0.38	e0.30	0.35	0.25	0.00	0.00
7	0.00	0.00	e0.00	e0.00	e0.00	0.32	0.19	0.83	0.34	0.20	0.00	5.5
8	0.00	0.00	e0.00	e0.00	e0.00	0.60	0.31	0.09	1.0	0.28	0.00	0.32
9	1.0	0.00	e0.00	e0.00	e0.00	0.35	0.49	30	0.30	0.33	0.00	0.00
10	0.00	0.00	e0.00	e0.00	e0.00	0.51	e0.52	0.71	0.30	0.36	0.00	0.00
11	0.00	0.00	e0.00	e0.00	e0.00	0.54	0.75	0.23	0.22	0.28	0.00	0.00
12	0.00	0.00	e0.00	e0.00	e0.00	1.0	0.75	0.09	0.34	0.29	0.00	0.00
13	0.00	0.00	e0.00	e0.00	e0.00	0.71	0.55	0.17	0.40	0.30	0.00	0.00
14	0.00	0.00	e0.00	e0.00	e0.00	0.47	0.26	0.19	0.38	0.04	0.00	0.00
15	0.00	0.00	e0.00	e0.00	e0.00	0.51	0.43	0.24	0.95	0.01	0.00	0.00
16	0.00	0.00	e0.00	e0.00	e0.00	0.70	0.57	0.25	0.05	0.04	0.13	0.00
17	0.00	0.00	e0.00	e0.00	e0.00	0.58	0.67	0.30	0.18	0.10	0.50	0.00
18	0.00	0.00	e0.00	e0.00	e0.65	0.80	0.50	0.36	0.22	0.23	0.00	0.00
19	0.00	0.00	e0.00	e0.00	1.1	0.77	0.42	0.36	0.24	0.21	0.01	0.00
20	0.00	e0.00	e0.00	e0.00	0.44	0.58	0.35	0.45	0.24	0.12	4.6	0.00
21	0.00	e126	e0.00	e0.00	0.69	0.43	0.36	0.25	0.27	0.23	0.04	0.00
22	0.00	e10	e0.00	e0.00	0.93	0.25	0.54	0.39	0.32	0.06	0.00	0.00
23	0.00	e0.00	e0.00	e0.00	0.63	0.07	0.30	0.34	0.34	0.05	0.00	0.00
24	0.00	e0.00	e0.00	e0.00	0.51	0.34	0.49	0.37	0.44	0.03	0.01	0.00
25	0.00	e0.00	e0.00	e0.00	0.40	0.46	6.4	0.28	0.43	0.00	0.00	0.00
26	0.00	e0.00	e0.00	e0.00	1.4	0.22	17	0.28	0.41	0.09	0.00	0.00
27	0.00	e0.00	e0.00	e0.00	5.0	0.20	0.15	0.29	0.39	0.25	0.38	0.00
28	0.00	e0.00	e0.00	e0.00	282	0.24	0.18	0.36	0.63	0.56	e0.49	0.00
29	0.00	e0.00	e0.00	e0.00		0.22	1.2	0.37	2.5	0.59	0.23	0.00
30	0.00	e0.00	e0.00	e0.00		0.24	2.0	0.38	1.6	0.82	e0.00	0.00
31	0.00		e0.00	e0.00		0.25		0.42		0.67	0.00	
Total	1.00	136	.000	.000	294	40.3	39.7	43.3	14.7	7.89	85.2	6.05
Mean	.032	4.53	.000	.000	10.5	1.30	1.32	1.40	.49	.25	2.75	.20
Max	1.00	126	.000	.000	282	28.0	17.0	30.0	2.50	.82	76.0	5.50
Min	.000	.000	.000	.000	.000	.050	.15	.090	.050	.000	.000	.000
Ac-ft	1.98	270	.000	.000	583	80.0	78.8	85.8	29.2	15.6	169	12.0

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.14	3.76	9.63	18.9	27.6	15.7	4.07	3.51	1.99	1.23	.82	.61
Max	83.2	79.1	142	318	363	326	57.3	87.6	61.3	35.4	17.1	9.58
(WY)	(2005)	(1966)	(2011)	(1969)	(1980)	(1978)	(1969)	(1969)	(1978)	(1978)	(1969)	(1980)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(1958)	(1958)	(1959)	(1963)	(1961)	(1959)	(1961)	(1959)	(1958)	(1958)	(1958)	(1958)

Water-Data Report 2014

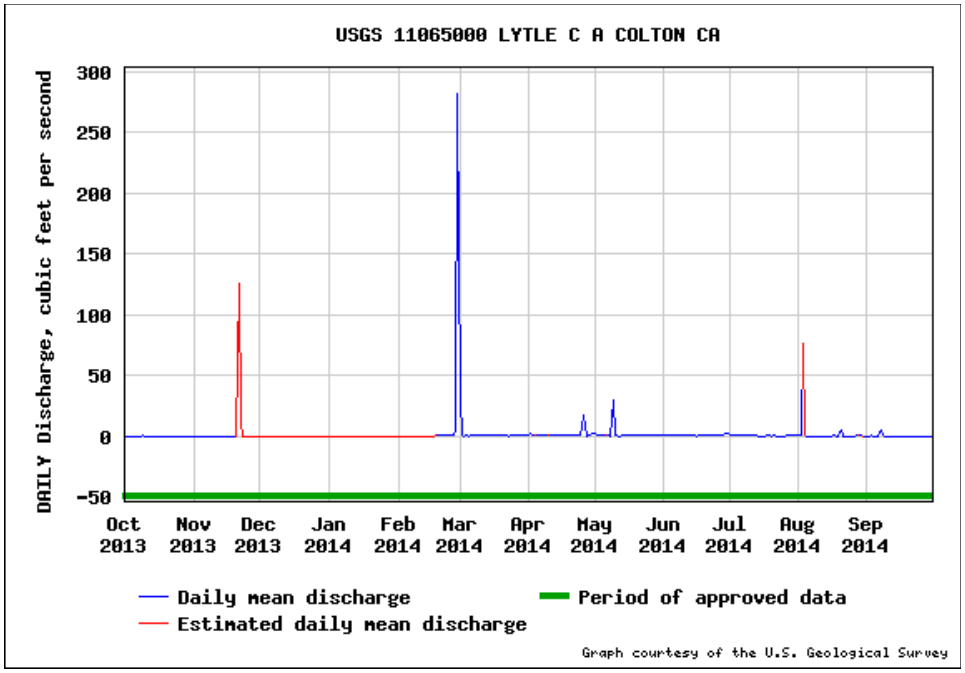
11065000 Lytle Creek at Colton, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1958 - 2014	
Annual total	667.9			
Annual mean	1.83		7.40	
Highest annual mean			65.4	1969
Lowest annual mean			0.008	1977
Highest daily mean	282.0	Feb 28	5,040	Jan 25, 1969
Lowest daily mean	0.0	Oct 01	0.0	Oct 01, 1957
Annual 7-day minimum	0.0	Sep 09	0.0	Apr 18, 1968
Maximum peak flow			17,500[a,b]	Mar 04, 1978
Maximum peak stage			14.80	Mar 04, 1978
Annual runoff (cfsm)	0.010		0.040	
Annual runoff (inches)	0.134		0.540	
10 percent exceeds	0.714		3.10	
50 percent exceeds	0.010		0.0	
90 percent exceeds	0.0		0.0	

[a] Discharge affected to unknown degree by Regulation or Diversion

[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11060400 Warm Creek near San Bernardino, CA

LOCATION - Lat 34°04'42", long 117°17'58" referenced to North American Datum of 1927, San Bernardino County, CA, Hydrologic Unit 18070203, in San Bernardino Grant, on left bank, 0.2 mi downstream from Interstate Highway 215 Bridge, and 2.0 mi southwest of San Bernardino.

DRAINAGE AREA - 11 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - February 1964 to September 1972, October 1974 to current year. CHEMICAL DATA: Water years 1999-2004. SPECIFIC CONDUCTANCE: Water years 1999-2001. WATER TEMPERATURE: Water years 1999-2001. SEDIMENT DATA: Water years 1999-2004.

REVISED RECORDS - WDR CA-83-1: Drainage area. WDR CA-92-1: 1978 (instantaneous maximum discharge), 1980-81 (instantaneous maximum discharge), 1983-86 (instantaneous maximum discharge).

GAGE - Water-stage recorder and concrete-lined flood-control channel. Elevation of gage is 960 ft above NGVD of 1929, from topographic map. Prior to Oct. 1, 1974, at site 0.1 mi upstream at different datum.

REMARKS - Records fair except for estimated daily discharges, which are poor. Natural channel prior to October 1972; concrete-lined channel since October 1974. Possible diversion during high flows into Warm Creek from Lytle Creek flood detention basin 3.4 mi upstream. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 8,500 ft³/s, Mar. 4, 1978, gage height, 4.88 ft, from rating curve extended above 420 ft³/s, on basis of step-backwater analysis, maximum gage height, 6.33 ft, Nov. 22, 1965, site and datum then in use; no flow at times in some years.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11060400&agency_cd=USGS

Water-Data Report 2014

11060400 Warm Creek near San Bernardino, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	0.13	0.02	0.26	0.23	0.27	49	2.8	0.00	0.13	0.18	0.14	0.00
2	0.25	0.00	0.46	0.29	0.19	1.0	13	0.00	0.16	0.23	1.2	0.00
3	0.19	0.00	0.58	0.41	0.41	0.47	1.2	0.00	0.31	0.28	61	0.00
4	0.16	0.21	0.60	0.45	0.55	0.48	0.82	0.02	0.25	0.41	1.5	0.02
5	0.11	0.27	0.45	0.24	0.41	0.32	0.76	0.00	0.21	1.1	0.14	0.00
6	0.12	0.29	0.47	0.54	2.2	0.23	0.59	0.00	0.29	3.0	0.03	0.00
7	0.22	0.22	16	0.68	e1.9	0.16	1.4	0.00	0.32	4.1	0.03	113
8	0.32	0.22	0.56	0.77	e0.40	0.13	2.2	0.01	0.30	0.69	0.02	4.1
9	26	0.12	0.64	0.66	e0.40	0.06	2.4	0.00	0.23	0.14	0.01	0.26
10	1.0	0.11	0.62	0.53	e0.35	0.13	2.6	0.00	0.40	0.21	0.11	0.03
11	0.40	0.20	0.48	0.52	0.26	0.12	2.6	0.00	0.29	0.10	0.01	0.00
12	0.18	0.74	0.45	0.26	0.28	0.20	2.5	0.00	0.32	0.07	0.10	0.00
13	0.18	0.52	0.46	0.48	0.32	0.16	2.0	0.00	0.30	0.06	0.00	0.00
14	0.25	0.84	0.27	0.17	e0.25	0.07	2.0	0.00	0.24	0.12	0.00	0.00
15	0.14	0.30	0.20	0.32	0.12	0.04	1.9	0.53	0.21	0.10	0.00	0.00
16	0.53	0.41	0.38	0.39	0.10	0.00	1.9	0.02	0.45	0.49	0.01	0.00
17	0.20	0.11	0.46	0.52	0.22	0.14	1.9	0.16	0.33	0.33	0.00	0.00
18	0.29	0.26	0.44	0.39	0.28	0.12	1.4	0.14	0.33	0.29	0.00	0.00
19	0.36	0.36	14	0.27	0.36	0.06	1.4	0.18	0.30	0.18	0.00	0.00
20	0.11	1.0	1.6	0.24	0.21	0.00	1.6	0.20	0.27	0.19	20	0.00
21	0.51	207	0.65	0.38	0.20	0.08	1.6	0.33	0.20	0.60	0.74	0.00
22	0.72	8.7	0.30	0.14	0.09	0.00	1.7	0.17	0.58	0.19	0.12	0.03
23	0.36	0.19	0.57	0.33	0.08	0.00	1.7	0.15	0.56	0.20	0.03	0.00
24	0.29	0.22	0.35	0.81	0.24	0.00	1.4	0.13	0.20	0.45	0.01	0.00
25	0.21	0.39	0.21	0.36	0.31	0.00	5.9	0.06	0.20	0.16	0.02	0.00
26	0.08	0.58	0.49	0.34	0.44	0.08	39	0.19	0.27	0.29	0.03	0.00
27	0.07	0.62	0.42	0.39	12	0.00	0.07	0.10	0.22	0.06	0.08	0.00
28	0.68	0.35	0.42	0.22	183	0.00	0.05	0.03	0.14	0.08	0.00	0.00
29	0.58	0.35	0.17	0.18		0.00	0.00	0.00	0.11	0.14	0.04	0.00
30	0.27	0.28	0.51	0.40		0.00	0.00	0.04	0.14	0.36	0.00	0.00
31	0.03		0.32	0.43		0.00		0.08		0.25	0.00	
Total	34.9	225	43.8	12.3	206	53.0	98.4	2.54	8.26	15.0	85.4	117
Mean	1.13	7.50	1.41	.40	7.35	1.71	3.28	.082	.28	.49	2.75	3.91
Max	26.0	207	16.0	.81	183	49.0	39.0	.53	.58	4.10	61.0	113
Min	.030	.000	.17	.14	.080	.000	.000	.000	.11	.060	.000	.000
Ac-ft	69.3	446	86.9	24.5	408	105	195	5.04	16.4	29.9	169	233

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	5.96	7.48	10.5	14.3	28.9	24.6	11.4	8.88	6.53	5.69	5.53	5.20
Max	32.4	33.1	48.3	41.2	418	376	44.2	86.7	43.6	34.5	50.6	30.3
(WY)	(1984)	(1986)	(2011)	(1993)	(1978)	(1978)	(1986)	(1980)	(1980)	(1980)	(1983)	(1983)
Min	.12	.087	.40	.066	.72	1.33	.17	.082	.067	.059	.061	.023
(WY)	(1978)	(1996)	(1980)	(2003)	(2002)	(2008)	(1977)	(2014)	(1978)	(2002)	(1979)	(1979)

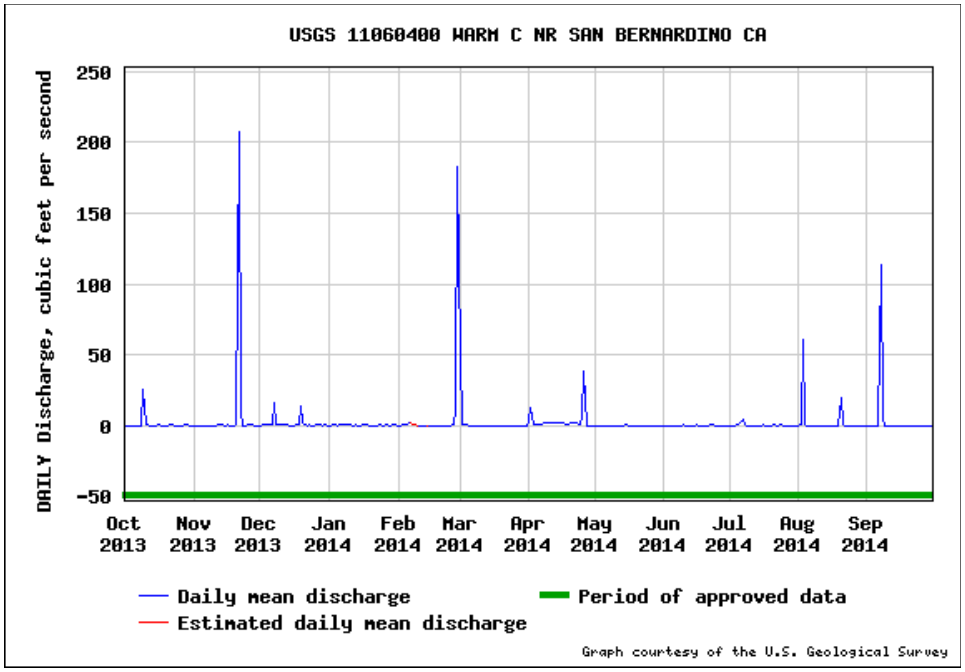
Water-Data Report 2014

11060400 Warm Creek near San Bernardino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1975 - 2014	
Annual total	901.9			
Annual mean	2.47		11.1	
Highest annual mean			70.5	1978
Lowest annual mean			1.23	2002
Highest daily mean	207.0	Nov 21	3,400	Mar 01, 1978
Lowest daily mean	0.0	Nov 02	0.0	Nov 29, 1974
Annual 7-day minimum	0.0	Sep 11	0.0	Jul 21, 1993
Maximum peak flow			8,500[a]	Mar 04, 1978
Maximum peak stage			4.88	Mar 04, 1978
Annual runoff (cfsm)	0.225		1.01	
Annual runoff (inches)	3.05		13.8	
10 percent exceeds	1.44		25.0	
50 percent exceeds	0.230		2.20	
90 percent exceeds	0.0		0.130	

[a] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2014

11057500 San Timoteo Creek near Loma Linda, CA

LOCATION - Lat 34°03'41", long 117°16'00" referenced to North American Datum of 1927, in NW 1/4 NE 1/4 sec.26, T.1 S., R.4 W., San Bernardino County, CA, Hydrologic Unit 18070203, on left bank, 1,500 ft upstream from Redlands Boulevard Bridge, and 0.6 mi northwest of Loma Linda.

DRAINAGE AREA - 125 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - October 1954 to September 1965, February 1968 to September 1975, April 1979 to current year. Discharge measurements only, October 1997 to September 1998. WATER TEMPERATURE: Water years 1979-82, 1992-94. SEDIMENT DATA: Water years 1979-82, 1992-94.

GAGE - Water-stage recorder and concrete-lined flood-control channel. Elevation of gage is 1,040 ft above NGVD of 1929, from topographic map. Prior to April 1979, water-stage recorder at site 0.45 mi downstream at different datum. April 1979 to Dec. 7, 1997, at site 0.25 mi downstream at different datum.

REMARKS - Records poor. Since Dec. 7, 1997, channel is a trapezoidal concrete floodway. No regulation upstream from station. Natural flow affected by pumping and return flow from irrigated areas. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 15,000 ft³/s, Feb. 25, 1969, gage height, 8.2 ft, from floodmark, from rating curve extended above 2,100 ft³/s, on basis of slope-conveyance study of peak flow, at site and datum then in use; no flow for many days most years.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2015, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 10, 2015], at URL http://nwis.waterdata.usgs.gov/nwis/wys_rpt?dd_parm_cds=001_00060&adr_begin_date=2013-10-01&adr_end_date=2014-09-30&site_no=11057500&agency_cd=USGS

Water-Data Report 2014

11057500 San Timoteo Creek near Loma Linda, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2013-10-01 to 2014-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014
1	7.0	6.5	11	6.6	7.9	158	16	1.1	1.5	0.72	0.26	0.74
2	6.7	4.9	10	6.2	8.1	92	25	1.1	2.0	1.1	1.1	0.65
3	6.2	4.8	11	5.9	8.6	11	12	1.2	2.2	0.74	38	0.97
4	6.9	5.2	10	4.5	7.8	4.6	11	1.6	1.5	1.2	34	0.96
5	3.5	4.7	10	6.3	7.8	2.3	10	2.5	0.77	7.0	1.1	0.56
6	4.2	5.0	10	6.6	8.5	1.2	11	3.6	0.62	0.85	0.57	0.64
7	8.5	7.1	13	7.1	9.1	0.75	10	4.3	0.73	1.00	0.59	0.70
8	13	7.8	11	6.0	7.1	0.57	9.2	4.4	1.2	1.0	1.2	0.44
9	25	6.4	8.1	6.5	7.8	0.38	8.4	4.4	1.0	0.91	0.50	0.51
10	39	13	6.9	6.8	8.1	0.61	7.8	5.2	1.1	0.83	0.74	0.97
11	15	9.8	6.1	6.7	11	0.74	9.2	4.7	0.91	1.5	0.88	0.52
12	9.4	9.3	6.3	7.7	11	0.84	10	5.6	0.72	1.3	0.55	0.90
13	11	10	5.3	8.3	5.2	1.2	12	4.4	0.66	1.5	0.71	0.86
14	19	8.0	6.3	8.6	4.7	1.6	11	3.7	1.7	1.1	1.2	1.2
15	16	6.9	4.9	6.9	4.6	1.7	8.1	3.5	1.6	1.5	0.57	0.48
16	8.8	7.7	5.3	6.3	4.0	2.3	7.5	3.2	1.4	1.0	0.38	0.31
17	5.0	12	4.7	6.2	3.6	3.6	7.0	2.2	1.4	1.1	0.22	0.33
18	7.3	11	4.8	5.7	4.0	7.0	7.4	3.0	1.5	0.83	0.16	0.27
19	7.7	12	6.2	6.3	3.3	8.0	9.4	3.4	1.4	0.79	0.21	0.58
20	3.7	13	7.0	6.3	3.6	8.6	9.1	2.9	1.2	0.89	3.1	1.4
21	4.5	e125	6.9	5.9	2.5	11	7.5	3.5	1.3	1.5	1.8	1.1
22	4.7	e88	5.8	7.4	1.5	10	5.1	2.3	1.6	0.61	1.1	1.3
23	3.9	20	7.3	7.2	1.9	10	4.1	2.3	2.0	0.40	1.1	1.1
24	3.2	16	6.9	8.5	2.3	12	2.9	3.3	1.3	0.59	0.38	1.6
25	6.0	15	6.3	7.4	2.1	11	5.2	4.7	1.0	0.66	0.64	2.0
26	9.9	15	6.2	9.3	2.3	12	33	3.4	1.2	0.62	0.47	1.3
27	9.5	14	5.3	9.5	4.2	11	5.1	3.2	1.2	0.54	0.28	1.9
28	9.4	13	5.1	7.9	165	10	5.0	2.6	0.99	0.80	0.30	2.5
29	13	13	5.5	6.8		11	2.3	2.2	0.97	0.85	0.80	3.3
30	9.2	12	5.3	6.9		12	1.3	2.6	0.84	0.76	0.30	2.9
31	9.5		6.3	7.9		13		2.0		0.46	1.3	
Total	306	496	225	216	318	430	283	98.1	37.5	34.6	94.5	33.0
Mean	9.86	16.5	7.25	6.97	11.3	13.9	9.42	3.16	1.25	1.12	3.05	1.10
Max	39.0	125	13.0	9.50	165	158	33.0	5.60	2.20	7.00	38.0	3.30
Min	3.20	4.70	4.70	4.50	1.50	.38	1.30	1.10	.62	.40	.16	.27
Ac-ft	606	984	446	429	630	853	561	195	74.4	68.7	187	65.4

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2014, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	1.96	2.51	5.71	12.7	14.2	7.93	3.15	1.53	1.12	.72	.75	.85
Max	39.8	16.5	76.2	124	186	53.7	23.1	8.93	7.43	3.65	3.05	3.03
(WY)	(2005)	(2014)	(2011)	(2005)	(1969)	(1991)	(2006)	(2010)	(2013)	(1968)	(2014)	(1965)
Min	.000	.000	.16	.079	.17	.000	.000	.000	.000	.000	.000	.000
(WY)	(1996)	(1996)	(1996)	(1972)	(1968)	(1997)	(1979)	(1996)	(1996)	(1995)	(1995)	(1995)

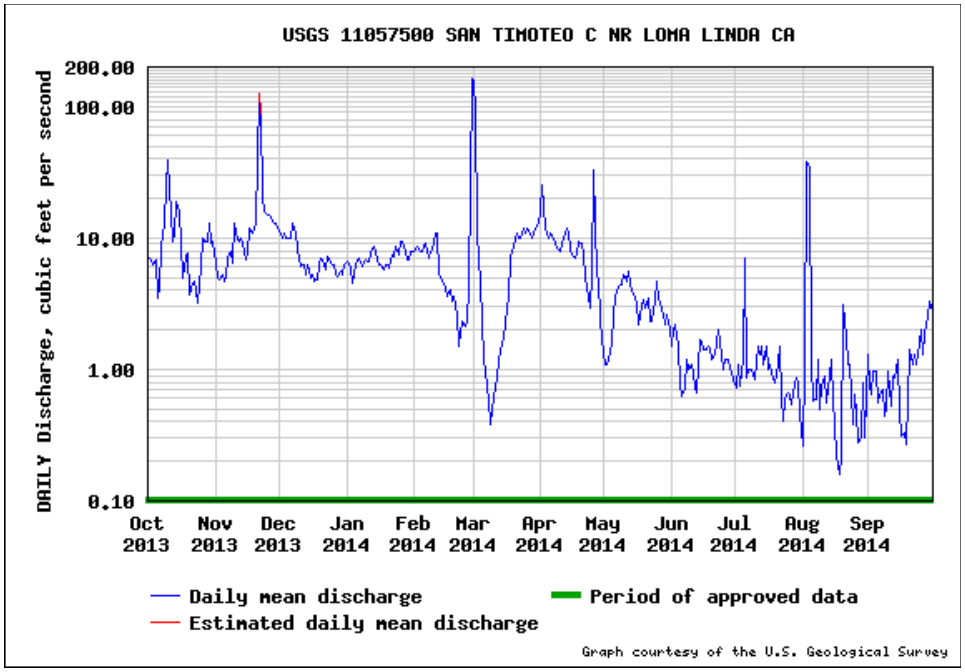
Water-Data Report 2014

11057500 San Timoteo Creek near Loma Linda, CA -- Continued

SUMMARY STATISTICS

	Water Year 2014		Water Years 1955 - 2014	
Annual total	2,571			
Annual mean	7.04		4.34	
Highest annual mean			25.3	2005
Lowest annual mean			0.155	1979
Highest daily mean	165.0	Feb 28	3,500	Feb 25, 1969
Lowest daily mean	0.160	Aug 18	0.0	Feb 04, 1968
Annual 7-day minimum	0.453	Aug 24	0.0	Nov 01, 2002
Maximum peak flow			15,000	Feb 25, 1969
Maximum peak stage			8.50[a]	Feb 16, 1980
Annual runoff (cfsm)	0.056		0.035	
Annual runoff (inches)	0.765		0.472	
10 percent exceeds	11.4		5.20	
50 percent exceeds	4.60		0.700	
90 percent exceeds	0.646		0.0	

[a] Gage datum changed during this year



APPENDIX B

DAILY PRECIPITATION DATA
FOR SAN BERNARDINO

WATER YEAR 2013-14

TABLE B-1

DAILY PRECIPITATION
USGS GILBERT STREET PRECIPITATION GAGE AT SAN BERNARDINO
NEAR FORMER COUNTY HOSPITAL SITE
(inches)

	2013			2014								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.00	0.00	0.00	0.00	0.00	0.55	0.12	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.30	0.00
3	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00
4	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.20	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.50
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
9	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00
21	0.00	3.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.03	0.24	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.06	0.00	0.00	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.02	0.03	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.01		0.01	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.03		0.00		0.00		0.00	0.00	
Total	0.81	3.55	0.48	0.04	2.40	0.59	1.01	0.00	0.00	0.00	1.99	1.55

Total Rainfall = 12.42 Inches

APPENDIX C

SANTA ANA RIVER WATERMASTER
FINANCIAL STATEMENTS WITH REPORT
ON EXAMINATION BY
ORANGE COUNTY WATER DISTRICT CONTROLLER

WATER YEAR 2013-14

SINCE 1933

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

March 2, 2015

Santa Ana River Watermaster
C/O SBVMWD
P.O. Box 5906
San Bernardino, CA 92412-5906

Subject: Review of Fiscal Year 2013-14 Financial Transactions

Gentlemen:

I have reviewed the transactions and prepared the attached Statement of Assets and Liabilities comprised of cash transactions for the Santa Ana River Watermaster, and the related Statement of Revenue, Expenses and Changes in Fund Balance for the year ended June 30, 2014. This review includes examining supporting documentation that supports the amounts and disclosures in the financial statements. We have reviewed minutes of meetings, annual budgets as well as Bank of America Checking and Savings Accounts' transactions and statements, and have concluded that all transactions were properly recorded.

Best Regards,

ORANGE COUNTY WATER DISTRICT

Vishav Sharma
Finance Manager

CC: R. Fick

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

JUNE 30, 2014

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

JUNE 30, 2014

ASSETS

Cash in Bank Account	$ 12,701

LIABILITIES AND NET ASSETS

Total Net Assets	$ 12,701

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUE AND EXPENSES ARISING FROM CASH TRANSACTIONS

FOR THE PERIOD JULY 1, 2013 - JUNE 30, 2014

	Actual	Budget	Variance - Favorable (Unfavorable)	
REVENUE COLLECTED:				
Water District Contributions				
Orange County Water District	$ -	$ 5,600	(5,600)	
Inland Empire Utilities Agency	-	2,800	(2,800)	
Western Municipal Water District	-	2,800	(2,800)	
San Bernardino Valley Municipal Water District	-	2,800	(2,800)	
TOTAL REVENUE COLLECTED	$ -	$ 14,000	$ (14,000)	(A)
EXPENSES PAID:				
Professional Engineering Services	$ -	$ 12,500	12,500	(B)
Administrative Expenses:				
Auditing Services				
Reproduction of Annual Report	-	1,500	1,500	(C)
Bank service charges				
	$ -	$ 14,000	$ 14,000	
CHANGE IN NET ASSETS	$ -			
NET ASSETS - BEGINNING OF THE YEAR	$ 12,701			
NET ASSETS - END OF THE YEAR	$ 12,701			

(A) Revenue for the fiscal year 2013-14 were received in fiscal year 2014-15

(B) For engineering service expenditure of 2013-14, the payment checks were issued in fiscal year 2014-15 to WMWD and OCWD

(C) For administrative expenes of 2013-14, the payment was made in fiscal year 2014-15 to WMWD and OCWD

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 2014

1. SIGNIFICANT ACCOUNTING POLICIES:

Basis of Accounting:

The Santa Ana River Watermaster's ("Watermaster") policy is to prepare its financial statements on the cash basis of accounting consequently, certain revenues are recognized when received rather than when earned, and certain expenses are recognized when cash is disbursed rather than when the obligation is incurred.

2. ORGANIZATION AND HISTORY:

The Santa Ana River Watermaster is composed of a committee of five representatives from four water districts. Two representatives serve from Orange County Water District and one representative each serves from the Inland Empire Utilities Agency, Western Municipal Water District and San Bernardino Valley Municipal Water District. The committee was established on April 23, 1969, by order of the Superior Court of California in Orange County as part of a judgment resulting from a lawsuit by the Orange County Water District as plaintiff vs. City of Chino, et al, as defendants.

Costs and expenses incurred by the individual representatives are reimbursed directly from the water districts. Collective Watermaster costs and expenses are budgeted and paid for by the Watermaster after receiving contributions from the water districts. Water districts contributions are made in the following ratios:

Orange County Water District	40%
Inland Empire Utilities Agency	20%
Western Municipal Water District	20%
San Bernardino Valley Municipal Water District	20%
Total	100%

The Water master issues a report each year to satisfy its obligation to monitor and test water flows from the Upper Area to the Lower Area of the Santa Ana River.

3. CASH IN BANK:

The following disclosures are made in accordance with Statement No. 3 of the Governmental Accounting Standards Board (GASB 3):

Cash at June 30, 2014 consisted of the following:

Bank of America:	$12,701

All cash is fully insured by the FDIC.

APPENDIX D

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS

WATER YEAR 2013-14

There was no discharge of HGMP water to Santa Ana River in the Bunker Hill area during the 2013-14 water year.

APPENDIX E

WATER QUALITY AND DISCHARGE OF WATER RELEASED BY MWDSC TO SAN ANTONIO CREEK NEAR UPLAND (CONNECTION OC-59)

WATER YEAR 2013-14

There was no discharge of OC-59 water to Santa Ana River during the 2013-14 water year. There were updated TDS calculations for the years, 2003-04, 2004-05, 2005-06, 2010-11, and 2012-13 where only evapotranspiration losses had been taken into account to adjust for TDS associated with OC-59 water arriving at Prado. The updates are reflected in Table E-5 for each water year.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE

WATER YEAR 2003-04

2003 - 04

Method 2 **First Step is to get value for q_{bf}**

Calculation of SAR Baseflow TDS

Note: Baseflow TDS was calculated for the days where there were no purchaces of OC-59 water, low interference (storm flow and other purchases), and no storage behind Prado Dam.

$$Qp*qp = Qbf*qbf + Qad*qad$$

			Sept 28 - Oct 15, 2004	
Q_p =	total inflow at Prado [1]	=	6,454	af
q_p =	total flow TDS at Prado [2]	=	613	mg/L
Q_{bf} =	base flow at Prado [1]	=	6,381	af
q_{bf} =	base flow TDS at Prado	=	Unknown	mg/L
Q_{ad} =	Arlington Desalter flow [1]	=	73	af
q_{ad} =	Arlington Desalter flow TDS [2]	=	280	mg/L

$$q_{bf} = (Q_p*q_p - Q_{ad}*q_{ad})/Q_{bf}$$

		q_{bf}	=	**617** mg/L

2003 - 04 **Next step is to solve for q_{59}:** **May - Sept, 2004**

Using the period of OC-59 flow at Prado **81 days** [4]

Q_p =	total inflow at Prado [1]	=	33,140	af
q_p =	total flow TDS at Prado [2]	=	578	mg/L
Q_{bf} =	base flow at Prado [1]	=	27,978	af
q_{bf} =	base flow TDS at Prado [3]	=	617	mg/L
Q_{ad} =	Arlington Desalter flow [1]	=	254	af
q_{ad} =	Arlington Desalter flow TDS [2]	=	313	mg/L
Q_{59} =	OC-59 flow reaching Prado [1]	=	4,908	af
q_{59} =	OC-59 flow TDS reaching Prado	=	Unknown	mg/L

$$q_{59} = (Q_p*q_p - Q_{bf}*q_{bf} - Q_{ad}*q_{ad})/Q_{59}$$

	q_{59}	=	**369** mg/L
Flow Weighed TDS in Total Base and Storm Flow		=	502 mg/L
Change in Cumulative Credit		**=**	**718** af

NOTES:

[1] For specific days in Water Year 2003-04.

[2] Flow-weighted TDS at Prado.

[3] Baseflow TDS was calculated above.

[4] Select days where there was no storm flow when OC-59 water released.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE
WATER YEAR 2004-05

2004 - 05

Method 2 **First Step is to get value for q_{bf}**

Calculation of SAR Baseflow TDS

Note: Baseflow TDS was calculated for the days where there were no purchaces of OC-59

$Qp*qp = Qbf*qbf + Qad*qad$

			Oct 1 - 15, 2004	
Q_p =	total inflow at Prado [1]	=	5,417	af
q_p =	total flow TDS at Prado [2]	=	616	mg/L
Q_{bf} =	base flow at Prado [1]	=	5,349	af
q_{bf} =	base flow TDS at Prado	=	Unknown	mg/L
Q_{ad} =	Arlington Desalter flow [1]	=	68	af
q_{ad} =	Arlington Desalter flow TDS [2]	=	280	mg/L

$q_{bf} = (Q_p*q_p - Q_{ad}*q_{ad})/Q_{bf}$

	q_{bf}	=	**624**	mg/L

2004 - 05 **Next step is to solve for q_{59}:** **Sept, 2005**

Using the period of OC-59 flow at Prado **12 days**

Q_p =	total inflow at Prado [1]	=	5,675	af
q_p =	total flow TDS at Prado [2]	=	578	mg/L
Q_{bf} =	base flow at Prado [1]	=	4,226	af
q_{bf} =	base flow TDS at Prado [3]	=	624	mg/L
Q_{sf} =	storm flow at Prado	=	576	af
q_{sf} =	storm flow TDS at Prado [4]	=	275	mg/L
Q_{sjw} =	San Jacinto Watershed outflow	=	290	af
q_{sjw} =	San Jacinto Watershed outflow TDS	=	780	af
Q_{59} =	OC-59 flow reaching Prado [1]	=	583	af
q_{59} =	OC-59 flow TDS reaching Prado	=	Unknown	mg/L

$q_{59} = (Q_p*q_p - Q_{bf}*q_{bf} - Q_{sf}*q_{sf} - Q_{sjw}*q_{sjw})/Q_{59}$

	q_{59}	=	**443**	mg/L
Flow Weighed TDS in Total Base and Storm Flow		=	348	mg/L
	Change in Cumulative Credit	**=**	**0**	af

NOTES:

[1] For specific days in Water Year 2004-05.

[2] Flow-weighted TDS at Prado.

[3] Baseflow TDS was calculated above.

[4] Water Years 2004-05 and 2009-10 (where storm flow was the dominant component) were used to obtain representative Storm Flow TDS of 275 at Prado.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE

WATER YEAR 2005-06

2005 - 06

Method 2 **First Step is to get value for q_{bf}**

Calculation of SAR Baseflow TDS

Note: Baseflow TDS was calculated for the days where there were no purchaces of OC-59

Qp*qp = Qbf*qbf

			Jul 18 - Aug 3, 2006	
Q_p =	total inflow at Prado [1]	=	6,075	af
q_p =	total flow TDS at Prado [2]	=	593	mg/L
Q_{bf} =	base flow at Prado [1]	=	6,075	af
q_{bf} =	base flow TDS at Prado	=	Unknown	mg/L
	$q_{bf} = (Q_p*q_p)/Q_{bf}$			
	q_{bf}	=	**593**	mg/L

2005 - 06	**Next step is to solve for q_{59}:**		**Oct, 2005**	
Using the period of OC-59 flow at Prado			**11 days** [4]	
Q_p =	total inflow at Prado [1]	=	5,584	af
q_p =	total flow TDS at Prado [2]	=	563	mg/L
Q_{bf} =	base flow at Prado [1]	=	4,526	af
q_{bf} =	base flow TDS at Prado [3]	=	593	mg/L
Q_{sjw} =	San Jacinto Watershed outflow [1]	=	312	af
q_{sjw} =	San Jacinto Watershed outflow TDS	=	750	mg/L
Q_{59} =	OC-59 flow reaching Prado [1]	=	746	af
q_{59} =	OC-59 flow TDS reaching Prado	=	Unknown	mg/L
	$q_{59} = (Q_p*q_p - Q_{bf}*q_{bf} - Q_{sjw}*q_{sjw})/Q_{59}$			
	q_{59}	**=**	**303**	mg/L
Balance:			0	
	Flow Weighed TDS in Total Base and Storm Flow	=	517	mg/L
	Change in Cumulative Credit	**=**	**0**	af

NOTES:

[1] For specific days in Water Year 2005-06.

[2] Flow-weighted TDS at Prado.

[3] Baseflow TDS was calculated above.

[4] Select days where there was no storm flow when OC-59 water released.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE

WATER YEAR 2010-11

2010 - 11

Method 2 **First Step is to get value for q_{bf}**

Calculation of SAR Baseflow TDS

Note: Baseflow TDS was calculated for the days where there were no purchaces of OC-59

$$Q_p * q_p = Q_{bf} * q_{bf} + Q_{sf} * q_{sf}$$

			Oct 1 - 17, 2010	
Q_p =	total inflow at Prado [1]	=	10,426	af
q_p =	total flow TDS at Prado [2]	=	634	mg/L
Q_{bf} =	base flow at Prado [1]	=	10,020	af
q_{bf} =	base flow TDS at Prado	=	Unknown	mg/L
Q_{sf} =	storm flow at Prado	=	407	af
q_{sf} =	storm flow TDS at Prado [3]	=	275	mg/L

$$q_{bf} = (Q_p * q_p - Q_{sf} * q_{sf})/Q_{bf}$$

q_{bf} = 649

2010 - 11 **Next step is to solve for q_{59}:** **Sept 15 - 30, 2011**

Using the period of OC-59 flow at Prado **22 days** [5]

Q_p =	total inflow at Prado [1]	=	5,585	af
q_p =	total flow TDS at Prado [2]	=	535	mg/L
Q_{bf} =	base flow at Prado [1]	=	3,717	af
q_{bf} =	base flow TDS at Prado [4]	=	649	mg/L
Q_{59} =	OC-59 flow reaching Prado [1]	=	1,868	af
q_{59} =	OC-59 flow TDS reaching Prado	=	Unknown	mg/L

$$q_{59} = (Q_p * q_p - Q_{bf} * q_{bf})/Q_{59}$$

	q_{59}	**=**	**308** mg/L
Flow Weighed TDS in Total Base and Storm Flow		=	522 mg/L
Change in Cumulative Credit		**=**	**511** af

NOTES:

[1] For given month or specific days in Water Year 2010-11.

[2] Flow-weighted TDS for select days or month during OC-59 flow.

[3] component) were used to obtain representative Storm Flow TDS of 275 at Prado.

[4] Baseflow TDS was calculated above.

[5] Select days where there was no storm flow when OC-59 water released.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE

WATER YEAR 2012-13

2012 - 13

Method 2 **First Step is to get value for q_{bf}**

Calculation of SAR Baseflow TDS

Note: Baseflow TDS was calculated for the days where there were no purchaces of OC-59

$$Q_p * q_p = Q_{bf} * q_{bf}$$

			June, 2013	
Q_p =	total inflow at Prado [1]	=	4,626	af
q_p =	total flow TDS at Prado [2]	=	675	mg/L
Q_{bf} =	base flow at Prado [1]	=	4,626	af
q_{bf} =	base flow TDS at Prado	=	Unknown	mg/L

$$q_{bf} = Q_p * q_p / Q_{bf}$$

q_{bf} = **675** mg/L

2012 - 13 **Next step is to solve for q_{59}:** **Nov 13 - 18, 2012**

Using the period of OC-59 flow at Prado **5 days**

Q_p =	total inflow at Prado [1]	=	1,533	af
q_p =	total flow TDS at Prado [2]	=	613	mg/L
Q_{bf} =	base flow at Prado [1]	=	1,251	af
q_{bf} =	base flow TDS at Prado [3]	=	675	mg/L
Q_{sf} =	storm flow at Prado	=	14	af
q_{sf} =	storm flow TDS at Prado	=	275	mg/L
Q_{59} =	OC-59 flow reaching Prado [1]	=	268	af
q_{59} =	OC-59 flow TDS reaching Prado	=	Unknown	mg/L

$$q_{59} = (Q_p * q_p - Q_{bf} * q_{bf} - Q_{sf} * q_{sf}) / Q_{59}$$

q_{59} **=** **343** mg/L

Flow Weighed TDS in Total Base and Storm Flow = 621 mg/L

Change in Cumulative Credit **=** **0** af

NOTES:

[1] For given month or specific days in Water Year 2012-13.

[2] Flow-weighted TDS for select days or month during OC-59 flow.

[3] Baseflow TDS was calculated above.

[4] Water Years 2004-05 and 2009-10 (where storm flow was the dominant component) were used to obtain representative Storm Flow TDS of 275 at Prado.

APPENDIX F

WATER QUALITY AND DISCHARGE FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN

WATER YEAR 2013-14

There was no discharge of Arlington Desalter water to the Arlington Valley Drain for Orange County Water District during the 2013-14 water year.

APPENDIX G

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2013-14

There was no discharge of the San Jacinto Watershed to the Santa Ana River during the 2013-14 water year.

APPENDIX H

WATER QUALITY AND DISCHARGE OF THE SANTA ANA RIVER BELOW PRADO DAM

WATER YEAR 2013-14

TABLE H-1

WATER QUALITY SAMPLES BELOW PRADO DAM
WATER YEAR 2013-14

Date	EC (microsiemens/cm)	TDS (mg/L)	Source
10/1/2013	1180	730	OCWD
10/22/2013	1130	687	USGS
10/29/2013	1000	598	USGS
11/12/2013	1180	664	OCWD
11/13/2013	1130	670	USGS
11/20/2013	1090	663	USGS
11/25/2013	766	449	USGS
12/3/2013	1040	606	OCWD
12/12/2013	1060	672	USGS
12/19/2013	1100	689	USGS
12/23/2013	1080	639	USGS
1/7/2014	1160	700	OCWD
1/14/2014	1110	678	USGS
1/16/2014	1130	670	USGS
1/23/2014	1100	680	USGS
1/30/2014	1110	659	USGS
2/4/2014	1050	648	USGS
2/4/2014	1060	642	OCWD
2/18/2014	1090	657	USGS
2/20/2014	1120	672	USGS
2/26/2014	1080	656	USGS
3/5/2014	520	322	OCWD
3/6/2014	512	298	USGS
3/12/2014	719	430	OCWD
3/14/2014	605	339	USGS
3/24/2014	1010	613	USGS
3/31/2014	1180	722	USGS
4/9/2014	1160	710	USGS
4/9/2014	1250	692	OCWD
4/15/2014	1140	706	USGS
4/24/2014	1140	708	USGS
4/28/2014	978	591	USGS
5/7/2014	1170	728	OCWD
5/15/2014	1180	740	USGS
5/16/2014	1180	720	USGS
5/29/2014	1180	724	USGS
5/29/2014	1160	704	USGS
6/12/2014	1170	724	USGS
6/12/2014	1180	743	USGS
6/25/2014	1210	746	USGS
7/16/2014	1160	719	USGS
7/16/2014	1160	724	OCWD
8/4/2014	562	339	USGS
8/5/2014	766	476	OCWD
8/13/2014	1120	726	OCWD
8/13/2014	1,140	695	USGS
8/21/2014	888	533	USGS
8/26/2014	1140	684	OCWD
9/4/2014	1160	718	USGS
9/8/2014	633	393	USGS
9/10/2014	1060	688	OCWD
9/22/2014	1100	669	USGS

TABLE H-2

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

October 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	61	1,080	660	40,260
2	63	1,080	660	41,580
3	67	1,080	660	44,220
4	61	1,070	654	39,894
5	54	1,080	660	35,640
6	62	1,070	654	40,548
7	66	1,070	654	43,164
8	67	1,120	685	45,895
9	74	1,130	691	51,134
10	185	799	488	90,280
11	181	981	600	108,600
12	99	1,080	660	65,340
13	85	1,080	660	56,100
14	95	1,080	660	62,700
15	79	1,100	672	53,088
16	79	1,100	672	53,088
17	64	1,130	691	44,224
18	66	1,130	691	45,606
19	75	1,110	678	50,850
20	80	1,120	685	54,800
21	84	1,110	678	56,952
22	79	1,120	685	54,115
23	81	1,130	691	55,971
24	85	1,130	691	58,735
25	86	1,140	697	59,942
26	86	1,160	709	60,974
27	89	1,150	703	62,567
28	116	1,090	666	77,256
29	132	998	610	80,520
30	108	1,100	672	72,576
31	112	1,110	678	75,936
Total	2,721			1,782,555
		Monthly Flow-weighted TDS =	655	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

November 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	106	1,110	678	71,868
2	103	1,120	685	70,555
3	106	1,090	666	70,596
4	108	1,080	660	71,280
5	105	1,090	666	69,930
6	113	1,080	660	74,580
7	99	1,080	660	65,340
8	102	1,070	654	66,708
9	95	1,070	654	62,130
10	96	1,080	660	63,360
11	99	1,070	654	64,746
12	104	1,070	654	68,016
13	101	1,060	648	65,448
14	100	1,060	648	64,800
15	97	1,050	642	62,274
16	100	1,060	648	64,800
17	105	1,040	636	66,780
18	106	1,040	636	67,416
19	110	1,030	630	69,300
20	113	1,040	636	71,868
21	153	769	470	71,910
22	208	611	373	77,584
23	227	575	351	79,677
24	228	657	402	91,656
25	227	730	446	101,242
26	225	870	532	119,700
27	222	950	581	128,982
28	219	982	600	131,400
29	216	998	610	131,760
30	214	1,000	611	130,754
Total	4,207			2,416,460
		Monthly Flow-weighted TDS =	574	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

December 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	210	990	605	127,050
2	205	1,010	617	126,485
3	200	1,040	636	127,200
4	192	1,100	672	129,024
5	181	1,130	691	125,071
6	167	1,130	691	115,397
7	159	1,100	672	106,848
8	177	902	551	97,527
9	175	977	597	104,475
10	232	1,070	654	151,728
11	137	1,100	672	92,064
12	127	1,090	666	84,582
13	122	1,100	672	81,984
14	121	1,100	672	81,312
15	123	1,100	672	82,656
16	119	1,100	672	79,968
17	122	1,090	666	81,252
18	121	1,100	672	81,312
19	99	1,100	672	66,528
20	133	861	526	69,958
21	141	930	568	80,088
22	141	1,050	642	90,522
23	222	1,070	654	145,188
24	131	1,120	685	89,735
25	96	1,120	685	65,760
26	93	1,110	678	63,054
27	90	1,120	685	61,650
28	90	1,120	685	61,650
29	93	1,120	685	63,705
30	95	1,120	685	65,075
31	73	1,130	691	50,443
Total	4,387			2,397,007

Monthly Flow-weighted TDS = 546 mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

January 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	80	1,140	697	55,760
2	88	1,130	691	60,808
3	87	1,120	685	59,595
4	92	1,130	691	63,572
5	93	1,120	685	63,705
6	96	1,110	678	65,088
7	92	1,110	678	62,376
8	94	1,120	685	64,390
9	98	1,110	678	66,444
10	91	1,100	672	61,152
11	97	1,100	672	65,184
12	100	1,100	672	67,200
13	99	1,100	672	66,528
14	97	1,100	672	65,184
15	95	1,110	678	64,410
16	111	1,120	685	76,035
17	109	1,120	685	74,665
18	114	1,120	685	78,090
19	127	1,050	642	81,534
20	125	1,090	666	83,250
21	124	1,090	666	82,584
22	124	1,110	678	84,072
23	121	1,110	678	82,038
24	112	1,120	685	76,720
25	107	1,130	691	73,937
26	119	1,120	685	81,515
27	121	1,110	678	82,038
28	125	1,110	678	84,750
29	117	1,120	685	80,145
30	122	1,120	685	83,570
31	135	1,100	672	90,720
Total	3,312			2,247,059
		Monthly Flow-weighted TDS =	678	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

February 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	123	1,110	678	83,394
2	128	1,120	685	87,680
3	149	1,090	666	99,234
4	140	1,080	660	92,400
5	122	1,140	697	85,034
6	129	1,120	685	88,365
7	149	947	579	86,271
8	151	1,030	630	95,130
9	148	1,080	660	97,680
10	202	1,090	666	134,532
11	157	1,100	672	105,504
12	132	1,100	672	88,704
13	125	1,100	672	84,000
14	118	1,110	678	80,004
15	126	1,120	685	86,310
16	118	1,120	685	80,830
17	115	1,120	685	78,775
18	117	1,120	685	80,145
19	114	1,120	685	78,090
20	108	1,120	685	73,980
21	104	1,120	685	71,240
22	99	1,130	691	68,409
23	102	1,180	721	73,542
24	111	1,160	709	78,699
25	124	1,120	685	84,940
26	118	1,100	672	79,296
27	129	971	593	76,497
28	169	646	395	66,755
Total	3,627			2,385,440

Monthly Flow-weighted TDS = 658 mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

March 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	194	412	252	48,888
2	346	467	285	98,610
3	399	491	300	119,700
4	394	479	293	115,442
5	392	488	298	116,816
6	392	476	291	114,072
7	386	487	298	115,028
8	375	567	347	130,125
9	372	508	310	115,320
10	383	510	312	119,496
11	392	517	316	123,872
12	386	626	383	147,838
13	383	559	342	130,986
14	378	567	347	131,166
15	373	606	370	138,010
16	367	632	386	141,662
17	361	680	416	150,176
18	364	705	431	156,884
19	360	738	451	162,360
20	360	777	475	171,000
21	354	828	506	179,124
22	350	858	524	183,400
23	344	902	551	189,544
24	339	939	574	194,586
25	331	978	598	197,938
26	324	1,010	617	199,908
27	317	1,010	617	195,589
28	306	1,000	611	186,966
29	295	1,020	623	183,785
30	278	1,080	660	183,480
31	216	1,100	672	145,152
Total	10,811			4,586,923

Monthly Flow-weighted TDS = 424 mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

April 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	168	1,070	654	109,872
2	184	871	532	97,888
3	191	791	483	92,253
4	186	975	596	110,856
5	178	1,040	636	113,208
6	169	1,120	685	115,765
7	210	1,130	691	145,110
8	129	1,100	672	86,688
9	108	1,120	685	73,980
10	104	1,140	697	72,488
11	106	1,130	691	73,246
12	110	1,100	672	73,920
13	111	1,130	691	76,701
14	121	1,120	685	82,885
15	116	1,130	691	80,156
16	117	1,140	697	81,549
17	109	1,140	697	75,973
18	103	1,160	709	73,027
19	100	1,170	715	71,500
20	106	1,140	697	73,882
21	106	1,120	685	72,610
22	94	1,120	685	64,390
23	98	1,090	666	65,268
24	97	1,090	666	64,602
25	98	1,070	654	64,092
26	285	524	320	91,200
27	280	616	376	105,280
28	250	973	595	148,750
29	192	1,060	648	124,416
30	103	1,100	672	69,216
Total	4,329			2,650,771

Monthly Flow-weighted TDS = 612 mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

May 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	84	1,110	678	56,952
2	82	1,120	685	56,170
3	84	1,080	660	55,440
4	77	1,110	678	52,206
5	81	1,140	697	56,457
6	84	1,130	691	58,044
7	71	1,110	678	48,138
8	72	1,100	672	48,384
9	70	1,100	672	47,040
10	75	1,090	666	49,950
11	77	1,080	660	50,820
12	72	1,090	666	47,952
13	70	1,080	660	46,200
14	66	1,110	678	44,748
15	63	1,140	697	43,911
16	59	1,140	697	41,123
17	57	1,120	685	39,045
18	59	1,130	691	40,769
19	62	1,120	685	42,470
20	60	1,090	666	39,960
21	58	1,090	666	38,628
22	56	1,180	721	40,376
23	64	1,210	740	47,360
24	59	1,240	758	44,722
25	60	1,240	758	45,480
26	59	1,260	770	45,430
27	73	1,230	752	54,896
28	75	1,180	721	54,075
29	80	1,170	715	57,200
30	80	1,160	709	56,720
31	71	1,160	709	50,339
Total	2,160			1,501,005
		Monthly Flow-weighted TDS =	695	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

June 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	72	1,130	691	49,752
2	70	1,090	666	46,620
3	68	1,080	660	44,880
4	67	1,070	654	43,818
5	67	1,060	648	43,416
6	62	1,050	642	39,804
7	60	1,060	648	38,880
8	60	1,060	648	38,880
9	61	1,060	648	39,528
10	59	1,100	672	39,648
11	61	1,180	721	43,981
12	57	1,190	727	41,439
13	58	1,240	758	43,964
14	58	1,220	746	43,268
15	64	1,190	727	46,528
16	63	1,200	733	46,179
17	58	1,160	709	41,122
18	60	1,160	709	42,540
19	61	1,160	709	43,249
20	60	1,190	727	43,620
21	59	1,200	733	43,247
22	56	1,220	746	41,776
23	62	1,200	733	45,446
24	55	1,230	752	41,360
25	60	1,220	746	44,760
26	58	1,170	715	41,470
27	62	1,160	709	43,958
28	64	1,130	691	44,224
29	66	1,130	691	45,606
30	69	1,140	697	48,093
Total	1,857			1,301,056
		Monthly Flow-weighted TDS =	701	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

July 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	63	1,110	678	42,714
2	57	1,160	709	40,413
3	53	1,150	703	37,259
4	57	1,140	697	39,729
5	53	1,150	703	37,259
6	46	1,180	721	33,166
7	46	1,180	721	33,166
8	43	1,200	733	31,519
9	45	1,190	727	32,715
10	46	1,190	727	33,442
11	48	1,180	721	34,608
12	49	1,170	715	35,035
13	51	1,140	697	35,547
14	55	1,150	703	38,665
15	56	1,150	703	39,368
16	58	1,210	740	42,920
17	59	1,200	733	43,247
18	61	1,160	709	43,249
19	59	1,120	685	40,415
20	61	1,130	691	42,151
21	60	1,140	697	41,820
22	56	1,160	709	39,704
23	55	1,180	721	39,655
24	57	1,170	715	40,755
25	58	1,170	715	41,470
26	57	1,170	715	40,755
27	61	1,170	715	43,615
28	59	1,150	703	41,477
29	56	1,150	703	39,368
30	56	1,140	697	39,032
31	57	1,130	691	39,387
Total	1,698			1,203,625
		Monthly Flow-weighted TDS =	709	mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

August 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	58	1,120	685	39,730
2	61	1,130	691	42,151
3	91	1,100	672	61,152
4	211	607	371	78,281
5	198	801	490	97,020
6	157	1,040	636	99,852
7	102	1,080	660	67,320
8	81	1,080	660	53,460
9	75	1,080	660	49,500
10	71	1,080	660	46,860
11	68	1,120	685	46,580
12	63	1,110	678	42,714
13	59	1,120	685	40,415
14	62	1,130	691	42,842
15	57	1,150	703	40,071
16	53	1,150	703	37,259
17	50	1,150	703	35,150
18	53	1,160	709	37,577
19	51	1,180	721	36,771
20	52	1,180	721	37,492
21	115	936	572	65,780
22	77	1,090	666	51,282
23	73	1,120	685	50,005
24	74	1,130	691	51,134
25	70	1,130	691	48,370
26	65	1,140	697	45,305
27	66	1,110	678	44,748
28	64	1,120	685	43,840
29	63	1,150	703	44,289
30	57	1,160	709	40,413
31	55	1,140	697	38,335
Total	2,452			1,555,698

Monthly Flow-weighted TDS = 634 mg/L

(1) TDS = EC x 0.611171

TABLE H-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2013-14

September 2014

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	54	1,150	703	37,962
2	56	1,130	691	38,696
3	58	1,120	685	39,730
4	60	1,140	697	41,820
5	58	1,160	709	41,122
6	57	1,150	703	40,071
7	58	1,150	703	40,774
8	138	718	439	60,582
9	171	923	564	96,444
10	98	1,070	654	64,092
11	74	1,120	685	50,690
12	68	1,150	703	47,804
13	67	1,150	703	47,101
14	65	1,150	703	45,695
15	63	1,150	703	44,289
16	58	1,150	703	40,774
17	63	1,130	691	43,533
18	47	1,180	721	33,887
19	48	1,200	733	35,184
20	51	1,220	746	38,046
21	56	1,120	685	38,360
22	62	1,110	678	42,036
23	54	1,170	715	38,610
24	55	1,180	721	39,655
25	60	1,140	697	41,820
26	59	1,160	709	41,831
27	64	1,180	721	46,144
28	74	1,150	703	52,022
29	75	1,130	691	51,825
30	72	1,160	709	51,048
Total	2,043			1,371,647

Monthly Flow-weighted TDS = 671 mg/L

(1) TDS = EC x 0.611171

TABLE H-3

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM

WATER YEAR 2013-14

Month	Monthly Flow (cfs-days)	Monthly Flow-weighted TDS (mg/L)	Monthly Flow x TDS
2013			
October	2,721	655	1,782,255
November	4,207	574	2,414,818
December	4,387	546	2,395,302
2014			
January	3,312	678	2,245,536
February	3,627	658	2,386,566
March	10,811	424	4,583,864
April	4,329	612	2,649,348
May	2,160	695	1,501,200
June	1,857	701	1,301,757
July	1,698	709	1,203,882
August	2,452	634	1,554,568
September	2,043	671	1,370,853
Total	43,604		25,389,949
	Yearly Flow-weighted TDS =	582	

APPENDIX I

WATER QUALITY AND FLOW OF WASTEWATER FROM RUBIDOUX COMMUNITY SERVICES DISTRICT DISCHARGED BELOW THE RIVERSIDE NARROWS GAGING STATION

WATER YEAR 2013-14

PREPARED BY

JOHN V. ROSSI

TABLE I-1

QUANTITY AND QUALITY OF WASTEWATER FROM RUBIDOUX
DISCHARGED BELOW THE
RIVERSIDE NARROWS GAGING STATION

WATER YEAR 2013-14

MONTH	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2013			
October	193	748	144,364
November	182	740	134,680
December	187	712	133,144
2014			
January	184	784	144,256
February	166	734	121,844
March	185	734	135,790
April	184	768	141,312
May	184	792	145,728
June	185	792	146,520
July	193	808	155,944
August	195	788	153,660
September	192	796	152,832
Total	2,230		1,710,074

Flow-weighted TDS = $\frac{1,710,074}{2,230}$ = 767 mg/L

APPENDIX J

WATER QUALITY AND DISCHARGE OF THE SANTA ANA RIVER AT RIVERSIDE NARROWS

WATER YEAR 2013-14

PREPARED BY

JOHN V. ROSSI

TABLE J-1

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2013-14

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2013	10/02/13	1095	665	C of R		0.61	
	10/09/13	1078	669	C of R	*	0.62	
	10/16/13	975	603	C of R		0.62	
	10/23/13	1070	656	C of R		0.61	
	10/24/13	981	604	USGS		0.62	
	10/30/13	1544	937	C of R	**	0.61	*632*
	11/06/13	1537	928	C of R	**	0.60	
	11/13/13	1534	917	C of R	**	0.60	
	11/13/13	981	589	USGS		0.60	
	11/20/13	1586	945	C of R	**	0.60	
	11/27/13	1501	931	C of R	**	0.62	
	11/27/13	1030	631	USGS		0.61	*610*
	12/04/13	1473	923	C of R	**	0.63	
	12/04/13	1040	639	USGS		0.61	
	12/11/13	1501	934	C of R	**	0.62	
	12/18/13	1518	931	C of R	**	0.61	
	12/18/13	1020	632	USGS		0.62	
	12/26/13	1518	909	C of R	**	0.60	*636*
2014	01/01/14	1518	913	C of R	**	0.60	
	01/08/14	1519	937	C of R	**	0.62	
	01/15/14	1511	909	C of R	**	0.60	
	01/15/14	1010	641	USGS		0.63	
	01/22/14	1508	921	C of R	**	0.61	
	01/24/14	1000	645	USGS		0.65	
	01/29/14	1501	902	C of R	**	0.60	*643*

* TDS data not used in determining monthly averages
** City of Riverside data not used in determining monthly averages
*** TDS data that is verified prior to storm event and used in determining monthly average
C of R City of Riverside
USGS U.S. Geological Survey

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2013-14

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2014	02/05/14	1501	919	C of R	**	0.61	
	02/06/14	1000	637	USGS		0.64	
	02/12/14	1511	924	C of R	**	0.61	
	02/19/14	1509	895	C of R	**	0.59	
	02/26/14	1512	900	C of R	**	0.60	
	02/26/14	1000	645	USGS		0.65	*641*
	03/01/14	278	172	USGS	*	0.62	
	03/05/14	1493	923	C of R	**	0.62	
	03/10/14	966	615	USGS		0.64	
	03/12/14	1540	957	C of R	**	0.62	
	03/19/14	1516	934	C of R	**	0.62	
	03/20/14	990	639	USGS		0.65	
	03/26/14	1511	918	C of R	**	0.61	*627*
	04/02/14	926	554	C of R	**	0.60	
	04/09/14	1509	928	C of R	**	0.61	
	04/10/14	1010	634	USGS		0.63	
	04/16/14	1502	941	C of R	**	0.63	
	04/23/14	1520	906	C of R	**	0.60	
	04/24/14	1020	637	USGS		0.62	
	04/30/14	1520	945	C of R	**	0.62	*636*
	05/07/14	1523	948	C of R	**	0.62	
	05/14/14	1516	921	C of R	**	0.61	
	05/15/14	1040	655	USGS		0.63	
	05/21/14	1526	948	C of R	**	0.62	
	05/29/14	1547	934	C of R	**	0.60	
	05/29/14	1030	629	USGS		0.61	*642*

*	TDS data not used in determining monthly averages
**	City of Riverside data not used in determining monthly averages
***	TDS data that is verified prior to storm event and used in determining monthly average
C of R	City of Riverside
USGS	U.S. Geological Survey

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2013-14

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2014	06/04/14	1484	896	C of R	**	0.60	
	06/11/14	1484	932	C of R	**	0.63	
	06/12/14	1040	648	USGS		0.62	
	06/18/14	1474	920	C of R	**	0.62	
	06/25/14	1505	920	C of R	**	0.61	*648*
	07/02/14	1503	952	C of R	**	0.63	
	07/09/14	1510	958	C of R	**	0.63	
	07/09/14	1040	647	USGS		0.62	
	07/16/14	1500	953	C of R	**	0.64	
	07/21/14	1010	634	USGS		0.63	
	07/23/14	1499	936	C of R	**	0.62	
	07/30/14	1509	934	C of R	**	0.62	*641*
	08/04/14	579	385	USGS	*	0.66	
	08/06/14	1506	980	C of R	**	0.65	
	08/13/14	1473	944	C of R	**	0.64	
	08/20/14	1516	994	C of R	**	0.66	
	08/20/14	1060	660	USGS	***	0.62	
	08/27/14	1404	912	C of R	**	0.65	*660*
	09/03/14	1480	962	C of R	**	0.65	
	09/08/14	703	431	USGS	*	0.61	
	09/10/14	1513	956	C of R	**	0.63	
	09/17/14	1526	972	C of R	**	0.64	
	09/22/14	1040	647	USGS		0.62	
	09/24/14	1510	984	C of R	**	0.65	*647*

* TDS data not used in determining monthly averages
** City of Riverside data not used in determining monthly averages
*** TDS data that is verified prior to storm event and used in determining monthly average
C of R City of Riverside
USGS U.S. Geological Survey

TABLE J-2

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS AT RIVERSIDE NARROWS
WATER YEAR 2013-14

	Month	Stream Flow [1] (acre-feet)	Monthly Average TDS [2] (mg/L)	Monthly Flow x TDS
2013	October	2,607	632	1,647,624
	November	3,222	610	1,965,420
	December	2,598	636	1,652,328
2014	January	2,275	643	1,462,825
	February	2,498	641	1,601,218
	March	3,469	627	2,175,063
	April	2,772	636	1,762,992
	May	2,588	642	1,661,496
	June	1,916	648	1,241,568
	July	1,843	641	1,181,363
	August	2,277	660	1,502,820
	September	2,018	647	1,305,646
	Total Stream Flow	30,083		19,160,363

$$\text{Flow-weighted TDS} = \frac{19{,}160{,}363}{30{,}083} = 637 \text{ mg/L}$$

1 USGS measured flow minus storm flow.

2 TDS based on water quality data from Table J-1.

APPENDIX K

WMWD TRANSFER PROGRAM WATER DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS

WATER YEAR 2013-14

There was no discharge of WMWD Transfer Program water to the Santa Ana River above Riverside Narrows during the 2013-14 water year.