SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO, et al.

CASE NO. 117628 - COUNTY OF ORANGE

FORTY-THIRD
ANNUAL REPORT
OF THE
SANTA ANA RIVER WATERMASTER

FOR WATER YEAR
OCTOBER 1, 2012 - SEPTEMBER 30, 2013

APRIL 30, 2014

SANTA ANA RIVER WATERMASTER

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

WATERMASTER
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April 30, 2014

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

Re: Watermaster Report for Water Year October 1, 2012 - September 30, 2013

Ladies and Gentlemen:

We have the honor of submitting herewith the Forty-Third 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 2012-13 are as follows:

		At Prado	
1	Measured Outflow at Prado	100,003	acre-feet
2	Base Flow at Prado	81,452	acre-feet
3	Annual Weighted TDS in Base and Storm Flows	621	mg/L
4	Annual Adjusted Base Flow	86,814	acre-feet
5	Cumulative Adjusted Base Flow	5,209,529	acre-feet
6	Other Credits (Debits)	243	acre-feet
7	Cumulative Entitlement of OCWD	1,806,000	acre-feet
8	Cumulative Credit	3,443,537	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	36,407	acre-feet
2	Annual Weighted TDS in Base Flow	662	mg/L
3	Annual Adjusted Base Flow	36,407	acre-feet
4	Cumulative Adjusted Base Flow	1,925,931	acre-feet
5	Cumulative Entitlement of IEUA and WMWD	655,750	acre-feet
6	Cumulative Credit	1,270,181	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 2012-13.

At the end of the 2012-13 Water Year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit 3,443,537 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 1,270,181 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

_____
Douglas D. Headrick

_____
Roy L. Herndon

_____
Michael R. Markus

_____
John V. Rossi

SANTA ANA RIVER WATERMASTER

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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-Third Annual Report of the Santa Ana River Watermaster covers Water Year 2012-13. 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 2012-13 the Watermaster consisted of Samuel H. Fuller, Roy L. Herndon, Thomas A. Love, Michael R. Markus, and John V. Rossi. Mr. Herndon was elected Chairman and Mr. Fuller was elected Secretary/Treasurer at the January 18, 2013 meeting. During the Water Year 2013 – 14, Mr. Herndon was re-elected Chairman and Mr. Fuller was re-elected Secretary/Treasurer at the January 17, 2014 meeting. Mr. P. Joseph Grindstaff was nominated by Inland Empire Utilities Agency and appointed by the court to replace Mr. Love. Mr. Douglas D. Headrick was nominated by San Bernardino Valley Municipal Water District and appointed by the court to replace Mr. Fuller. Mr.

Headrick was elected Secretary/Treasurer at the February 7, 2014 meeting. 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 2012-13 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), 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 2012-13 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, 426 cfs on January 31, 2013 and 53 cfs on August 23, 2013. The maximum and minimum daily flow-weighted mean EC values reported by the USGS at Prado were 1,160 μs/cm on June 14, 2013 and 549 μs/cm on March 9, 2013, respectively. The corresponding calculated TDS concentrations were 695 and 329 mg/L. EC records were rated "excellent" except for November 8 to 14, March 28 to April 15, May 3 to 21, and June 12 to 19, which were rated "good"; October 12 to 16, which were rated "fair"; and October 17 and December 2 to January 30, which were rated "poor" by the USGS.

The Water Year 2012-13 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 1,390 cfs on December 13, 2012 and 21 cfs on August 24, 2013, respectively. The maximum and minimum EC values reported by the USGS were 1,080 μs/cm on July 10, 2013 and 860 μs/cm on August 30, 2012, respectively. The corresponding measured TDS concentrations were 693 mg/L and 527 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 2012-13, the total precipitation recorded at the Gilbert Street gage was 9.53 inches, or 53% 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 2012-13.

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 2012-13 there were no sources of Nontributary Flow in the River at Riverside Narrows. There were two sources of Nontributary Flow in the River at Prado, which the Watermaster has not included in Base Flow.

- A total of 268 acre-feet of Nontributary Flow attributable to imported State Water Project water purchased by OCWD arrived at Prado. This water was released at the OC-59 turnout from MWDSC's Foothill Feeder into San Antonio Creek.

- Eastern Municipal Water District (EMWD) reported that it discharged 2,727 acre-feet of treated wastewater to Temescal Creek, with a flow-weighted average TDS of 668 mg/L, which originated in the San Jacinto River Watershed. Discharges from the San Jacinto Watershed were not taken into account in the settlement discussions and calculations that led to the flow obligations in the Judgment. In the past, the Watermaster decided that fifty percent of any portion of such discharges that reached Prado Reservoir and that are subsequently captured by OCWD should be added to the Cumulative Credit at Prado (after adjustment for TDS). OCWD Hydrogeologist Gwen Sharp estimated that 502 acre-feet of the EMWD treated wastewater, with an average TDS concentration of 703 mg/L, reached Prado Reservoir, that 486 acre-feet of it was captured by OCWD, and recommended that the Cumulative Credit at Prado be increased accordingly using the previously established fifty percent rule. The Watermaster accepted the estimate and the recommendation.

The determinations of the Watermaster for Water Year 2012-13 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 2012-13 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 Area.

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	33.41	462,646	456,316	154,021	392	193,553	1,836,100
1998-99	8.02	184,998	182,310	158,637	581	174,369	1,968,469
1999-00	11.09	207,850	188,538	148,269	527	169,644	2,096,113
2000-01	16.13	222,559	208,535	153,914	525	176,360	2,230,473
2001-02	5.08	174,968	156,596	145,981	587	159,728	2,348,201
2002-03	16.22	256,157	245,947	146,113	463	174,970	2,482,058
2003-04	10.80	214,102	201,967	143,510	508	166,472	2,606,777
2004-05	29.89	638,513	637,568	154,307	348	199,570	2,766,713
2005-06	13.23	247,593	246,101	147,736	517	170,266	2,898,541
2006-07	4.61	156,147	153,823	129,830	604	140,216	3,002,288
2007-08	13.70	199,690	194,309	116,483	495	136,382	3,100,835
2008-09	10.14	162,698	161,026	102,711	527	117,519	3,178,543
2009-10	17.79	243,776	243,690	103,099	443	125,179	3,263,211
2010-11	23.50	324,892	313,018	102,031	528	116,655	3,339,059
2011-12	9.01	121,123	121,123	93,068	597	101,056	3,398,480
2012-13	9.53	100,003	99,735	81,452	621	86,814	3,443,537

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	13.70	78,619	74,554	46,776[6]	674	46,776[6]	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

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 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 5,000 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 #1[3]	IEUA #2	IEUA #5	IEUA CCWRF[4]	WRCR[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	--	--	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	--	--	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	--	--	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	--	--	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	--	--	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	--	--	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	504	502	650	1,656	113,146	126,351

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. WRCR = 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) Inland Empire Brine Line (IEBL)[1]		Total Flow
	North System (acre-feet)	SARI\IEBL Flow[2] (acre-feet)	Average TDS (mg/L)	(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

1. Santa Ana Regional Interceptor began operation in 1985-86. The San Bernardino County and Riverside County portions of the SARI name changed to IEBL in WY 2012-13. The Orange County portion remains SARI.
2. IEUA Non-Reclaimable Wastewater from the South System goes into the SARI\IEBL and is included in SARI|IEBL Flow.
3. SARI\IEBL flow and thus Total Flow for Water Year 1985-86 through 1988-89 are partial flows.

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 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 2012-13 fiscal year as well as the budget adopted for the 2012-13 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, 2012 to June 30, 2013 Budget	July 1, 2012 to June 30, 2013 Expenses	July 1, 2013 to June 30, 2014 Budget
Support Services	$12,500.00	$21,240.00*	$12,500.00
Reproduction of Annual Report	1,500.00	$1,358.59*	1,500.00
TOTAL	$14,000.00	$22,598.59*	$14,000.00

* A portion of the expenses for Fiscal Year 2011-12 were paid during Fiscal Year 2012-13.

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 2012-13, 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, 2012 to September 30, 2013

	Total Cost	USGS Share	Parties' Share
USGS PRECIPITATION GAGING STATIONS			
Gilbert Street Gage at San Bernardino	$7,900	$0	$7,900
USGS FLOW AND WATER QUALITY GAGING			
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 Lee Lake	15,200	0	15,200
Temescal Creek at Lee Lake Construction	22,650	0	22,650
TOTAL COST AND SHARES	$197,700	$50,150	$147,550
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$29,510
Orange County Water District	40%		$59,020
San Bernardino Valley Municipal Water District	20%		$29,510
Western Municipal Water District	20%		$29,510

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 2012-13, the flow of the River as measured at the USGS gaging station below Prado Dam amounted to 100,003 acre-feet. There was 5 acre-feet of 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 81,452 acre-feet of Base Flow and 17,776 acre-feet of Storm Flow. Nontributary flows consisted of 268 acre-feet of State Water Project water discharged from OC-59. Water discharged from the San Jacinto Watershed was excluded from Base Flow, but was partially credited to the Cumulative Credit at Prado. Discharge from the San Jacinto Watershed calculated to have reached Prado Reservoir was 502 acre-feet. The monthly components of flow of the River at Prado Dam for Water Year 2012-13 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the River below Prado during the period Water Years 1934-35 through 2012-13 are presented on Plate 5.

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 2012-13 there was no nontributary water. Some flows from the San Jacinto Watershed were determined to have reached Prado Reservoir. In the past nontributary flows have included and may include in the future other water discharged to the River pursuant to the water exchanges or other such programs.

High Groundwater Mitigation Project

No High Groundwater Mitigation Project water was discharged to the River during Water Year 2012-13.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
WATER YEAR 2012-13
(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
2012								
October	6,926	331	7,257	0	0	0	675	6,582
November	9,328	(211)	9,117	0	0	268	736	8,113
December	15,011	1,332	16,343	0	0	0	6,190	10,153
								0
2013								0
January	15,162	(976)	14,186	0	0	0	3,738	10,448
February	12,448	(475)	11,973	107	0	0	3,202	8,664
March	10,507	2	10,509	395	0	0	2,008	8,106
								0
April	6,879	(5)	6,874	0	0	0	0	6,874
May	6,911	(1)	6,910	0	0	0	732	6,178
June	4,627	(1)	4,626	0	0	0	0	4,626
								0
July	4,330	0	4,330	0	0	0	141	4,189
August	3,967	3	3,970	0	0	0	223	3,747
September	3,907	(4)	3,903	0	0	0	131	3,772
Total	100,003	(5)	99,998	502	0	268	17,776	81,452

(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 Dam this Water Year.

Releases to San Antonio Creek

During Water Year 2012-13, State Water Project water was released for OCWD from OC-59. A total of 280 acre-feet of State Water Project water was released for OCWD into San Antonio Creek from the Foothill Feeder at turnout OC-59 near Upland.

Water loss between OC-59 and Prado Dam was calculated per the procedures set forth in the Twelfth Annual Report (1981-82), Appendix C. It was determined that of the OC-59 water released, a total of 268 acre-feet arrived at Prado Reservoir and 12 acre-feet (4.2%) was lost to evaporation. A monthly summary of Nontributary Flow released from OC-59 into San Antonio Creek is contained in Appendix E.

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 2012-13, 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. No WMWD-OCWD Transfer Program water deliveries were made to the River upstream of Riverside Narrows and Prado Dam during Water Year 2012-13.

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 2012-13, EMWD discharged 2,727 acre-feet of treated wastewater to Temescal Wash, and 502 acre-feet of that discharge was estimated to have reached Prado Reservoir. The Watermaster previously determined that to the extent such discharges occur and are captured by OCWD, fifty percent of such captured water will be added as Cumulative Credit at Prado. OCWD captured 486 acre-feet of the San Jacinto Watershed discharge and 16 acre-feet flowed past OCWD's groundwater recharge facilities and was considered as lost to the ocean. Summaries of the EMWD Discharges, San Jacinto Watershed Discharge Calculations, and San Jacinto Watershed Discharges are contained in Appendix G. Page G-7 contains hydrographs of Discharge of Temescal Creek at Main Street in Corona and Lee Lake in Corona, EMWD Discharge, and Elsinore Precipitation and illustrates the known and estimated components of flow of Temescal Creek.

Storm Flow

Portions of storm flows are retained behind Prado Dam for flow regulation and for water conservation purposes. The 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 U.S. Fish and Wildlife Service, 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 U.S. Fish and Wildlife Service 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 2012-13, the maximum volume of water stored in Prado Reservoir reached 3,099 acre-feet on December 18, 2012. The maximum daily mean flow released from Prado Dam to the River during the Water Year was 426 cfs on January 31, 2013.

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 2012-13 included discharges from the San Jacinto Watershed. The general procedure used by the Watermaster to separate the Water Year 2012-13 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, including San Jacinto Watershed discharge, was found to be 621 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 21 grab samples for EC collected by the USGS and analyzed for TDS.

For Water Year 2012-13 a correlation between TDS and EC yields the following best fit equation:

$$TDS = EC \times 0.59907$$

(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 621 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 2012-13, 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 2012-13, 280 acre-feet was released from OC-59 to San Antonio Creek for OCWD, 268 acre-feet of OC-59 water was calculated to have arrived at Prado Dam, and 12 acre-feet was lost to evaporation. A flow-weighted average TDS of 309 mg/L was calculated for State Water Project water reaching Prado Dam. A summary of these calculations is contained in Appendix E.

Adjustment for Arlington Desalter Discharge

During Water Year 2012-13, 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 2012-13, no WMWD-OCWD Transfer Program water was delivered. Therefore, no water quality adjustment was necessary.

Adjustment for San Jacinto Watershed Discharge

Discharge from the San Jacinto Watershed during Water Year 2012-13 reaching Prado Reservoir was estimated to be 502 acre-feet. Using EMWD discharge data, the TDS data for the discharge, and monthly volume of the discharge estimated to have reached Prado Reservoir, a flow-weighted average TDS of 703 mg/L was calculated. A summary of these calculations is contained in Appendix G.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow X Average TDS
1. Measured Outflow	100,003	621	62,101,863
2. Less High Groundwater Mitigation Project	0	---	---
3. Less Nontributary Flow San Antonio Creek	(268)	309	(82,812)
4. Less Arlington Desalter	0	---	---
5. Less WMWD Transfer Program	0	---	---
6. Less San Jacinto Watershed Discharge	(502)	703	(352,906)
7. Measured Outflow less lines 2 through 6	99,233		61,666,145
Average TDS in Total Base and Storm Flow	61,666,145 ÷ 99,233 = 621 mg/L		

After adjusting for San Jacinto Watershed discharge, the flow-weighted average annual TDS of Storm Flow and Base Flow for Water Year 2012-13 is 621 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 621 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:

$$(81{,}452 \text{ acre-feet}) + \frac{35}{42{,}000} (81{,}452 \text{ acre-feet}) (700 - 621) = 86{,}814 \text{ acre-feet}$$

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.

Of the 502 acre-feet of San Jacinto Watershed outflows reaching Prado Reservoir in Water Year 2012-13, 16 acre-feet flowed past OCWD's groundwater recharge facilities and was considered as lost to the ocean. Therefore, a net of 486 acre-feet of San Jacinto Watershed outflow recharged the Orange County groundwater basin in Water Year 2012-13. One-half of that amount has been considered a credit against the Upper Area Base Flow obligation at Prado Dam. Thus, an additional 243 acre-feet was added to the Cumulative Credit at Prado Dam.

While compiling the Thirty-Third Annual Watermaster Report, it came to the attention of the Watermaster that in previous reports one-half the San Jacinto Watershed discharge reaching Prado and recharging Orange County groundwater basin had been included in the Cumulative Adjusted Base Flow as well as in the Cumulative Credit. The Watermaster determined that the San Jacinto Watershed discharge should be included only in the Cumulative Credit and not in the Cumulative Adjusted Base Flow. Therefore, the Watermaster revised the Cumulative Adjusted Base Flow and has included Table 7 summarizing the historical Watermaster findings concerning flow at Prado that reflect the revision in the report following the findings of the Watermaster.

The findings of the Watermaster concerning flow at Prado for Water Year 2012-13 required under the Judgment are as follows:

1.	Measured Outflow at Prado	100,003 acre-feet
2.	Base Flow at Prado	81,452 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	621 mg/L
4.	Annual Adjusted Base Flow	86,814 acre-feet
5.	Cumulative Adjusted Base Flow	5,209,529 acre-feet
6.	Other Credits (Debits) [1]	243 acre-feet
7.	Cumulative Entitlement of OCWD	1,806,000 acre-feet
8.	Cumulative Credit [2]	3,443,537 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	154,021	193,553	2,994,329	0	1,176,000	1,836,100
1998-99	158,637	174,369	3,168,698	0	1,218,000	1,968,469
1999-00	148,269	169,644	3,338,342	0	1,260,000	2,096,113
2000-01	153,914	176,360	3,514,702	0	1,302,000	2,230,473
2001-02	145,981	159,728	3,674,430	0	1,344,000	2,348,201
2002-03	146,113	174,970	3,849,400	887	1,386,000	2,482,058
2003-04	143,510	166,472	4,015,872	247	1,428,000	2,606,777
2004-05	154,307	199,570	4,215,442	2,366	1,470,000	2,766,713
2005-06	147,736	170,266	4,385,708	3,562	1,512,000	2,898,541
2006-07	129,830	140,216	4,525,924	5,531	1,554,000	3,002,288
2007-08	116,483	136,382	4,662,306	4,165	1,596,000	3,100,835
2008-09	102,711	117,519	4,779,825	2,189	1,638,000	3,178,543
2009-10	103,099	125,179	4,905,004	1,489	1,680,000	3,263,211
2010-11	102,031	116,655	5,021,659	1,193	1,722,000	3,339,059
2011-12	93,068	101,056	5,122,715	365	1,764,000	3,398,480
2012-13	81,452	86,814	5,209,529	243	1,806,000	3,443,537

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

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 41,337 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 36,407 acre-feet and Storm Flow was 7,123 acre-feet. Included in Base Flow are 2,193 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 2012-13 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 2012-13 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 2012-13 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 2012-13.

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 2012-13, no WMWD-OCWD Transfer Program water was delivered to the River.

TABLE 8

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
WATER YEAR 2012-13
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	SBVMWD HGMP Water (1)	WMWD Transfer Program (2)	Rubidoux Waste-water	Base Flow (3)
2012	October	3,398	147	0	0	188	3,439
	November	3,524	186	0	0	181	3,519
	December	7,353	3,954	0	0	184	3,583
2013	January	3,455	442	0	0	183	3,196
	February	4,140	1,210	0	0	166	3,096
	March	4,300	799	0	0	185	3,686
	April	3,295	0	0	0	180	3,475
	May	2,777	8	0	0	184	2,953
	June	2,794	28	0	0	179	2,945
	July	2,275	63	0	0	185	2,397
	August	1,983	284	0	0	192	1,891
	September	2,043	2	0	0	186	2,227
Total		41,337	7,123	0	0	2,193	36,407

(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 2012-13, in the amount of 2,193 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. Water quality data based on samples taken during storm flow periods were not used in the calculations. A summary of TDS and EC data of the River at Riverside Narrows is contained in Appendix J.

Adjustment for High Groundwater Mitigation Project Discharge

During Water Year 2012-13, 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 2012-13, 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 786 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 662 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS
1. Base Flow plus Nontributary Flow	34,214	654	22,375,956
2. Less Nontributary Flow HGMP Pumped Water	0	---	---
3. Less WMWD Transfer Flow	0	---	---
4. Plus Rubidoux Treated Wastewater	2,193	786	1,723,698
5. Base Flow (line 1 less lines 2 and 3 plus line 4)	36,407		24,099,654
Average TDS of Base Flow	24,099,654 ÷ 36,407 = 662 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 2012-13 was 662 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for Water Year 2012-13 is 36,407 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 2012-13 required under the Judgment are as follows:

1.	Base Flow at Riverside Narrows	36,407 acre-feet
2.	Annual Weighted TDS of Base Flow	662 mg/L
3.	Annual Adjusted Base Flow	36,407 acre-feet
4.	Cumulative Adjusted Base Flow	1,925,931 acre-feet
5.	Cumulative Entitlement of IEUA and WMWD	655,750 acre-feet
6.	Cumulative Credit	1,270,181 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2012-13	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	Douglas D. Headrick Secretary/Treasurer	P. Joseph Grindstaff	John V. Rossi	Michael R. Markus	Roy L. Herndon, Chairman

Santa Ana River Watershed

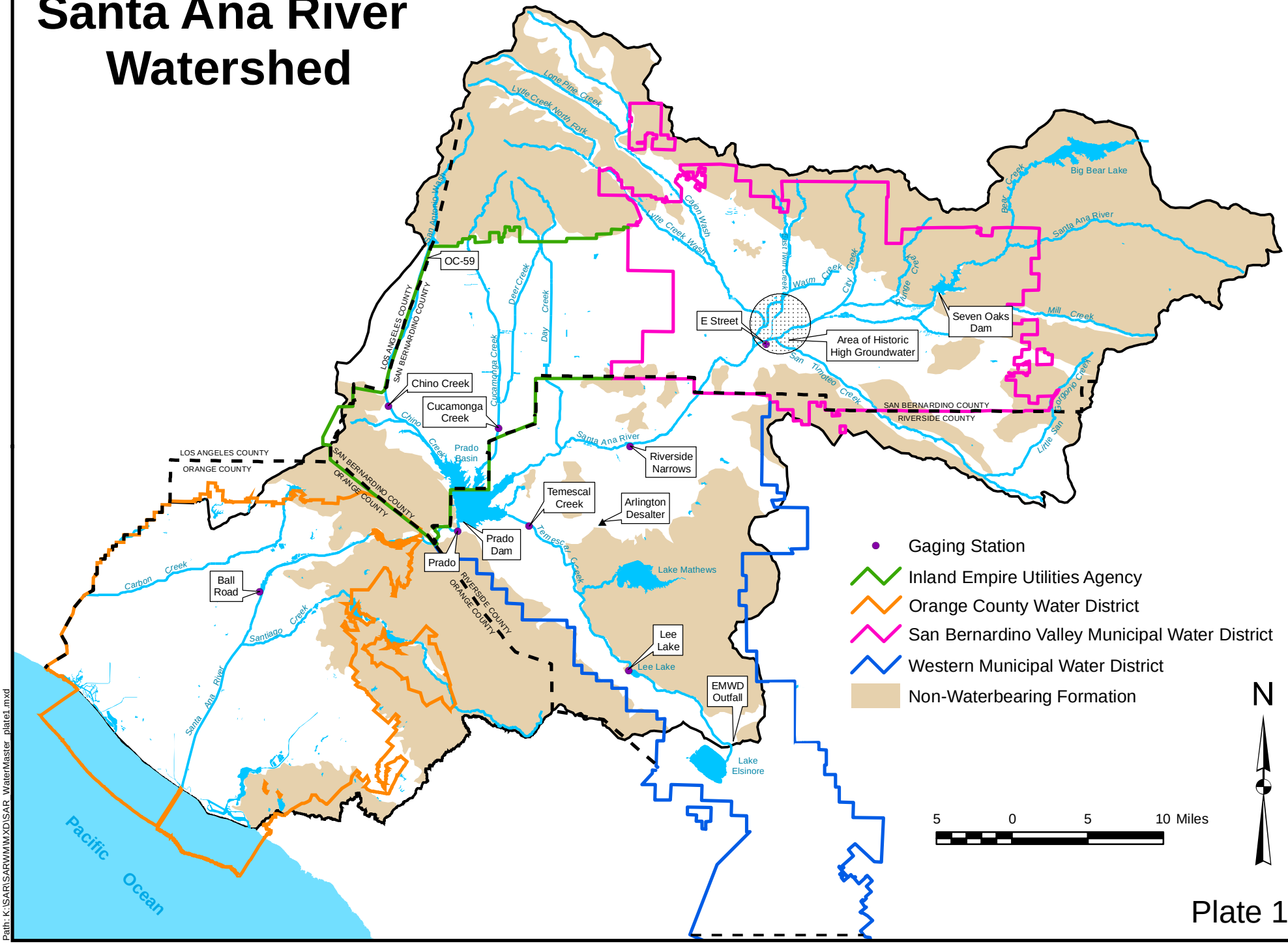

Plate 1

Path: K:\SAR\SARWMWXD\SAR_WaterMaster_plate1.mxd

Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

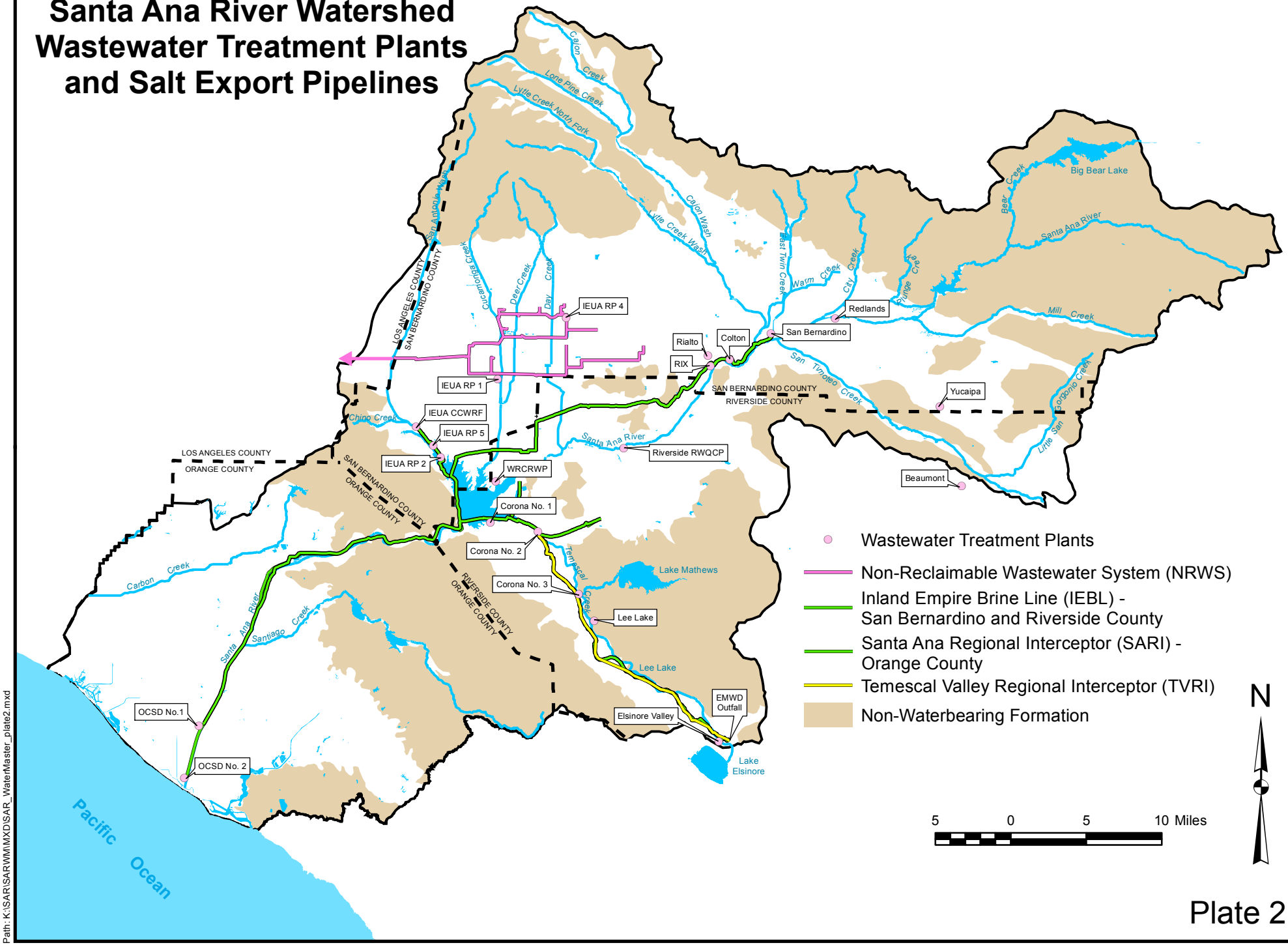

Plate 2

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PRECIPITATION AT SAN BERNARDINO STARTING WITH 1934-35

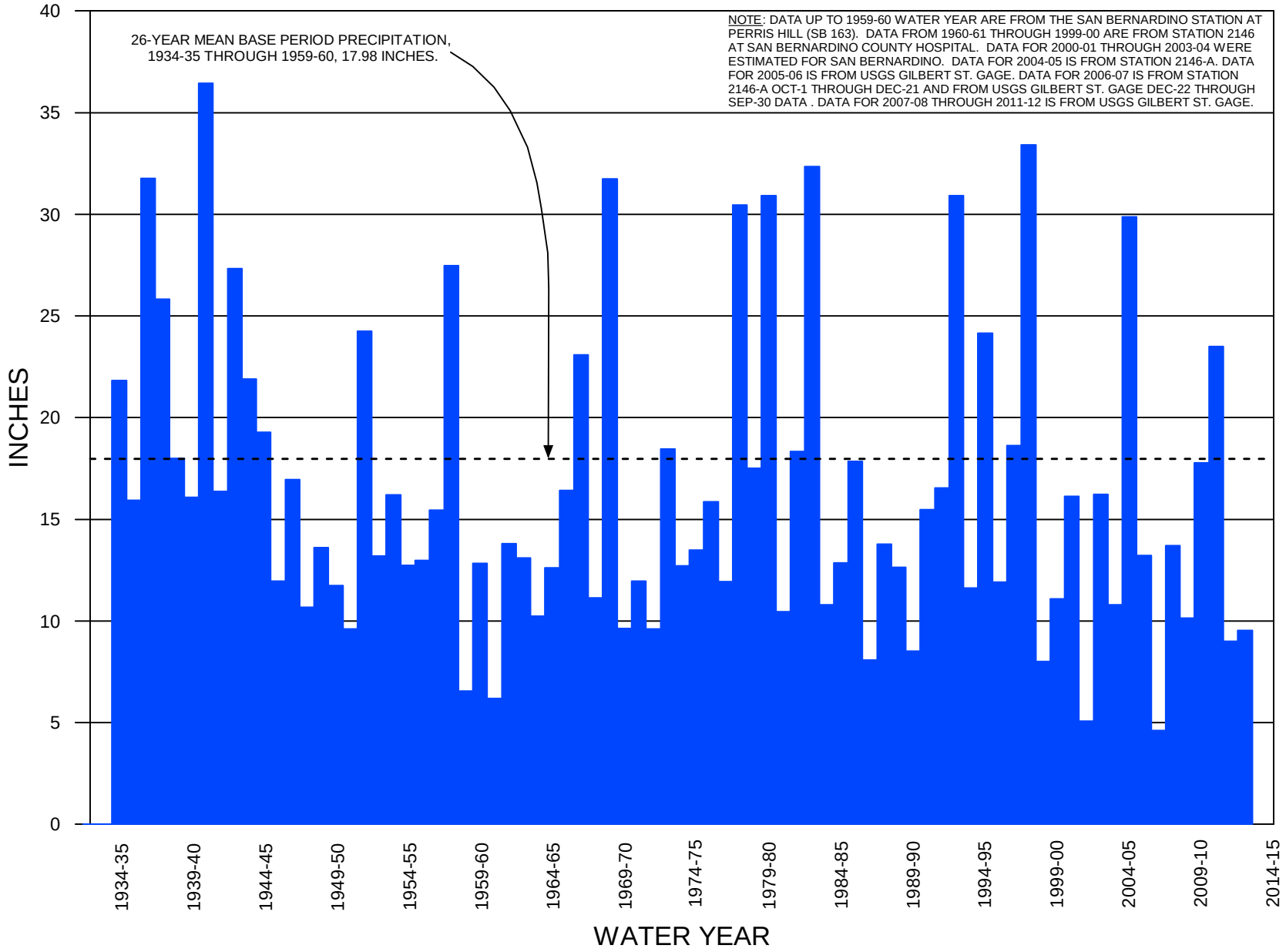
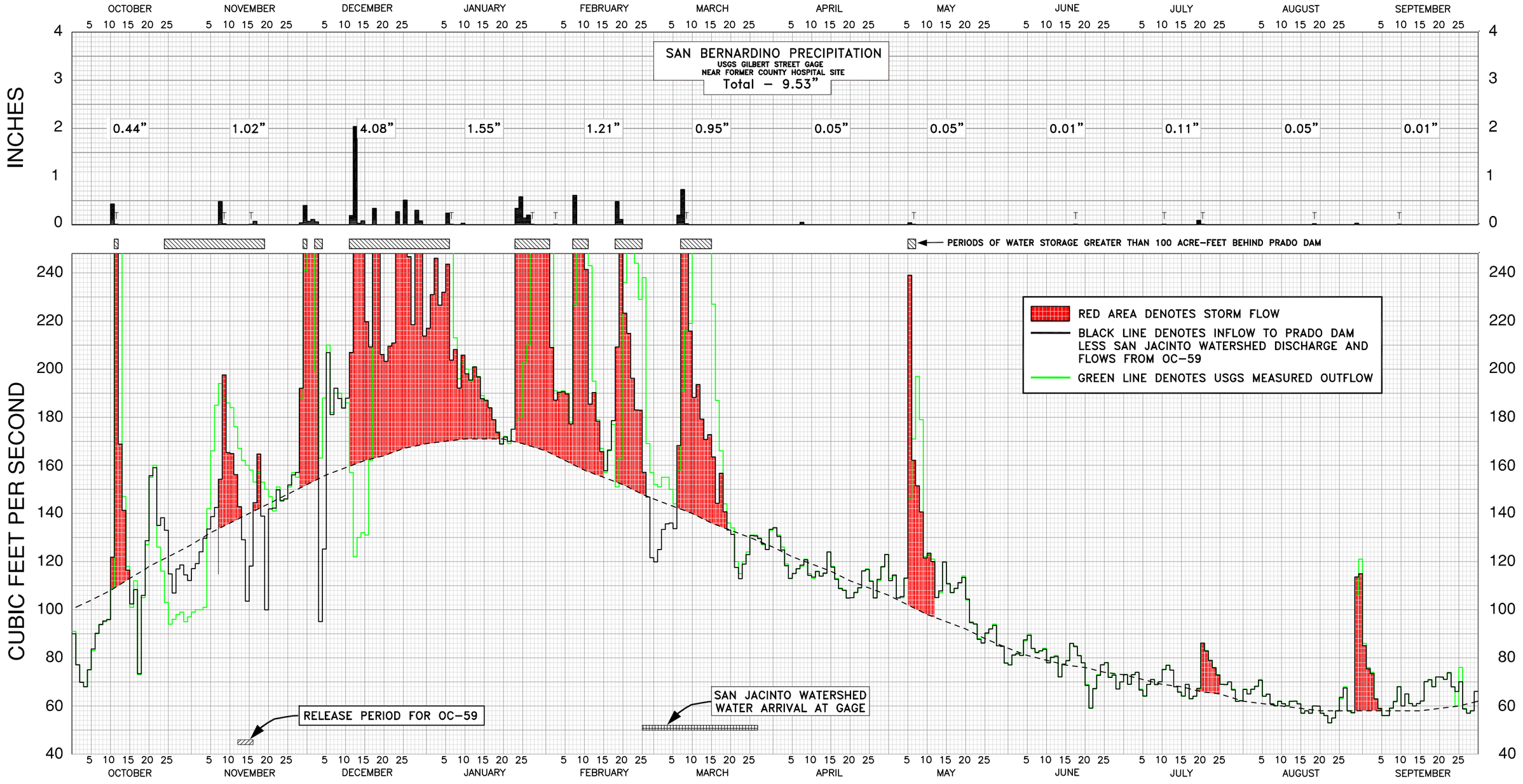


PLATE 3



DISCHARGE OF SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2012-13

Plate 4

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

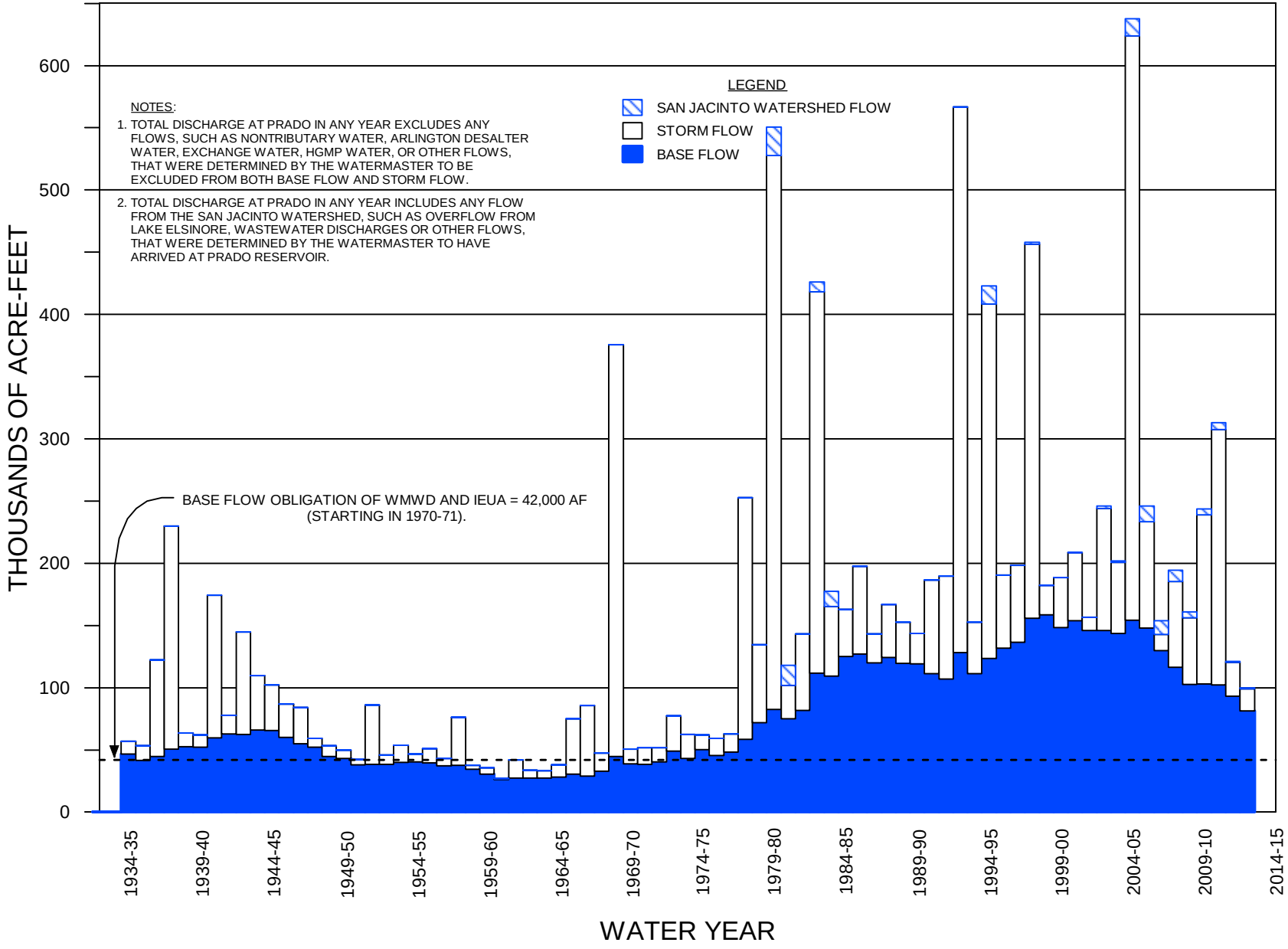
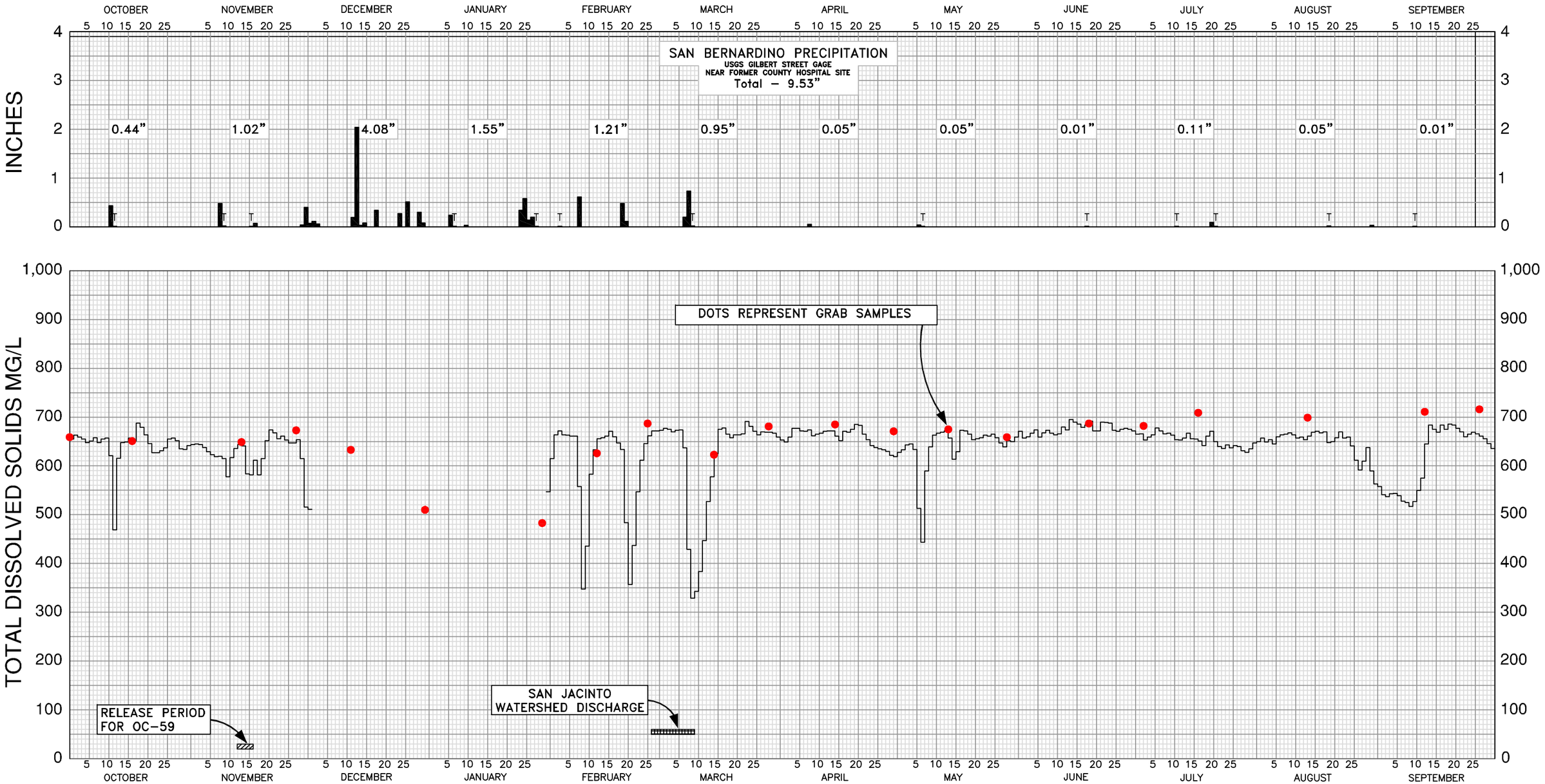
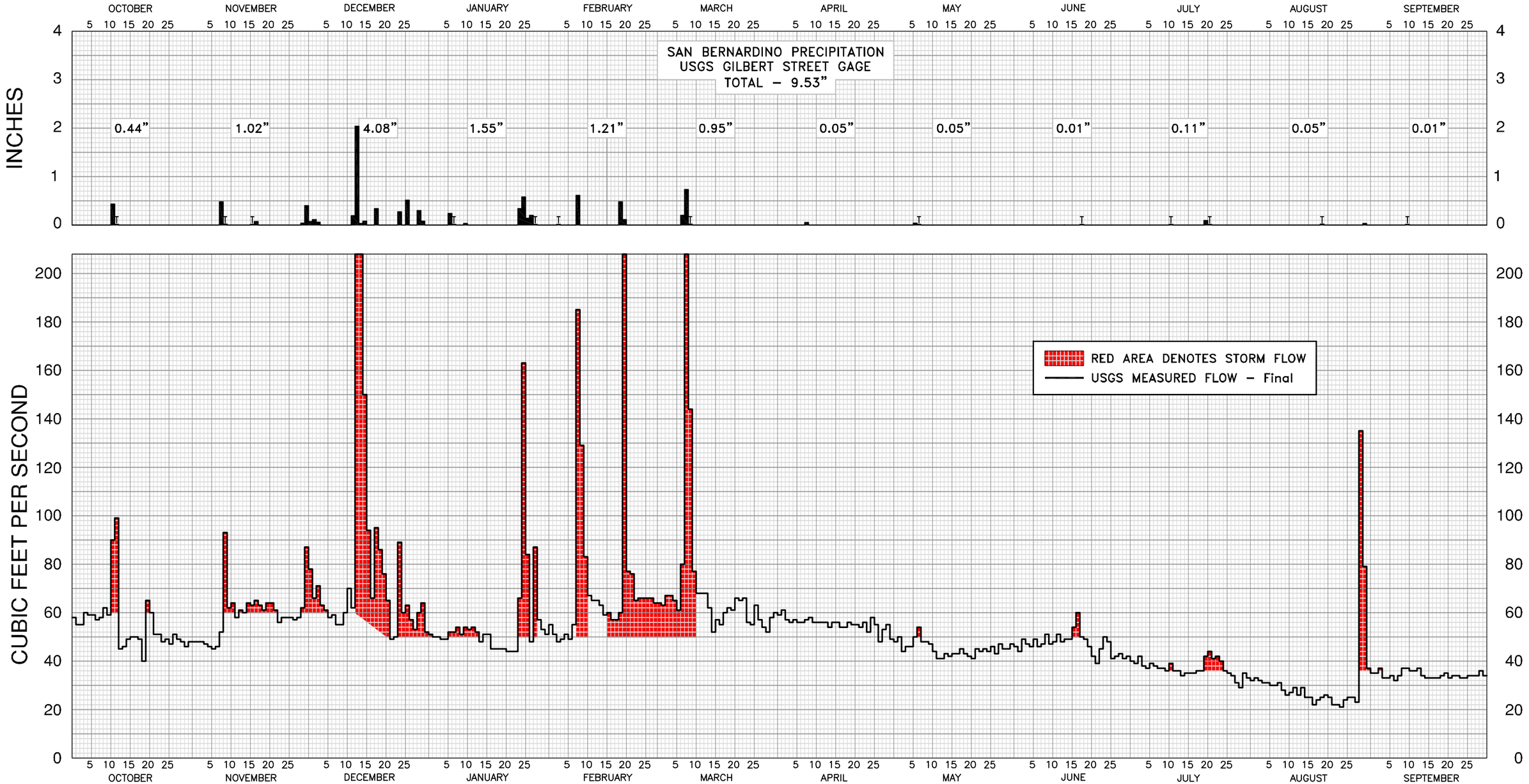


PLATE 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2012-13

Plate 6



DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2012-13

Plate 7

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

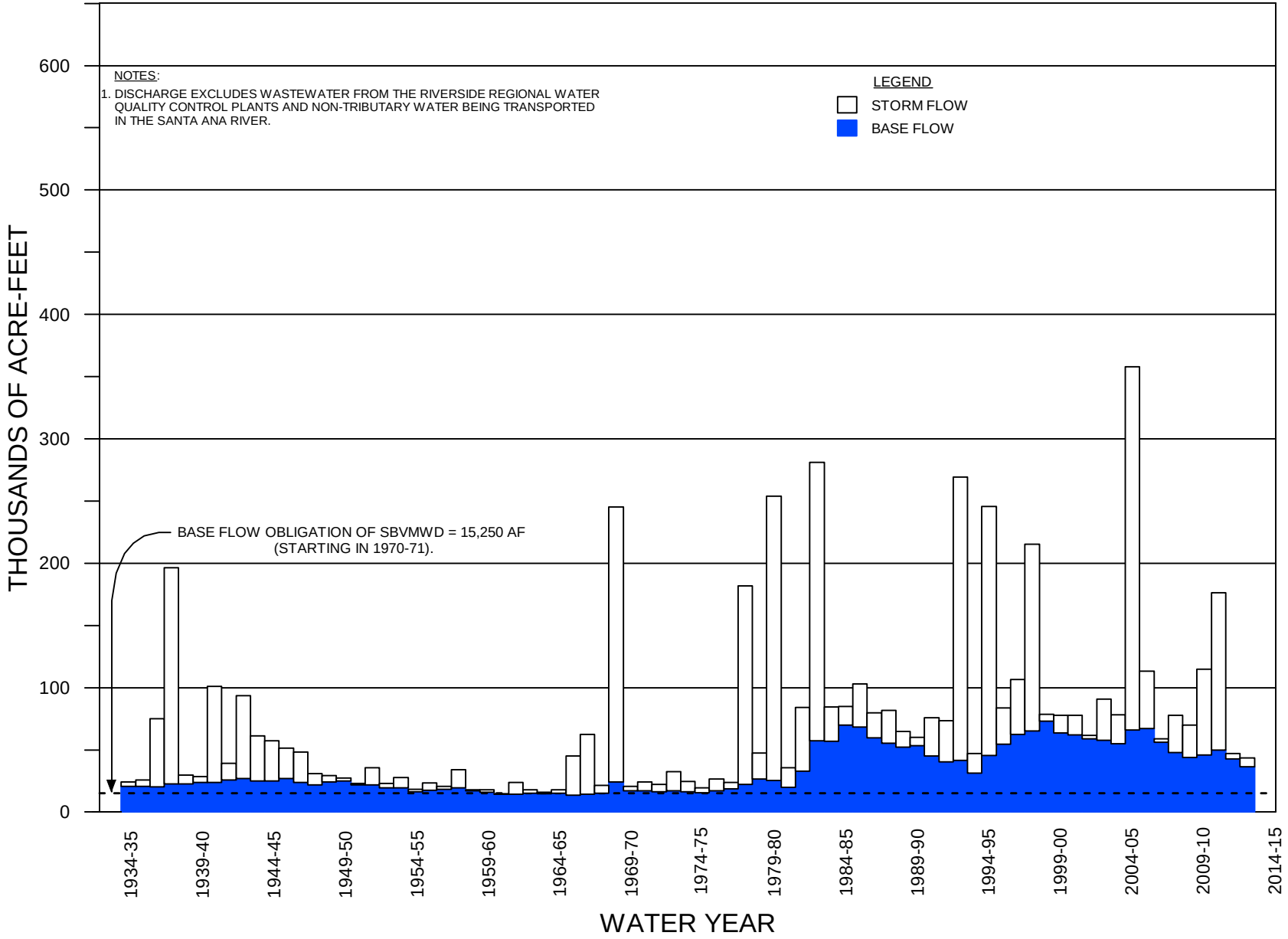


PLATE 8

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-THIRD ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2012 - SEPTEMBER 30, 2013

April 30, 2014

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), AND CHINO CREEK AT SCHAEFER AVENUE (NEAR CHINO)

WATER YEAR 2012-13

Water-Data Report 2013

11074000 Santa Ana River below Prado Dam, CA

Santa Ana River Basin

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, the California Water Project released 12,190 acre-ft to the basin. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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).

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.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11074000, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11074000.2013.pdf

11074000 Santa Ana River below Prado Dam, CA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	91	99	309	357	399	152	134	113	77	73	67	86
2	77	100	253	371	299	151	131	114	81	69	65	76
3	70	100	e199	369	191	155	126	105	82	73	67	74
4	68	101	e163	348	189	155	119	105	81	74	68	63
5	75	142	e188	326	191	150	113	113	87	67	71	59
6	83	166	210	293	190	144	115	146	90	64	64	56
7	90	185	182	256	178	158	117	171	84	69	65	56
8	94	194	190	213	227	191	118	197	82	71	61	59
9	95	188	190	196	355	216	121	179	83	69	60	62
10	96	186	184	203	344	219	115	122	84	70	62	68
11	109	184	186	200	306	267	113	123	78	75	61	60
12	268	176	157	195	243	292	116	121	80	77	60	65
13	254	167	122	201	195	279	114	105	81	75	62	61
14	147	162	130	197	179	267	115	107	72	68	62	60
15	118	160	132	189	167	251	124	120	77	66	61	61
16	101	158	131	187	157	227	118	111	79	64	57	62
17	112	153	162	184	166	187	113	107	86	69	58	70
18	73	157	255	179	177	166	109	109	85	63	57	71
19	105	e153	313	174	151	144	108	e111	81	64	60	68
20	127	e150	339	169	163	136	105	e114	78	67	60	72
21	155	147	338	172	236	134	105	e104	69	86	57	72
22	160	141	336	169	274	120	107	95	59	83	56	71
23	126	151	331	175	262	115	109	94	67	79	53	74
24	116	145	322	179	244	120	116	88	73	76	55	68
25	103	146	323	180	229	124	117	86	77	73	58	60
26	94	151	321	203	238	131	112	90	78	69	63	76
27	96	157	319	210	169	131	105	92	72	69	68	59
28	98	155	317	320	157	130	112	94	73	70	58	57
29	99	188	315	393	---	127	118	85	67	67	57	58
30	95	241	313	410	---	125	123	85	70	62	106	66
31	97	---	338	426	---	133	---	78	---	62	121	---
Total	3,492	4,703	7,568	7,644	6,276	5,297	3,468	3,484	2,333	2,183	2,000	1,970
Mean	113	157	244	247	224	171	116	112	77.8	70.4	64.5	65.7
Max	268	241	339	426	399	292	134	197	90	86	121	86
Min	68	99	122	169	151	115	105	78	59	62	53	56
Ac-ft	6,930	9,330	15,010	15,160	12,450	10,510	6,880	6,910	4,630	4,330	3,970	3,910

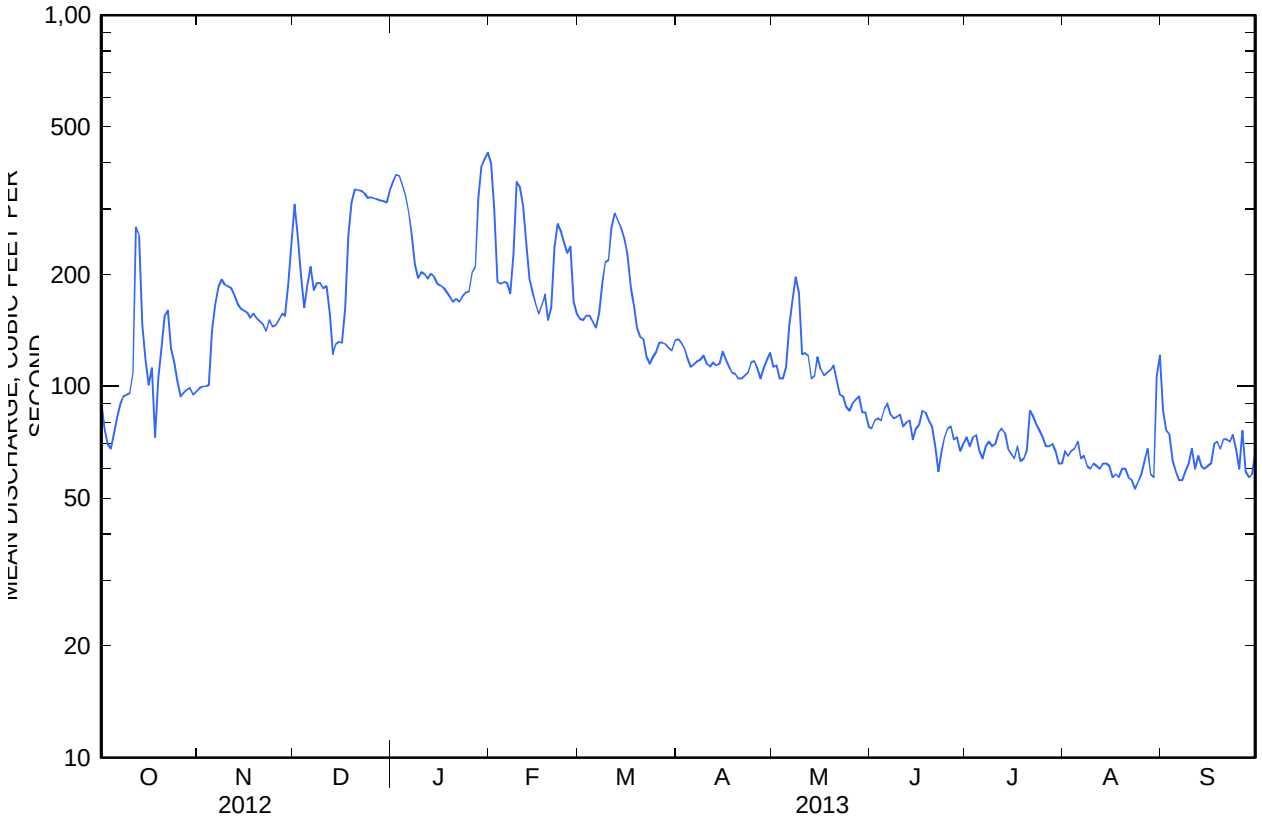
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	130	151	239	391	442	396	264	191	156	127	108	102
Max	910	322	1,300	3,543	2,733	2,556	1,101	915	736	446	402	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)

11074000 Santa Ana River below Prado Dam, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1941 - 2013	
Annual total	58,611		50,418			
Annual mean	160		138		224	
Highest annual mean					882	2005
Lowest annual mean					36.4	1961
Highest daily mean	340	Mar 20	426	Jan 31	11,400	Jan 14, 2005
Lowest daily mean	58	Aug 3	53	Aug 23	2.4	Jul 29, 1978
Annual seven-day minimum	64	Aug 8	57	Aug 18	3.0	Sep 24, 1973
Maximum peak flow			451	Jan 31	13,200	Jan 15, 2005
Maximum peak stage			3.69	Jan 31	8.73	Jan 15, 2005
Annual runoff (ac-ft)	116,300		100,000		162,100	
10 percent exceeds	276		258		385	
50 percent exceeds	150		114		140	
90 percent exceeds	74		62		42	



11074000 Santa Ana River below Prado Dam, CA—Continued

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. 04 to 11, Nov. 08 to Nov. 14, Mar. 28 to Apr. 15, May 03 to May 21, June 12 to June 19, Oct. 05 to Oct. 29, which is good; Oct. 12 to 16, which is fair; Oct. 17, Dec. 02 to Jan. 30, which is poor.

Temperature record excellent except for Dec. 02 to Jan. 30, which is poor.

The above period of missing/unusable record totals 60 days (16.2% of the year).

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.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded, 1,180 microsiemens, Mar. 23, 2013, June 19, 2013, June 24, 2013, Sept. 13, 2013; minimum recorded, 488 microsiemens, Dec. 13, 2012, but may have been lower during periods of missing record.
WATER TEMPERATURE: Maximum recorded, 27.7°C, Aug. 31, 2013; minimum recorded, 10.8°C, Feb. 9, 2013, but may have been lower during periods of missing record.

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
[ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter]

Sample date-time	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Specific conductance, water, unfiltered, µS/cm at 25°C (00095)	Temperature, water, °C (00010)	Dissolved solids dried at 180°C, water, filtered, mg/L (70300)
10-01-2012 1630	40.0	93	1,100	23.4	659
10-17-2012 1420	35.5	119	1,090	20.9	651
11-14-2012 1344	25.6	161	1,080	14.6	649
11-28-2012 1445	20.6	150	1,100	17.0	673
12-12-2012 1337	17.1	209	1,030	15.1	633
12-31-2012 1331	17.7	357	847	11.2	510
01-30-2013 1357	20.2	428	790	14.0	483
02-13-2013 1259	19.2	198	1,090	12.7	626
02-26-2013 1432	21.7	269	1,090	13.5	687
03-15-2013 1350	24.3	251	1,060	19.0	623
03-29-2013 1536	24.3	133	1,120	19.5	681
04-15-2013 1455	19.2	127	1,110	17.7	685
04-30-2013 1140	18.2	129	1,100	20.1	671
05-14-2013 1255	27.5	123	1,120	23.2	675
05-29-2013 1347	26.7	87	1,120	22.7	659
06-19-2013 1336	26.3	82	1,160	23.7	687
07-03-2013 1025	27.4	76	1,140	24.4	682
07-17-2013 1430	33.0	76	1,130	24.0	709
08-14-2013 1350	29.7	65	1,130	23.5	699
09-13-2013 1209	28.3	67	1,170	22.3	711
09-26-2013 1248	23.4	72	1,190	21.1	716

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 1 of 5

[%, percent; $CaCO_3$, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO_2, silicon dioxide; cm, centimeter; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Sample date-time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Absorbance, UV, 254 nm, 1 cm path length, water, filtered, units per cm (50624)	Absorbance, UV, organic constituents, 280 nm, 1 cm path length, water, filtered, units per cm (61726)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25°C (00095)
10-09-2012 1500	749	25.5	0.108	0.081	99	9.3	107	8.2	1,090
11-15-2012 1430	752	22.5	.111	.083	161	9.2	93	7.9	963
12-10-2012 1500	752	23.5	.104	.076	191	10.1	102	8.0	1,060
01-16-2013 1330	756	21.0	.091	.067	198	14.2	127	8.2	1,080
01-30-2013 1045	760	11.0	.164	.121	432	9.5	93	7.9	787
02-13-2013 1315	757	14.0	.096	.070	198	10.2	98	8.0	1,070
02-26-2013 1430	750	21.5	.111	.083	269	10.0	98	8.0	1,100
03-12-2013 1245	753	24.5	.160	.118	296	8.8	89	8.1	767
03-26-2013 1030	750	14.5	.095	.071	138	10.2	109	8.1	1,110
04-09-2013 1230	748	25.3	.118	.090	125	11.3	121	8.1	1,110
04-25-2013 1030	752	20.0	.103	.077	134	11.5	125	8.1	1,120
05-07-2013 1330	751	24.5	.373	.264	186	7.4	82	7.7	767
05-23-2013 1300	748	26.0	.125	.101	98	8.9	103	8.1	1,120
06-03-2013 1400	747	25.0	.230	.188	79	7.8	94	8.2	1,120
06-19-2013 1230	746	27.0	.107	.080	82	9.1	108	8.2	1,160
07-16-2013 1215	748	32.0	.100	.074	71	7.4	90	8.2	1,170
08-05-2013 1230	750	27.5	.107	.081	76	8.7	103	8.3	1,130
09-04-2013 1315	746	37.5	.108	.080	65	10.0	125	8.1	1,140

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 2 of 5

[%, percent; $CaCO_3$, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO_2, silicon dioxide; cm, centimeter; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Sample date-time	Tempera-ture, water, °C (00010)	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Dissolved solids dried at 180°C, water, filtered, mg/L (70300)	Calcium, water, filtered, mg/L (00915)	Magne-sium, water, filtered, mg/L (00925)	Potassium, water, filtered, mg/L (00935)	Sodium, water, filtered, mg/L (00930)	Alkalinity, water, filtered, inflection-point, incremental titration method, field, mg/L as $CaCO_3$ (39086)
10-09-2012 1500	21.5	46	688	84.4	19.8	14.3	114	229
11-15-2012 1430	15.0	34	586	73.9	18.8	11.3	104	188
12-10-2012 1500	15.5	31	652	87.4	19.8	13.0	106	212
01-16-2013 1330	10.0	20	675	87.7	20.7	12.9	104	212
01-30-2013 1045	14.0	E 14	471	62.5	15.0	10.2	73.4	172
02-13-2013 1315	13.0	31	676	85.8	20.5	12.6	102	232
02-26-2013 1430	13.5	E 20	670	84.8	20.8	12.3	101	229
03-12-2013 1245	15.5	E 14	448	58.9	14.0	9.43	71.7	160
03-26-2013 1030	17.5	28	688	85.9	21.0	12.2	104	234
04-09-2013 1230	17.5	27	693	85.9	20.8	12.5	112	230
04-25-2013 1030	18.5	29	707	86.7	21.8	13.2	116	238
05-07-2013 1330	19.5	E 18	471	60.3	14.2	10.4	79.9	164
05-23-2013 1300	21.5	33	685	85.6	19.5	13.3	115	231
06-03-2013 1400	23.5	41	688	88.6	21.6	13.6	117	232
06-19-2013 1230	23.0	39	699	84.9	20.1	12.6	107	238
07-16-2013 1215	24.0	47	705	98.7	22.9	14.1	120	239
08-05-2013 1230	23.0	34	712	87.2	20.6	13.6	115	233
09-04-2013 1315	26.0	45	691	94.5	20.7	13.1	102	238

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 3 of 5

[%, percent; $CaCO_3$, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO_2, silicon dioxide; cm, centimeter; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Sample date-time	Bicarbonate, water, filtered, inflection-point, incremental titration method, field, mg/L (00453)	Carbon (inorganic plus organic), suspended sediment, total, mg/L (00694)	Carbonate, water, filtered, inflection-point incremental titration method, field, mg/L (00452)	Chloride, water, filtered, mg/L (00940)	Fluoride, water, filtered, mg/L (00950)	Inorganic carbon, suspended sediment, total, mg/L (00688)	Silica, water, filtered, mg/L as SiO_2 (00955)	Sulfate, water, filtered, mg/L (00945)	Ammonia plus organic nitrogen, water, filtered, mg/L as N (00623)
10-09-2012 1500	275	2.47	2	140	0.39	0.04	21.8	113	0.67
11-15-2012 1430	227	1.81	1	133	.35	< .03	17.3	86.6	.70
12-10-2012 1500	255	2.10	2	137	.39	< .03	20.2	103	.71
01-16-2013 1330	255	1.59	2	132	.39	< .03	20.5	107	.61
01-30-2013 1045	208	1.21	1	94.8	.36	< .03	15.3	84.5	.64
02-13-2013 1315	280	2.02	2	136	.38	< .03	20.0	113	.60
02-26-2013 1430	277	1.14	1	138	.37	< .03	19.8	116	.63
03-12-2013 1245	192	.99	1	87.7	.32	< .03	14.5	84.2	.70
03-26-2013 1030	281	1.73	2	135	.42	< .03	19.9	119	.61
04-09-2013 1230	277	1.82	2	138	.43	< .03	18.5	115	.66
04-25-2013 1030	286	1.64	2	145	.44	< .03	19.1	122	.70
05-07-2013 1330	198	2.29	1	86.1	.39	< .03	14.7	79.5	1.1
05-23-2013 1300	277	.99	2	144	.42	< .03	18.2	121	.68
06-03-2013 1400	278	2.18	2	139	.53	< .03	20.4	116	.52
06-19-2013 1230	286	1.41	2	147	.52	< .03	18.4	122	.66
07-16-2013 1215	286	1.59	2	148	.50	< .03	22.1	120	.58
08-05-2013 1230	277	1.71	3	139	.47	< .03	20.4	111	.61
09-04-2013 1315	285	2.45	2	145	.47	< .03	22.5	122	.59

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 4 of 5

[%, percent; $CaCO_3$, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO_2, silicon dioxide; cm, centimeter; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Sample date-time	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrite, water, filtered, mg/L as N (00613)	Orthophosphate, water, filtered, mg/L as P (00671)	Particulate nitrogen, suspended in water, mg/L (49570)	Phosphorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, filtered, analytically determined, mg/L (62854)
10-09-2012 1500	1.1	0.047	4.12	0.041	0.926	0.396	0.92	1.07	--
11-15-2012 1430	.86	.110	3.56	.055	.917	.259	.91	1.03	--
12-10-2012 1500	.90	.082	5.65	.044	1.11	.268	1.15	1.24	--
01-16-2013 1330	.81	.049	6.40	.028	.936	.224	.96	1.05	--
01-30-2013 1045	1.1	.140	4.58	.071	.530	.229	.53	.59	--
02-13-2013 1315	.86	.119	5.47	.045	1.11	.195	1.10	1.22	--
02-26-2013 1430	.84	.084	5.68	.042	1.11	.115	1.14	1.23	--
03-12-2013 1245	.76	.039	3.93	.038	.622	.174	.66	.67	--
03-26-2013 1030	.86	.060	5.10	.023	.953	.186	.96	1.06	--
04-09-2013 1230	.97	.053	4.78	.028	1.05	.242	1.06	1.19	--
04-25-2013 1030	.97	.061	4.78	.033	1.03	.208	1.03	1.13	--
05-07-2013 1330	1.4	.118	3.92	.133	.699	.404	.72	.81	--
05-23-2013 1300	1.0	.059	4.40	.037	1.11	.140	1.10	1.21	4.67
06-03-2013 1400	.90	.033	3.66	.035	1.02	.293	.99	1.18	4.30
06-19-2013 1230	1.0	.030	3.66	.030	1.10	.210	1.06	1.21	4.17
07-16-2013 1215	.86	< .010	3.66	.030	.912	.268	.91	1.06	4.14
08-05-2013 1230	.86	.030	3.87	.048	.823	.260	.82	.94	4.31
09-04-2013 1315	.88	.036	4.45	.036	1.04	.330	1.07	1.23	4.78

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 5 of 5

[%, percent; $CaCO_3$, calcium carbonate; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; SiO_2, silicon dioxide; cm, centimeter; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Sample date-time	Iron, water, filtered, µg/L (01046)	Lithium, water, filtered, µg/L (01130)	Strontium, water, filtered, µg/L (01080)	Vanadium, water, filtered, µg/L (01085)	Arsenic, water, filtered, µg/L (01000)	Boron, water, filtered, µg/L (01020)	Selenium, water, filtered, µg/L (01145)	Organic carbon, suspended sediment, total, mg/L (00689)	Organic carbon, water, filtered, mg/L (00681)
10-09-2012 1500	11.1	6.28	567	7.3	3.3	274	0.35	2.43	5.10
11-15-2012 1430	70.0	4.30	475	6.3	2.7	230	.32	1.79	4.24
12-10-2012 1500	17.4	5.55	561	5.6	2.7	256	.44	2.08	4.87
01-16-2013 1330	14.5	6.07	586	4.5	2.4	234	.51	1.59	4.42
01-30-2013 1045	20.6	4.52	417	5.2	2.3	174	.29	1.21	5.28
02-13-2013 1315	13.4	7.12	594	5.3	2.7	269	.43	2.01	4.61
02-26-2013 1430	11.0	5.71	603	5.6	2.7	251	.49	1.14	4.55
03-12-2013 1245	420	3.69	386	6.0	2.4	172	.37	.99	5.10
03-26-2013 1030	28.1	6.41	592	6.9	3.1	275	.58	1.72	4.23
04-09-2013 1230	9.0	6.94	594	6.7	3.1	292	.41	1.82	4.35
04-25-2013 1030	11.2	6.88	605	6.4	3.2	267	.45	1.63	3.81
05-07-2013 1330	47.3	5.33	396	7.0	2.9	197	.47	2.29	11.1
05-23-2013 1300	13.7	7.54	567	7.4	3.5	266	.47	.97	4.28
06-03-2013 1400	6.0	7.62	653	10.3	4.2	291	.56	2.18	3.79
06-19-2013 1230	< 4.0	7.58	602	8.3	3.4	286	.38	1.40	4.35
07-16-2013 1215	7.6	7.84	639	7.8	3.1	292	.41	1.57	4.00
08-05-2013 1230	10.4	6.99	620	7.4	2.7	227	.38	1.71	3.73
09-04-2013 1315	5.0	7.03	630	7.7	3.4	264	.43	2.44	4.20

11074000 Santa Ana River below Prado Dam, CA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		October			November			December			January	
1	1,110	1,080	1,090	1,090	1,060	1,080	964	682	860	---	---	---
2	1,120	1,090	1,110	1,080	1,060	1,080	---	---	---	---	---	---
3	1,130	1,070	1,100	1,080	1,060	1,070	---	---	---	---	---	---
4	1,130	1,070	1,090	1,080	1,050	1,060	---	---	---	---	---	---
5	1,100	1,060	1,080	1,060	1,040	1,050	---	---	---	---	---	---
6	1,120	1,070	1,090	1,050	1,030	1,040	---	---	---	---	---	---
7	1,130	1,050	1,100	1,040	1,020	1,030	---	---	---	---	---	---
8	1,110	1,060	1,080	1,050	1,020	1,040	---	---	---	---	---	---
9	1,110	1,070	1,090	1,060	968	1,040	---	---	---	---	---	---
10	1,120	1,080	1,100	982	954	965	---	---	---	---	---	---
11	1,090	905	1,070	1,060	982	1,030	---	---	---	---	---	---
12	908	678	779	1,080	1,060	1,060	---	---	---	---	---	---
13	1,120	906	1,050	1,110	1,040	1,070	---	---	---	---	---	---
14	1,110	1,060	1,080	1,100	998	1,080	---	---	---	---	---	---
15	1,100	1,060	1,080	998	962	974	---	---	---	---	---	---
16	1,110	1,080	1,100	984	966	971	---	---	---	---	---	---
17	1,110	1,080	1,090	1,070	958	1,030	---	---	---	---	---	---
18	1,160	1,110	1,150	1,020	944	978	---	---	---	---	---	---
19	1,160	1,110	1,130	1,070	963	1,030	---	---	---	---	---	---
20	1,140	1,080	1,110	1,120	1,070	1,080	---	---	---	---	---	---
21	1,100	1,050	1,080	1,130	1,120	1,120	---	---	---	---	---	---
22	1,060	1,030	1,050	1,130	1,080	1,120	---	---	---	---	---	---
23	1,060	1,030	1,050	1,110	1,080	1,090	---	---	---	---	---	---
24	1,060	1,000	1,050	1,110	1,090	1,100	---	---	---	---	---	---
25	1,090	1,030	1,060	1,100	1,080	1,090	---	---	---	---	---	---
26	1,100	1,050	1,100	1,100	1,060	1,080	---	---	---	---	---	---
27	1,110	1,090	1,100	1,090	1,070	1,080	---	---	---	---	---	---
28	1,100	1,070	1,090	1,110	1,050	1,100	---	---	---	---	---	---
29	1,070	1,050	1,060	1,080	964	1,060	---	---	---	---	---	---
30	1,070	1,050	1,060	1,030	634	979	---	---	---	---	---	---
31	1,080	1,060	1,070	---	---	---	---	---	---	988	854	893
Max	1,160	1,110	1,150	1,130	1,120	1,120	---	---	---	---	---	---
Min	908	678	779	982	634	965	---	---	---	---	---	---

11074000 Santa Ana River below Prado Dam, CA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

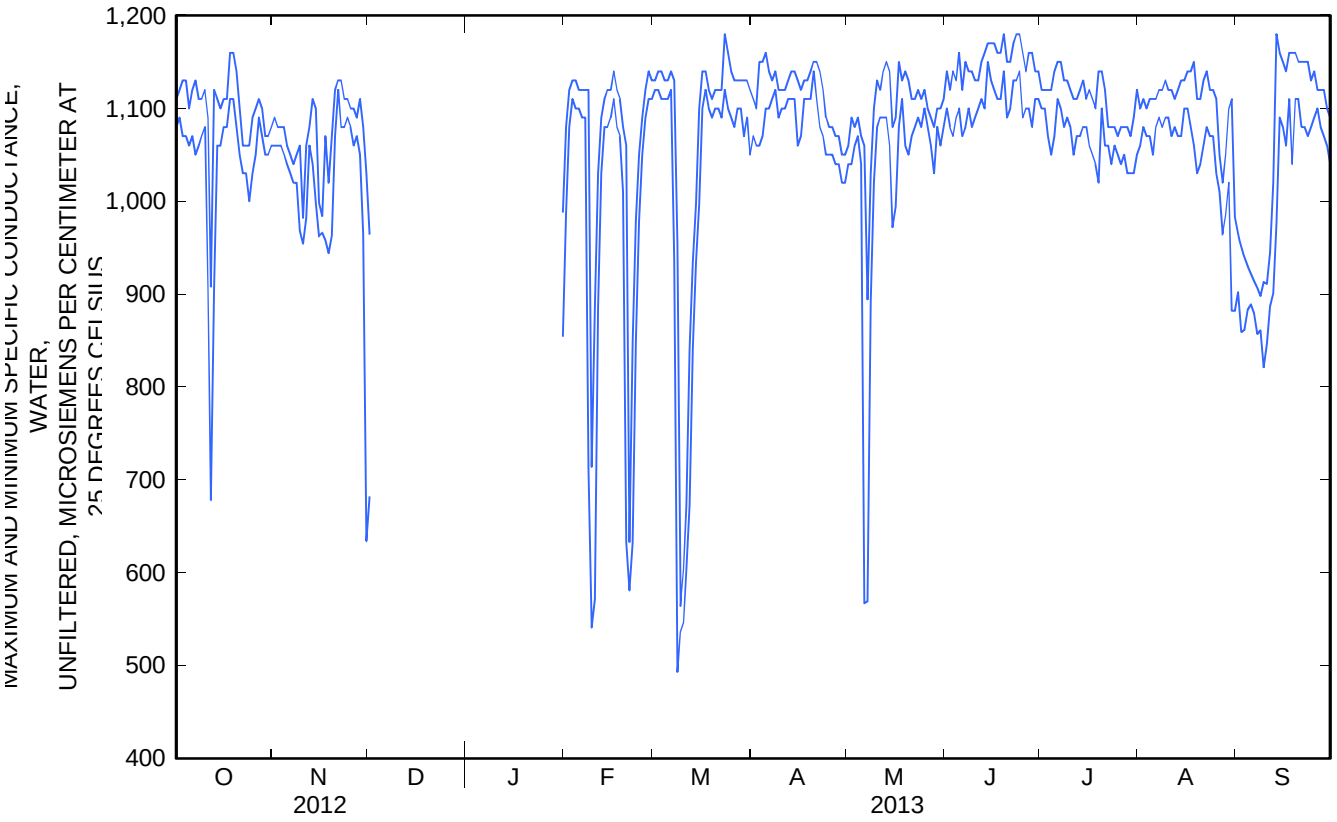
Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		February			March			April			May	
1	1,080	988	1,020	1,130	1,120	1,120	1,110	1,070	1,090	1,060	1,040	1,050
2	1,120	1,080	1,110	1,140	1,120	1,130	1,100	1,060	1,080	1,090	1,040	1,060
3	1,130	1,110	1,120	1,140	1,110	1,130	1,150	1,060	1,100	1,080	1,060	1,070
4	1,130	1,100	1,100	1,130	1,110	1,120	1,150	1,070	1,130	1,090	1,070	1,080
5	1,120	1,100	1,110	1,130	1,110	1,120	1,160	1,100	1,130	1,070	1,040	1,060
6	1,120	1,090	1,100	1,140	1,120	1,130	1,140	1,100	1,120	1,060	567	1,020
7	1,120	1,090	1,100	1,130	936	1,100	1,130	1,110	1,120	894	569	726
8	1,120	712	982	953	493	698	1,140	1,120	1,120	1,030	891	994
9	714	541	564	564	536	550	1,120	1,090	1,100	1,100	1,020	1,070
10	886	571	707	604	546	570	1,120	1,100	1,110	1,130	1,080	1,110
11	1,030	886	978	673	604	641	1,120	1,100	1,110	1,120	1,090	1,110
12	1,090	1,030	1,050	841	673	737	1,130	1,110	1,120	1,140	1,090	1,120
13	1,110	1,080	1,100	934	841	872	1,140	1,110	1,120	1,150	1,090	1,130
14	1,120	1,080	1,100	997	934	959	1,140	1,110	1,120	1,140	1,060	1,100
15	1,120	1,090	1,110	1,100	997	1,030	1,130	1,060	1,120	1,080	972	1,020
16	1,140	1,110	1,120	1,140	1,100	1,130	1,120	1,070	1,090	1,090	994	1,050
17	1,120	1,080	1,100	1,140	1,120	1,130	1,130	1,110	1,120	1,150	1,080	1,130
18	1,110	1,070	1,080	1,120	1,100	1,110	1,130	1,110	1,120	1,130	1,110	1,120
19	1,080	1,010	1,060	1,110	1,090	1,100	1,140	1,110	1,120	1,140	1,060	1,110
20	1,060	633	728	1,120	1,100	1,110	1,150	1,140	1,140	1,130	1,050	1,090
21	633	581	595	1,120	1,100	1,110	1,150	1,110	1,140	1,110	1,070	1,100
22	847	632	713	1,120	1,090	1,110	1,140	1,080	1,110	1,110	1,080	1,100
23	978	847	904	1,180	1,120	1,150	1,120	1,070	1,090	1,120	1,090	1,110
24	1,050	978	1,020	1,160	1,100	1,130	1,090	1,050	1,070	1,110	1,080	1,110
25	1,090	1,050	1,080	1,140	1,090	1,120	1,080	1,050	1,060	1,120	1,100	1,110
26	1,120	1,090	1,100	1,130	1,080	1,110	1,080	1,050	1,060	1,100	1,080	1,100
27	1,140	1,110	1,120	1,130	1,100	1,120	1,070	1,040	1,060	1,090	1,060	1,080
28	1,130	1,110	1,120	1,130	1,100	1,120	1,070	1,040	1,050	1,080	1,030	1,080
29	---	---	---	1,130	1,070	1,120	1,050	1,020	1,040	1,100	1,080	1,090
30	---	---	---	1,130	1,090	1,120	1,050	1,020	1,030	1,100	1,060	1,090
31	---	---	---	1,120	1,050	1,100	---	---	---	1,110	1,080	1,110
Max	1,140	1,110	1,120	1,180	1,120	1,150	1,160	1,140	1,140	1,150	1,110	1,130
Min	633	541	564	564	493	550	1,050	1,020	1,030	894	567	726

11074000 Santa Ana River below Prado Dam, CA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		June			July			August			September	
1	1,140	1,100	1,120	1,120	1,100	1,110	1,100	1,060	1,090	965	902	934
2	1,120	1,080	1,100	1,120	1,100	1,110	1,110	1,080	1,100	951	859	898
3	1,140	1,070	1,110	1,120	1,070	1,090	1,100	1,070	1,080	939	862	897
4	1,130	1,090	1,110	1,120	1,050	1,100	1,110	1,070	1,090	930	883	906
5	1,160	1,100	1,120	1,140	1,070	1,110	1,110	1,050	1,080	922	889	910
6	1,120	1,070	1,100	1,150	1,110	1,130	1,110	1,080	1,100	914	879	900
7	1,150	1,080	1,120	1,150	1,100	1,120	1,120	1,090	1,110	907	857	884
8	1,140	1,100	1,130	1,130	1,080	1,110	1,120	1,080	1,110	898	861	876
9	1,140	1,080	1,120	1,130	1,090	1,110	1,130	1,090	1,110	913	821	868
10	1,130	1,090	1,110	1,120	1,080	1,110	1,120	1,090	1,110	911	846	885
11	1,130	1,100	1,110	1,110	1,050	1,090	1,120	1,070	1,100	945	887	921
12	1,150	1,110	1,140	1,110	1,070	1,090	1,110	1,080	1,100	1,020	901	973
13	1,160	1,100	1,130	1,120	1,070	1,100	1,120	1,070	1,090	1,180	976	1,040
14	1,170	1,150	1,160	1,130	1,080	1,110	1,130	1,070	1,100	1,160	1,090	1,150
15	1,170	1,130	1,150	1,110	1,080	1,090	1,130	1,100	1,120	1,150	1,080	1,130
16	1,170	1,120	1,150	1,120	1,060	1,100	1,140	1,100	1,120	1,140	1,060	1,120
17	1,160	1,110	1,140	1,110	1,050	1,090	1,140	1,080	1,120	1,160	1,110	1,140
18	1,160	1,110	1,140	1,100	1,040	1,080	1,150	1,060	1,120	1,160	1,040	1,120
19	1,180	1,140	1,150	1,140	1,020	1,110	1,110	1,030	1,080	1,160	1,110	1,140
20	1,150	1,090	1,130	1,140	1,100	1,120	1,110	1,040	1,080	1,150	1,110	1,140
21	1,150	1,100	1,120	1,120	1,060	1,080	1,130	1,060	1,100	1,150	1,080	1,130
22	1,170	1,130	1,150	1,080	1,060	1,070	1,140	1,080	1,120	1,150	1,080	1,110
23	1,180	1,130	1,150	1,080	1,040	1,060	1,120	1,070	1,100	1,150	1,070	1,110
24	1,180	1,140	1,140	1,080	1,060	1,070	1,120	1,070	1,100	1,130	1,080	1,110
25	1,160	1,090	1,120	1,070	1,050	1,060	1,110	1,030	1,070	1,140	1,090	1,120
26	1,140	1,100	1,120	1,080	1,040	1,070	1,050	1,010	1,020	1,120	1,100	1,110
27	1,160	1,100	1,130	1,080	1,050	1,070	1,020	964	984	1,120	1,080	1,100
28	1,160	1,080	1,130	1,080	1,030	1,060	1,050	985	1,010	1,120	1,070	1,100
29	1,140	1,110	1,130	1,070	1,030	1,050	1,100	1,020	1,060	1,100	1,060	1,080
30	1,140	1,110	1,120	1,090	1,030	1,060	1,110	882	1,020	1,090	1,040	1,060
31	---	---	---	1,120	1,050	1,080	983	882	942	---	---	---
Max	1,180	1,150	1,160	1,150	1,110	1,130	1,150	1,100	1,120	1,180	1,110	1,150
Min	1,120	1,070	1,100	1,070	1,020	1,050	983	882	942	898	821	868

11074000 Santa Ana River below Prado Dam, CA—Continued



11074000 Santa Ana River below Prado Dam, CA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		October			November			December			January	
1	23.4	21.8	22.8	18.0	17.2	17.5	19.1	18.4	18.6	---	---	---
2	23.3	21.6	22.8	18.0	17.1	17.6	---	---	---	---	---	---
3	22.9	21.5	22.3	18.4	17.2	17.8	---	---	---	---	---	---
4	22.6	21.1	21.8	18.3	17.2	17.5	---	---	---	---	---	---
5	21.9	20.5	21.4	18.3	17.3	18.0	---	---	---	---	---	---
6	21.8	20.4	21.3	18.2	17.5	18.0	---	---	---	---	---	---
7	22.3	20.9	21.6	18.2	17.5	17.9	---	---	---	---	---	---
8	22.4	21.0	22.0	17.8	17.4	17.7	---	---	---	---	---	---
9	21.7	20.6	21.3	18.0	17.2	17.7	---	---	---	---	---	---
10	21.5	20.4	21.0	17.2	15.2	16.6	---	---	---	---	---	---
11	21.0	19.3	19.9	15.2	14.0	14.7	---	---	---	---	---	---
12	20.0	16.3	16.9	14.0	13.0	13.6	---	---	---	---	---	---
13	19.5	17.4	18.3	14.1	13.1	13.7	---	---	---	---	---	---
14	21.0	18.8	19.7	14.7	13.6	14.4	---	---	---	---	---	---
15	21.1	19.7	20.6	15.3	14.3	15.1	---	---	---	---	---	---
16	21.0	19.5	20.6	16.8	15.1	16.3	---	---	---	---	---	---
17	24.2	17.9	20.9	17.9	16.7	17.1	---	---	---	---	---	---
18	22.0	19.9	21.0	18.9	17.9	18.5	---	---	---	---	---	---
19	22.1	20.4	21.4	18.3	17.2	17.8	---	---	---	---	---	---
20	21.9	21.0	21.6	17.3	16.7	17.1	---	---	---	---	---	---
21	21.4	20.7	21.0	17.1	16.0	16.6	---	---	---	---	---	---
22	20.9	20.0	20.6	16.8	15.5	16.3	---	---	---	---	---	---
23	20.3	19.3	19.7	17.1	15.8	16.8	---	---	---	---	---	---
24	19.5	18.1	18.6	16.9	15.7	16.6	---	---	---	---	---	---
25	18.7	17.5	18.2	16.8	15.9	16.5	---	---	---	---	---	---
26	18.4	17.1	17.6	17.6	16.6	17.2	---	---	---	---	---	---
27	18.3	17.0	17.7	17.1	16.0	16.4	---	---	---	---	---	---
28	18.5	17.2	18.0	17.9	15.9	16.6	---	---	---	---	---	---
29	18.6	17.2	18.0	18.8	17.5	17.8	---	---	---	---	---	---
30	18.4	17.3	17.8	19.8	18.0	18.5	---	---	---	---	---	---
31	18.2	17.1	17.6	---	---	---	---	---	---	14.4	13.1	13.5
Max	24.2	21.8	22.8	19.8	18.0	18.5	---	---	---	---	---	---
Min	18.2	16.3	16.9	14.0	13.0	13.6	---	---	---	---	---	---

11074000 Santa Ana River below Prado Dam, CA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

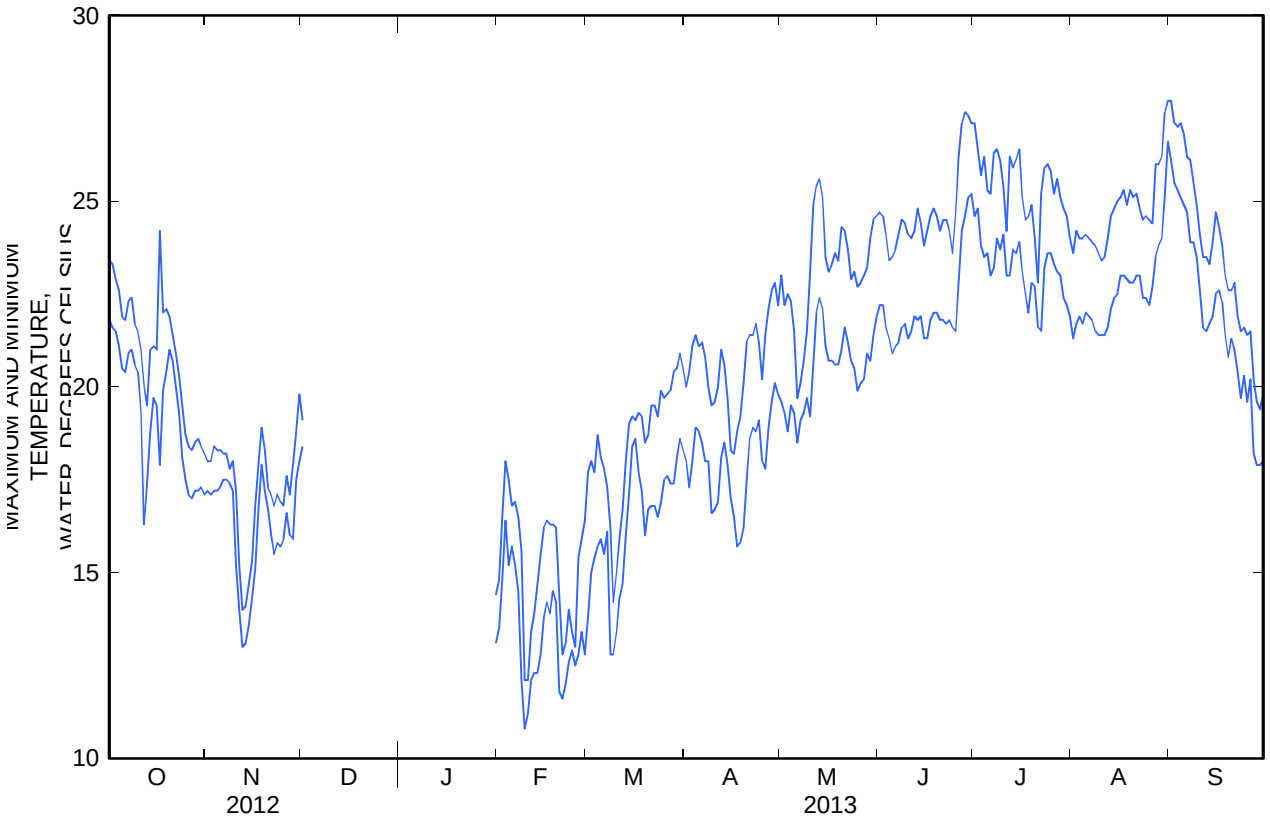
Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		February			March			April			May	
1	14.8	13.5	13.9	17.7	13.8	15.6	20.0	18.0	18.9	23.0	19.6	21.0
2	16.5	14.8	15.1	18.0	15.0	16.5	20.4	17.3	18.4	22.2	19.3	21.3
3	18.0	16.4	16.9	17.7	15.4	16.7	21.1	18.0	19.6	22.5	18.8	21.0
4	17.5	15.2	16.3	18.7	15.7	16.8	21.4	18.9	20.4	22.3	19.5	21.4
5	16.8	15.7	16.0	18.1	15.9	17.3	21.1	18.8	20.2	21.5	19.3	19.8
6	16.9	15.2	15.8	17.8	15.5	16.9	21.2	18.5	20.1	19.7	18.5	19.1
7	16.5	14.5	15.4	17.3	16.1	16.5	20.8	18.0	19.6	20.1	19.1	19.4
8	15.6	12.1	14.1	16.2	12.8	13.8	20.0	18.0	19.0	20.7	19.3	20.4
9	12.1	10.8	11.1	14.2	12.8	13.7	19.5	16.6	18.2	21.5	19.7	20.4
10	12.1	11.2	11.6	15.0	13.4	14.2	19.6	16.7	18.3	23.1	19.2	20.9
11	13.4	12.1	12.6	15.9	14.3	14.8	20.0	16.9	18.7	24.9	20.6	22.4
12	13.9	12.3	12.9	16.7	14.7	15.5	21.0	18.1	19.5	25.4	22.0	23.9
13	14.7	12.3	13.4	18.0	16.0	16.9	20.6	18.5	19.8	25.6	22.4	24.5
14	15.5	12.8	14.0	19.0	17.1	18.0	19.7	17.9	18.3	25.1	22.1	23.8
15	16.2	13.8	14.9	19.2	18.4	18.6	18.3	17.0	17.6	23.5	21.1	22.7
16	16.4	14.2	15.2	19.1	18.6	18.8	18.2	16.5	17.6	23.1	20.7	22.3
17	16.3	13.9	15.1	19.3	17.7	18.5	18.8	15.7	17.1	23.3	20.7	22.1
18	16.3	14.5	15.6	19.2	17.2	17.9	19.2	15.8	17.8	23.6	20.6	22.2
19	16.2	14.2	15.1	18.5	16.0	17.4	20.1	16.2	18.2	23.4	20.6	22.2
20	14.4	11.8	13.2	18.7	16.7	17.9	21.2	17.5	19.2	24.3	21.0	22.6
21	12.8	11.6	12.2	19.5	16.8	18.1	21.4	18.6	20.4	24.2	21.6	23.2
22	13.1	12.0	12.5	19.5	16.8	18.3	21.4	18.9	20.6	23.7	21.2	22.9
23	14.0	12.6	13.4	19.2	16.5	18.0	21.7	18.8	20.5	22.9	20.7	22.1
24	13.4	12.9	13.1	19.9	16.9	18.4	21.2	19.1	20.1	23.1	20.5	21.8
25	13.0	12.5	12.8	19.7	17.5	18.8	20.2	18.0	19.4	22.7	19.9	21.7
26	15.4	12.8	13.3	19.8	17.6	18.8	21.4	17.8	19.4	22.8	20.1	21.6
27	15.9	13.4	14.8	19.9	17.4	18.8	22.1	18.9	20.7	23.0	20.2	21.9
28	16.4	12.8	14.5	20.4	17.4	18.9	22.6	19.6	21.4	23.2	20.9	22.3
29	---	---	---	20.5	18.1	19.4	22.8	20.1	21.8	24.0	20.7	22.4
30	---	---	---	20.9	18.6	19.9	22.2	19.8	21.2	24.5	21.4	23.3
31	---	---	---	20.5	18.3	19.6	---	---	---	24.6	21.9	23.4
Max	18.0	16.4	16.9	20.9	18.6	19.9	22.8	20.1	21.8	25.6	22.4	24.5
Min	12.1	10.8	11.1	14.2	12.8	13.7	18.2	15.7	17.1	19.7	18.5	19.1

11074000 Santa Ana River below Prado Dam, CA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Median	Max	Min	Median	Max	Min	Median	Max	Min	Median
		June			July			August			September	
1	24.7	22.2	23.8	27.1	24.6	25.9	23.6	21.3	22.8	27.7	26.1	26.9
2	24.6	22.2	23.7	26.4	24.8	25.9	24.2	21.7	22.9	27.1	25.5	26.4
3	24.1	21.6	23.2	25.7	23.8	25.0	24.0	21.9	23.2	27.0	25.3	26.4
4	23.4	21.3	22.7	26.2	23.5	24.8	24.0	21.7	23.0	27.1	25.1	26.3
5	23.5	20.9	22.4	25.3	23.6	24.4	24.1	22.0	23.2	26.8	24.9	26.0
6	23.7	21.1	22.6	25.2	23.0	24.1	24.0	21.9	23.2	26.2	24.7	25.2
7	24.1	21.2	22.8	26.3	23.2	24.4	23.9	21.8	23.0	26.1	23.9	25.3
8	24.5	21.6	23.2	26.4	24.0	25.3	23.8	21.5	22.9	25.5	23.9	24.8
9	24.4	21.7	23.2	26.1	23.7	25.2	23.6	21.4	22.7	24.9	23.5	24.2
10	24.1	21.3	22.9	25.4	24.1	24.5	23.4	21.4	22.5	24.1	22.6	23.2
11	24.0	21.5	23.1	24.2	23.0	23.7	23.5	21.4	22.6	23.5	21.6	22.8
12	24.2	21.9	23.2	26.2	23.0	24.4	24.0	21.6	22.8	23.5	21.5	22.7
13	24.8	21.8	23.2	25.9	23.7	24.9	24.6	22.1	23.1	23.3	21.7	22.9
14	24.4	21.9	23.5	26.1	23.6	25.0	24.8	22.4	23.6	23.9	21.9	23.0
15	23.8	21.3	22.9	26.4	23.9	25.2	25.0	22.5	23.9	24.7	22.5	23.5
16	24.2	21.3	22.7	25.1	23.1	24.4	25.1	23.0	24.1	24.3	22.6	23.7
17	24.6	21.8	23.3	24.5	22.5	23.8	25.3	23.0	24.3	23.8	22.3	23.0
18	24.8	22.0	23.8	24.6	22.0	23.5	24.9	22.9	24.0	23.0	21.4	22.4
19	24.6	22.0	23.7	24.9	22.8	24.0	25.3	22.8	24.0	22.6	20.8	22.0
20	24.2	21.8	23.5	24.0	22.7	23.0	25.1	22.8	24.1	22.6	21.3	21.9
21	24.5	21.8	23.5	22.8	21.6	22.1	25.2	23.0	24.0	22.8	21.0	21.9
22	24.5	21.7	23.3	25.2	21.5	23.1	24.8	23.0	23.9	21.9	20.4	21.3
23	24.2	21.8	23.1	25.9	23.2	24.7	24.5	22.4	23.7	21.5	19.7	21.0
24	23.6	21.6	22.8	26.0	23.6	25.1	24.6	22.4	23.6	21.6	20.3	21.2
25	24.7	21.5	22.8	25.8	23.6	25.0	24.5	22.2	23.5	21.4	19.6	20.7
26	26.2	22.8	24.3	25.2	23.3	24.5	24.4	22.7	23.7	21.5	20.2	20.8
27	27.1	24.2	25.7	25.6	23.1	24.4	26.0	23.5	24.8	20.2	18.2	19.3
28	27.4	24.6	26.1	25.1	23.0	24.1	26.0	23.8	25.1	19.6	17.9	19.1
29	27.3	25.1	26.6	24.8	22.4	23.7	26.2	24.0	25.4	19.4	17.9	19.0
30	27.1	25.2	26.4	24.6	22.2	23.6	27.4	25.1	25.8	19.8	18.0	19.1
31	---	---	---	24.0	21.9	23.2	27.7	26.6	27.3	---	---	---
Max	27.4	25.2	26.6	27.1	24.8	25.9	27.7	26.6	27.3	27.7	26.1	26.9
Min	23.4	20.9	22.4	22.8	21.5	22.1	23.4	21.3	22.5	19.4	17.9	19.0

11074000 Santa Ana River below Prado Dam, CA—Continued



11074000 Santa Ana River below Prado Dam, CA—Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

[ft³/s, cubic feet per second; mg/L, milligrams per liter; mm, millimeters; °C, degrees Celsius; --, no data]

Sample date-time	Discharge, instantaneous, ft³/s (00061)	Temperature, water, °C (00010)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-09-2012 1500	99	21.5	--	64	17
11-15-2012 1430	161	15.0	--	49	21
12-10-2012 1500	191	15.5	99	53	27
01-16-2013 1330	198	10.0	97	38	20
01-30-2013 1045	432	14.0	95	17	20
02-13-2013 1315	198	13.0	98	54	29
02-26-2013 1430	269	13.5	99	34	25
03-12-2013 1245	296	15.5	94	16	13
03-26-2013 1030	138	17.5	99	49	18
04-09-2013 1230	125	17.5	99	42	14
04-25-2013 1030	134	18.5	99	50	18
05-07-2013 1330	186	19.5	98	31	16
05-23-2013 1300	98	21.5	99	53	14
06-03-2013 1400	79	23.5	99	60	13
06-19-2013 1230	82	23.0	98	62	14
07-16-2013 1215	71	24.0	99	64	12
08-05-2013 1230	76	23.0	98	48	9.8
09-04-2013 1315	65	26.0	99	67	12

11074000 Santa Ana River below Prado Dam, CA—Continued

CROSS SECTION ANALYSES
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

[%, percent; ft, feet; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter]

Sample date-time	Barometric pressure, mm Hg (00025)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conduct-tance, water, unfiltered, µS/cm at 25°C (00095)	Tempera-ture, water, °C (00010)	Depth to bottom at sample location, ft (81903)	Sampling depth, ft (00003)	Location in cross section, distance from left bank looking down-stream, ft (00009)
03-26-2013 1114	747	13.1	140	7.9	1,090	17.7	--	0.50	3.00
03-26-2013 1115	747	13.4	143	7.9	1,090	17.7	--	1.50	3.00
03-26-2013 1116	747	14.1	151	7.9	1,090	17.7	--	.50	9.00
03-26-2013 1117	747	14.2	152	7.9	1,090	17.7	--	1.50	9.00
03-26-2013 1118	747	14.3	154	7.9	1,090	17.7	--	.50	15.0
03-26-2013 1119	747	14.3	153	7.9	1,090	17.7	--	1.50	15.0
03-26-2013 1120	747	14.4	155	7.9	1,090	17.7	--	.50	21.0
03-26-2013 1121	747	14.4	154	7.9	1,090	17.7	--	1.50	21.0
03-26-2013 1122	747	14.7	157	7.9	1,090	17.7	--	.50	27.0
03-26-2013 1123	747	14.6	157	7.9	1,090	17.7	--	1.50	27.0
05-29-2013 1355	--	--	--	--	1,120	22.8	.45	.20	1.00
05-29-2013 1356	--	--	--	--	1,120	22.6	1.65	1.00	4.00
05-29-2013 1357	--	--	--	--	1,120	22.5	1.65	1.00	6.00
05-29-2013 1358	--	--	--	--	1,120	22.5	1.65	1.00	8.00
05-29-2013 1359	--	--	--	--	1,120	22.4	1.65	1.00	10.0
05-29-2013 1400	--	--	--	--	1,120	22.4	1.65	1.00	12.0
05-29-2013 1401	--	--	--	--	1,120	22.4	1.65	1.00	14.0
05-29-2013 1402	--	--	--	--	1,120	22.4	1.65	1.00	16.0
05-29-2013 1403	--	--	--	--	1,120	22.4	1.65	1.00	19.0
05-29-2013 1404	--	--	--	--	1,120	22.5	1.65	1.00	21.0
05-29-2013 1405	--	--	--	--	1,120	22.5	1.65	1.00	23.0
05-29-2013 1406	--	--	--	--	1,120	22.5	1.65	1.00	25.0

11074000 Santa Ana River below Prado Dam, CA—Continued

05-29-2013 1407	--	--	--	--	1,120	22.6	1.65	1.00	27.0
05-29-2013 1408	--	--	--	--	1,120	22.7	1.65	1.00	29.0
05-29-2013 1409	--	--	--	--	1,120	22.8	.25	.20	31.0

Note: Instantaneous discharge at mean time of cross-sectional measurements: Mar. 26, 142 ft^3/s; May 29, 87 ft^3/s.

Water-Data Report 2013

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

Santa Ana River Basin

LOCATION.--Lat 33°58′07″, long 117°26′51″ referenced to North American Datum of 1927, in NE ¼ SW ¼ 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 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.

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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and (or) maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)
Dec 13	1200	*5,360	*9.48

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	58	48	78	51	55	64	59	48	46	40	32	35
2	55	48	66	50	51	63	61	50	44	39	33	35
3	55	48	71	50	48	67	57	44	49	42	32	37
4	60	47	63	49	49	67	56	46	47	38	31	33
5	59	46	61	49	51	65	57	46	46	37	31	33
6	59	45	58	52	49	61	56	50	49	39	30	34
7	57	46	59	52	55	80	56	54	46	38	30	32
8	58	52	55	54	185	215	57	48	47	37	31	34
9	62	93	55	51	129	144	58	48	51	37	28	37
10	59	62	60	54	83	77	56	47	47	36	26	37
11	90	64	70	53	67	68	56	44	48	39	27	36
12	99	58	62	54	65	68	56	41	51	36	29	36
13	45	61	1,390	52	65	68	56	41	48	36	26	37
14	46	60	330	48	63	62	54	43	49	34	29	34
15	49	64	150	51	59	52	56	42	49	35	25	33
16	50	63	94	51	60	57	56	43	54	35	25	33
17	50	65	66	45	57	55	54	43	60	35	22	33
18	49	63	95	45	57	60	54	45	50	36	24	33
19	40	61	86	45	60	62	56	43	49	36	25	34
20	65	64	76	45	233	61	55	42	46	42	26	35
21	60	64	65	44	77	66	55	41	42	44	25	33
22	51	61	49	44	76	65	54	45	39	41	22	34
23	51	56	50	44	65	66	56	44	45	42	22	34
24	48	58	89	66	66	56	52	45	50	40	21	33
25	49	58	60	163	66	55	58	44	48	36	24	33
26	47	58	63	84	66	63	55	46	41	35	25	34
27	51	57	57	48	66	57	48	43	42	34	25	34
28	49	58	53	87	64	54	53	47	43	31	e23	34
29	48	62	60	57	---	52	55	45	41	29	135	36
30	46	87	64	53	---	58	49	45	42	35	79	34
31	48	---	52	51	---	60	---	47	---	33	37	---
Total	1,713	1,777	3,707	1,742	2,087	2,168	1,661	1,400	1,409	1,147	1,000	1,030
Mean	55.3	59.2	120	56.2	74.5	69.9	55.4	45.2	47.0	37.0	32.3	34.3
Max	99	93	1,390	163	233	215	61	54	60	44	135	37
Min	40	45	49	44	48	52	48	41	39	29	21	32
Ac-ft	3,400	3,520	7,350	3,460	4,140	4,300	3,290	2,780	2,790	2,280	1,980	2,040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1999, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	59.5	78.3	103	238	293	326	148	121	79.2	52.9	52.5	53.8
Max	194	259	292	1,839	1,411	1,806	604	666	351	145	233	129
(WY)	(1988)	(1984)	(1984)	(1993)	(1980)	(1995)	(1983)	(1983)	(1983)	(1983)	(1983)	(1976)
Min	20.5	21.2	23.3	24.7	23.1	23.7	23.1	22.3	20.2	16.8	17.9	18.0
(WY)	(1974)	(1975)	(1974)	(1972)	(1972)	(1972)	(1971)	(1972)	(1981)	(1981)	(1981)	(1974)

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

SUMMARY STATISTICS

	Water Years 1970 - 199		
Annual mean	134		
Highest annual mean	416		1983
Lowest annual mean	29.0		1975
Highest daily mean	11,500	Mar 2	1983
Lowest daily mean	15	Sep 7	1980
Annual seven-day minimum	16	Jul 1	1981
Maximum peak flow	31,300	Feb 24	1998
Maximum peak stage	20.23	Mar 4	1978
Annual runoff (ac-ft)	97,140		
10 percent exceeds	209		
50 percent exceeds	63		
90 percent exceeds	23		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2013, BY WATER YEAR (WY)

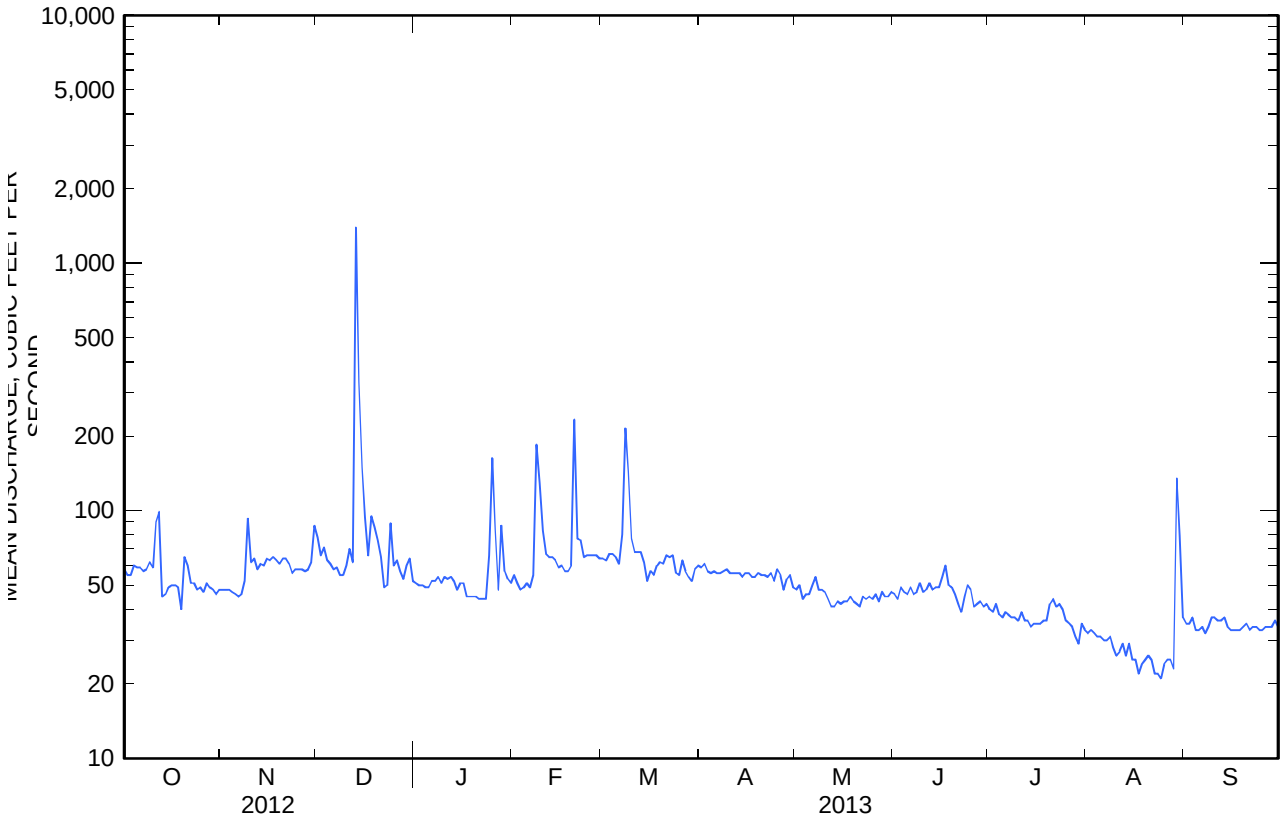
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	107	92.7	256	326	236	159	153	97.5	76.3	66.6	70.6	63.8
Max	498	141	1,730	2,350	755	498	500	314	192	137	201	86.6
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	51.0	51.5	68.5	56.2	72.2	69.9	55.4	45.1	41.1	36.8	32.3	34.3
(WY)	(2010)	(2010)	(2012)	(2013)	(2012)	(2013)	(2013)	(2012)	(2012)	(2012)	(2013)	(2013)

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 2000 - 2013	
Annual total	23,370		20,841			
Annual mean	63.9		57.1		142	
Highest annual mean					491	2005
Lowest annual mean					57.1	2013
Highest daily mean	1,390	Dec 13	1,390	Dec 13	[e]22,000	Jan 11, 2005
Lowest daily mean	33	Jul 30	21	Aug 24	21	Aug 24, 2013
Annual seven-day minimum	35	Jul 24	23	Aug 22	23	Aug 22, 2013
Maximum peak flow			5,360	Dec 13	49,100	Dec 21, 2010
Maximum peak stage			9.48	Dec 13	16.83	Dec 21, 2010
Annual runoff (ac-ft)	46,350		41,340		102,700	
10 percent exceeds	78		66		140	
50 percent exceeds	57		50		77	
90 percent exceeds	37		33		50	

[e] Estimated (HEADNOTE)

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



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

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.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
[ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter]

Sample date-time	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Specific conductance, water, unfiltered, µS/cm at 25°C (00095)	Temperature, water, °C (00010)	Dissolved solids dried at 180°C, water, filtered, mg/L (70300)
10-09-2012 1135	21.8	66	982	22.7	584
10-18-2012 1055	23.5	52	992	22.6	621
11-07-2012 1145	30.1	44	973	21.2	604
11-20-2012 1210	23.2	52	991	19.9	613
12-07-2012 1108	20.9	60	990	18.8	612
12-17-2012 1240	23.4	60	997	18.9	591
01-08-2013 1215	32.4	53	1,020	23.6	625
01-24-2013 1115	15.8	50	965	17.1	609
02-01-2013 1100	23.7	48	993	23.7	612
02-21-2013 1100	16.5	86	907	15.4	552
03-06-2013 1100	17.3	66	1,030	19.3	642
03-26-2013 1150	20.3	56	1,010	21.9	651
04-05-2013 0955	17.5	50	1,010	18.7	610
04-25-2013 1140	19.6	49	990	20.6	616
05-09-2013 1304	22.7	48	992	24.2	621
05-21-2013 1050	23.1	43	987	22.8	614
06-11-2013 1240	33.7	46	974	27.8	598
06-25-2013 1100	24.2	49	1,010	23.9	633
07-10-2013 1315	28.7	35	1,080	25.4	693
07-22-2013 1210	27.7	36	1,050	24.1	639
08-16-2013 1120	33.3	27	1,030	26.0	638
08-30-2013 1000	33.8	62	860	25.9	527
09-10-2013 1000	24.6	37	1,030	23.8	644

09-26-2013 1015	20.9	36	1,020	21.8	620

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
[°C, degrees Celsius; µS/cm, microsiemens per centimeter]

Sample date-time	Specific conduc-tance, water, unfiltered, µS/cm at 25°C (00095)	Tempera-ture, water, °C (00010)
02-21-2013 1110	833	15.7
02-21-2013 1111	846	15.9
02-21-2013 1112	922	16.0
02-21-2013 1113	944	16.0
02-21-2013 1114	983	16.1

Note: Instantaneous discharge at the time of cross-sectional measurement: Feb. 21, 71 ft3/s.

Water-Data Report 2013

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

Santa Ana River Basin

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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft³/s and (or) maximum (*), from rating curve extended as explained above:

Date	Time	Discharge (ft³/s)	Gage height (ft)
Dec 13	1030	2,020	4.72
Feb 20	0115	*3,120	*5.14
Mar 8	0730	1,350	4.53

[THE FOLLOWING FLAG(S) APPEARED IN THE ADAPS END-OF-YEAR SUMMARY RETRIEVAL: e, estimated].

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11059300, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11059300.2013.pdf

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	0.00	8.5	e1.6	e3.1	9.5	0.17	1.8	0.26	0.13	0.00	e0.00
2	0.00	0.00	8.4	e3.3	e1.3	7.4	0.75	2.0	0.26	0.12	0.01	e0.00
3	0.00	0.00	9.5	e2.2	e1.1	11	0.14	1.8	0.21	0.10	0.02	e0.00
4	0.00	0.00	3.7	e2.2	e1.0	12	0.00	2.0	0.21	0.11	0.01	e0.00
5	0.00	0.00	5.3	e4.3	e0.70	20	0.00	1.1	0.19	0.07	0.00	e0.00
6	0.00	0.00	1.8	e6.5	e0.66	26	0.00	3.6	0.22	0.07	0.00	e0.00
7	0.00	0.07	7.4	e6.6	e0.62	21	0.00	0.26	0.22	0.08	0.00	e0.00
8	0.00	9.1	5.5	e6.5	e94	182	0.34	0.27	0.22	0.10	0.00	e0.00
9	0.00	21	7.8	e1.8	e53	67	0.00	0.00	0.22	0.10	0.00	e0.00
10	0.00	0.02	9.1	e5.7	e24	10	0.00	0.39	0.21	0.03	0.00	e0.00
11	2.0	0.27	4.5	e5.4	e1.3	5.1	0.00	0.00	0.20	0.00	0.00	e0.00
12	1.6	0.40	5.0	e6.8	0.95	8.2	0.00	0.00	0.25	0.08	0.00	e0.00
13	0.00	0.78	569	e2.9	0.46	5.7	0.00	0.00	0.21	0.08	0.00	e0.00
14	0.00	2.1	64	e1.5	0.73	4.4	0.00	0.00	0.20	0.07	0.00	e0.00
15	0.00	0.57	11	e3.7	0.00	3.4	0.59	0.00	0.18	0.05	0.00	e0.00
16	0.00	0.69	1.8	e3.2	0.00	0.14	0.21	0.00	0.19	0.07	0.00	e0.00
17	0.00	4.4	0.99	e1.3	0.42	4.4	0.21	0.00	0.19	0.08	0.00	e0.00
18	0.00	8.3	26	e1.0	0.99	8.7	0.70	0.00	0.18	0.04	0.00	e0.00
19	0.00	7.2	7.0	e0.65	8.3	5.4	2.4	0.00	0.14	0.06	e0.00	e0.00
20	0.00	10	2.1	e0.50	338	0.12	1.8	0.00	0.14	1.2	e0.00	e0.00
21	0.00	17	3.1	e0.55	21	0.02	1.8	0.00	0.15	0.00	e0.00	e0.00
22	0.00	15	2.4	e0.47	16	2.7	2.4	0.00	0.14	2.6	e0.00	e0.00
23	0.00	14	2.9	e0.52	15	4.7	2.1	0.00	0.13	0.03	e0.00	e0.00
24	0.04	11	20	e25	14	4.0	2.0	0.00	0.08	0.04	e0.00	e0.00
25	0.00	12	3.4	e68	13	2.5	1.7	0.00	0.12	0.05	e0.00	e0.00
26	0.00	11	20	e33	14	1.1	1.1	0.00	0.16	0.01	e0.00	e0.00
27	0.00	9.5	3.2	e2.4	18	0.49	0.92	0.04	0.18	0.02	e0.00	e0.00
28	0.00	7.5	e1.5	e39	11	0.00	0.42	0.06	0.18	0.03	e0.00	e0.00
29	0.00	6.9	14	e2.4	---	0.00	0.76	0.00	0.16	0.02	e59	e0.00
30	0.00	19	5.9	e2.5	---	0.00	1.4	0.80	0.14	0.03	e0.00	e0.00
31	0.00	---	e2.0	e2.4	---	0.00	---	0.16	---	0.02	e0.00	---
Total	3.64	187.80	836.79	243.89	652.63	426.97	21.91	14.28	5.54	5.49	59.04	0.00
Mean	0.12	6.26	27.0	7.87	23.3	13.8	0.73	0.46	0.18	0.18	1.90	0.00
Max	2.0	21	569	68	338	182	2.4	3.6	0.26	2.6	59	0.00
Min	0.00	0.00	0.99	0.47	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00
Ac-ft	7.2	373	1,660	484	1,290	847	43	28	11	11	117	0.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1954, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	.88	3.47	20.9	23.7	20.6	37.4	27.2	11.3	2.39	.93	.87	.63
Max	3.35	21.3	117	109	72.2	183	237	145	31.2	9.87	8.37	6.32
(WY)	(1942)	(1945)	(1946)	(1943)	(1945)	(1943)	(1941)	(1941)	(1941)	(1940)	(1940)	(1939)
Min	.000	.007	.000	1.90	2.41	1.70	1.14	.14	.000	.000	.000	.000
(WY)	(1951)	(1952)	(1951)	(1948)	(1942)	(1951)	(1951)	(1942)	(1950)	(1950)	(1942)	(1948)

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

SUMMARY STATISTICS

	Water Years 1939 - 1954	
Annual mean	12.7	
Highest annual mean	56.6	1941
Lowest annual mean	.78	1951
Highest daily mean	2,350	Jan 23, 1943
Lowest daily mean	.00	Jun 19, 1940
Annual seven-day minimum	.00	Sep 10, 1940
Maximum peak flow	7,600	Jan 23, 1943
Maximum peak stage	6.50	Jan 23, 1943
Annual runoff (ac-ft)	9,190	
10 percent exceeds	16	
50 percent exceeds	1.0	
90 percent exceeds	.00	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	33.9	43.3	77.4	158	232	253	132	103	63.9	40.8	36.8	34.6
Max	117	191	469	1,327	2,096	1,279	742	707	339	162	160	75.0
(WY)	(1984)	(1984)	(1967)	(1993)	(1980)	(1980)	(1980)	(1983)	(1983)	(1969)	(1983)	(1983)
Min	12.4	13.2	14.8	13.2	11.6	10.6	12.5	9.35	13.0	9.08	9.97	9.93
(WY)	(1968)	(1972)	(1970)	(1972)	(1968)	(1972)	(1972)	(1967)	(1971)	(1967)	(1967)	(1967)

SUMMARY STATISTICS

	Water Years 1967 - 1995	
Annual mean	100	
Highest annual mean	441	1980
Lowest annual mean	17.2	1968
Highest daily mean	14,800	Feb 25, 1969
Lowest daily mean	6.4	Jul 13, 1967
Annual seven-day minimum	8.1	Sep 16, 1967
Maximum peak flow	28,000	Feb 25, 1969
Maximum peak stage	11.90	Feb 25, 1969
Annual runoff (ac-ft)	72,490	
10 percent exceeds	165	
50 percent exceeds	35	
90 percent exceeds	14	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1999, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	17.5	31.2	29.8	101	253	48.0	55.4	110	31.2	9.13	18.4	22.6
Max	38.1	56.2	42.6	230	729	114	190	430	116	20.9	66.1	75.8
(WY)	(1996)	(1997)	(1998)	(1997)	(1998)	(1998)	(1998)	(1998)	(1998)	(1999)	(1998)	(1998)
Min	4.97	11.0	16.5	22.2	7.57	0.10	0.00	0.00	0.00	0.00	0.00	0.00
(WY)	(1998)	(1998)	(1999)	(1999)	(1997)	(1997)	(1997)	(1996)	(1996)	(1996)	(1996)	(1996)

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

SUMMARY STATISTICS

	Water Years 1996 - 1999	
Annual mean	59.4	
Highest annual mean	152	1998
Lowest annual mean	15.9	1999
Highest daily mean	5,050	Feb 24, 1998
Lowest daily mean	0.00	Mar 22, 1996
Annual seven-day minimum	0.00	Mar 22, 1996
Maximum peak flow	21,100	Feb 23, 1998
Maximum peak stage	7.70	Feb 23, 1998
Annual runoff (ac-ft)	43,010	
10 percent exceeds	138	
50 percent exceeds	7.5	
90 percent exceeds	0.00	

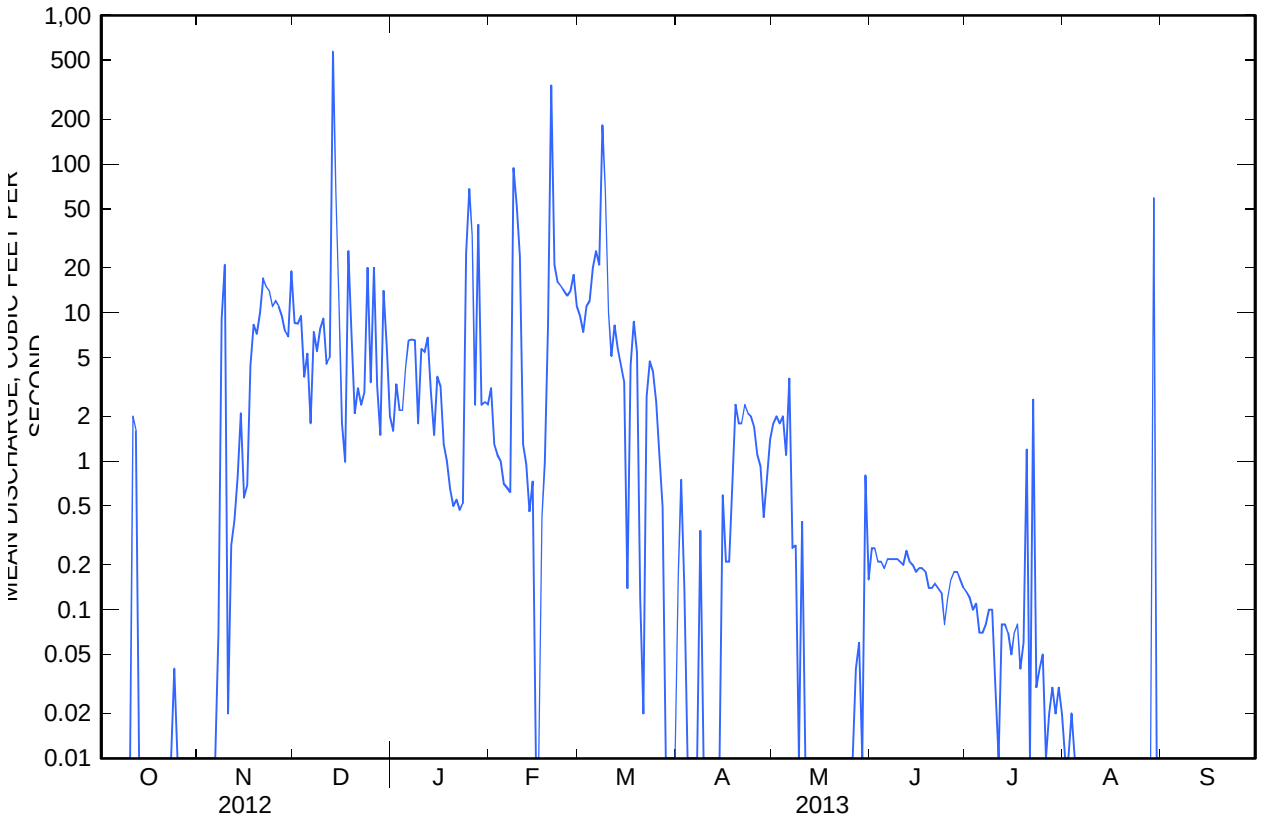
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	19.2	12.2	85.1	124	93.1	67.1	64.2	27.9	8.29	6.33	7.90	3.90
Max	200	39.7	764	1,185	376	398	351	247	112	52.9	102	40.6
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	0.00	0.67	1.16	0.00	0.82	4.10	0.04	0.00	0.00	0.00	0.00	0.00
(WY)	(2003)	(2001)	(2001)	(2003)	(2002)	(2008)	(2002)	(2002)	(2002)	(2002)	(2002)	(2002)

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 2000 - 2013	
Annual total	2,914.30		2,457.98			
Annual mean	7.96		6.73		43.1	
Highest annual mean					265	2005
Lowest annual mean					1.70	2002
Highest daily mean	569	Dec 13	569	Dec 13	12,500	Jan 11, 2005
Lowest daily mean	0.00	Feb 26	0.00	Oct 1	0.00	May 14, 2000
Annual seven-day minimum	0.00	Jun 29	0.00	Oct 1	0.00	Sep 11, 2000
Maximum peak flow			3,120	Feb 20	35,700	Jan 11, 2005
Maximum peak stage			5.14	Feb 20	9.04	Jan 11, 2005
Annual runoff (ac-ft)	5,780		4,880		31,220	
10 percent exceeds	14		11		54	
50 percent exceeds	0.08		0.19		0.92	
90 percent exceeds	0.00		0.00		0.00	

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



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

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968-72, 1983-86, 1988 to current year.
CHEMICAL ANALYSES: Water years 1969 (partial-record station), 1970-72.
SPECIFIC CONDUCTANCE: Water years 1968-72.
WATER TEMPERATURE: Water years 1968, 1983.
SEDIMENT DATA: Water years 1983-86, 1988 to current year.

PERIOD OF DAILY RECORD.--October 1982 to September 1983.
WATER TEMPERATURE: November 1982 to September 1983.
SUSPENDED-SEDIMENT DISCHARGE: October 1982 to September 1983.

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

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 1 of 2

[ft³/s, cubic feet per second; mg/L, milligrams per liter; mm, millimeters; °C, degrees Celsius; A, average]

Sample date-time	Discharge, instantaneous, ft³/s (00061)	Temperature, water, °C (00010)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)	Suspended sediment, fall diameter (deionized water), percent smaller than 0.002 mm (70337)	Suspended sediment, fall diameter (deionized water), percent smaller than 0.004 mm (70338)	Suspended sediment, fall diameter (deionized water), percent smaller than 0.008 mm (70339)	Suspended sediment, fall diameter (deionized water), percent smaller than 0.016 mm (70340)	Suspended sediment, fall diameter (deionized water), percent smaller than 0.031 mm (70341)
11-09-2012 0955	10	15.2	524	15	--	--	--	--	--
11-09-2012 0956	10	15.2	A 543	A 15	--	--	--	--	--
11-09-2012 0957	10	15.2	562	16	--	--	--	--	--
12-13-2012 1230	521	11.6	2,210	3,110	15	24	28	39	58
12-13-2012 1231	521	11.6	A 2,290	A 3,220	A 17	A 23	A 27	A 39	A 55
12-13-2012 1232	521	11.6	2,380	3,350	19	22	26	39	52
02-11-2013 1100	3.1	10.6	438	3.6	--	--	--	--	--
02-11-2013 1101	3.1	10.6	A 363	A 3.0	--	--	--	--	--
02-11-2013 1102	3.1	10.6	287	2.4	68	68	81	89	88
02-20-2013 0950	53	6.8	1,400	200	19	25	28	29	30
02-20-2013 0951	53	6.8	A 1,530	A 219	A 18	A 23	A 26	A 27	A 28
02-20-2013 0952	53	6.8	1,660	238	17	22	25	25	26
03-08-2013 0930	370	9.4	763	762	11	15	23	33	42
03-08-2013 0931	370	9.4	A 964	A 963	--	--	--	--	--
03-08-2013 0932	370	9.4	1,160	1,160	--	--	--	--	--

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

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 2 of 2

[ft³/s, cubic feet per second; mg/L, milligrams per liter; mm, millimeters; °C, degrees Celsius; A, average]

Sample date-time	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment, sieve diameter, percent smaller than 0.125 mm (70332)	Suspended sediment, sieve diameter, percent smaller than 0.25 mm (70333)	Suspended sediment, sieve diameter, percent smaller than 0.5 mm (70334)	Suspended sediment, sieve diameter, percent smaller than 1 mm (70335)	Suspended sediment, sieve diameter, percent smaller than 2 mm (70336)	Suspended sediment, sieve diameter, percent smaller than 4 millimeters (69314)
11-09-2012 0955	87	95	99	100	--	--	--
11-09-2012 0956	A 86	A 94	A 98	A 100	--	--	--
11-09-2012 0957	84	93	98	100	--	--	--
12-13-2012 1230	71	80	93	99	100	--	--
12-13-2012 1231	A 68	A 78	A 92	A 99	A 100	--	--
12-13-2012 1232	65	76	90	99	100	--	--
02-11-2013 1100	49	50	59	95	100	--	--
02-11-2013 1101	A 70	A 71	A 77	A 97	A 100	--	--
02-11-2013 1102	91	91	95	100	--	--	--
02-20-2013 0950	31	35	58	97	100	--	--
02-20-2013 0951	A 29	A 33	A 56	A 97	A 100	--	--
02-20-2013 0952	27	30	55	97	100	--	--
03-08-2013 0930	48	59	80	98	100	--	--
03-08-2013 0931	A 39	A 48	A 68	A 89	A 96	A 99	A 100
03-08-2013 0932	30	37	55	79	92	98	100

Water-Data Report 2013

11072100 Temescal Creek above Main Street, at Corona, CA

Santa Ana River Basin

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 mi^2, excludes 768 mi^2 above Lake Elsinore.

SURFACE-WATER RECORDS

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

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 ft^3/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 FOR PERIOD OF RECORD.--Maximum discharge, 5,290 ft^3/s, Dec. 22, 2010, gage height, 7.27 ft, from rating curve extended above 305 ft^3/s, on basis of step-backwater analysis; minimum daily, 0.27 ft^3/s, Sept. 25, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 8,850 ft^3/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.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11072100, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11072100.2013.pdf

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	5.6	1.5	3.8	0.83	1.5	35	1.8	1.1	1.9	1.9	2.1	3.3
2	5.4	2.0	4.3	0.85	1.6	29	1.8	1.1	1.4	1.8	2.4	3.6
3	4.3	1.9	11	0.97	1.9	25	1.9	1.3	1.4	1.8	2.7	2.9
4	2.2	2.2	2.6	0.82	2.0	22	1.7	1.5	2.1	1.7	2.7	2.6
5	2.2	2.1	2.8	0.83	2.7	17	2.0	1.6	1.9	2.0	2.8	3.1
6	2.5	2.3	2.5	1.5	1.9	13	2.5	14	1.8	2.0	2.5	3.1
7	2.6	3.2	2.2	1.6	1.9	16	2.3	2.4	1.9	2.5	2.9	2.6
8	2.2	3.1	2.1	1.4	100	143	2.0	0.57	1.8	2.0	2.8	2.6
9	2.0	4.4	2.5	1.6	6.4	36	1.8	0.45	3.6	2.5	3.5	2.9
10	2.0	2.9	2.6	2.2	1.9	10	1.8	0.49	2.7	2.7	3.8	5.1
11	58	2.8	1.8	1.3	1.6	7.7	2.1	0.39	3.5	3.4	3.5	3.2
12	2.2	3.8	5.3	1.3	1.4	7.0	2.0	0.54	1.3	3.9	4.0	3.7
13	1.0	7.8	115	1.4	1.6	6.7	2.6	0.60	1.6	3.5	4.5	3.5
14	0.87	3.6	2.1	1.1	1.6	7.6	3.0	0.55	1.6	3.9	4.4	3.2
15	1.0	3.1	11	1.4	1.6	6.7	2.9	0.73	1.4	4.1	3.9	3.8
16	1.1	3.8	3.0	1.9	1.8	6.7	3.1	0.84	1.3	4.1	3.1	3.7
17	1.3	5.1	1.8	2.1	1.8	5.9	2.9	0.53	1.5	4.0	3.4	4.3
18	1.2	7.8	6.4	2.0	2.1	5.9	2.8	0.55	1.3	4.4	3.7	4.4
19	1.2	3.2	2.5	1.8	14	5.9	2.4	0.48	1.4	3.8	4.4	6.0
20	1.4	3.3	0.62	2.3	29	5.5	2.8	0.70	1.0	5.0	3.8	6.5
21	1.4	3.9	0.63	2.2	2.6	5.3	3.8	0.67	1.3	2.0	3.0	6.7
22	1.3	3.6	0.85	1.7	2.6	5.2	4.2	0.82	1.7	2.1	2.4	6.7
23	1.3	3.2	0.93	2.1	2.9	5.1	3.6	0.67	1.8	1.9	2.2	7.5
24	1.1	3.9	35	26	2.7	4.6	3.8	1.2	1.3	1.9	1.9	6.6
25	0.97	4.0	1.2	91	2.6	4.1	3.4	0.54	1.2	1.6	2.0	7.2
26	1.2	4.5	3.8	28	4.2	3.6	3.2	0.51	1.4	4.5	2.6	9.7
27	1.1	3.8	0.99	2.5	21	3.5	3.3	0.96	1.6	2.1	2.7	10
28	1.6	4.1	0.85	2.5	38	3.2	3.6	1.7	1.7	1.7	2.9	11
29	1.6	13	23	2.1	---	3.8	5.0	1.9	2.2	2.1	3.2	13
30	1.6	15	2.4	1.8	---	2.9	1.1	1.2	1.8	2.0	3.1	14
31	1.3	---	0.94	2.2	---	4.0	---	1.6	---	2.5	3.6	---
Total	114.74	128.9	256.51	191.30	254.9	456.9	81.2	42.19	52.4	85.4	96.5	166.5
Mean	3.70	4.30	8.27	6.17	9.10	14.7	2.71	1.36	1.75	2.75	3.11	5.55
Max	58	15	115	91	100	143	5.0	14	3.6	5.0	4.5	14
Min	0.87	1.5	0.62	0.82	1.4	2.9	1.1	0.39	1.0	1.6	1.9	2.6
Ac-ft	228	256	509	379	506	906	161	84	104	169	191	330

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1981 - 1990, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	7.62	15.1	23.8	23.0	14.5	40.9	13.1	12.0	9.35	7.15	6.45	6.99
Max	16.1	55.9	126	116	25.5	237	39.3	43.7	30.0	10.9	13.4	11.3
(WY)	(1986)	(1981)	(1981)	(1981)	(1981)	(1983)	(1983)	(1983)	(1983)	(1985)	(1990)	(1985)
Min	2.36	4.67	2.53	7.01	7.42	6.26	4.02	3.77	1.12	1.20	1.79	1.09
(WY)	(1985)	(1987)	(1982)	(1989)	(1982)	(1990)	(1989)	(1982)	(1982)	(1982)	(1982)	(1981)

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

SUMMARY STATISTICS

	Water Years 1981 - 1990	
Annual mean	12.4	
Highest annual mean	33.7	1981
Lowest annual mean	6.10	1987
Highest daily mean	1,720	Mar 1, 1983
Lowest daily mean	.27	Sep 25, 1981
Annual seven-day minimum	.56	Sep 23, 1981
Maximum peak flow	4,720	Mar 1, 1983
Maximum peak stage	11.67	Mar 1, 1983
Annual runoff (ac-ft)	8,990	
10 percent exceeds	27	
50 percent exceeds	6.1	
90 percent exceeds	2.7	

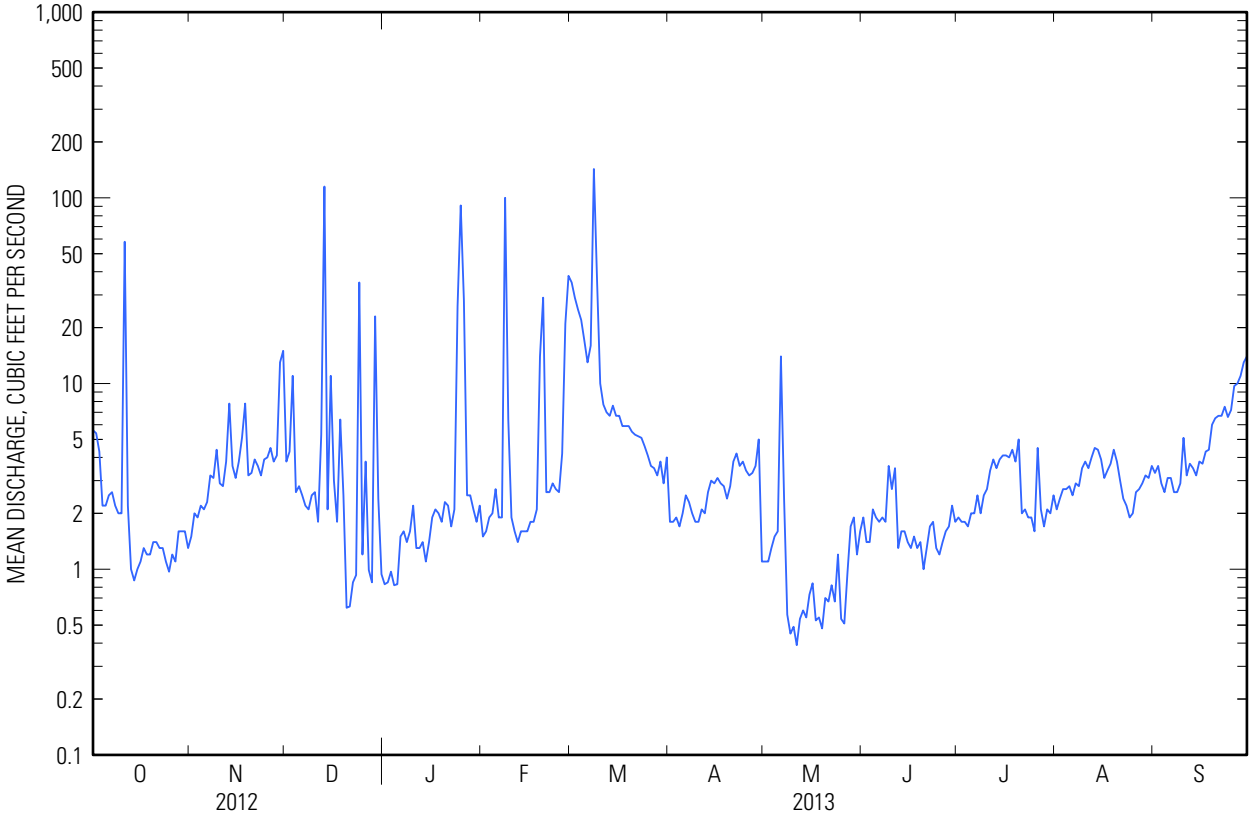
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	13.8	16.8	29.5	57.3	87.3	59.6	35.1	19.1	11.6	9.99	9.51	10.2
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	8.27	6.17	9.10	5.19	2.71	1.36	1.75	2.57	2.01	2.38
(WY)	(2013)	(2013)	(2013)	(2013)	(2013)	(2001)	(2013)	(2013)	(2013)	(2012)	(2012)	(2010)

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1991 - 2013	
Annual total	2,777.35		1,927.44			
Annual mean	7.59		5.28		29.7	
Highest annual mean					104	2005
Lowest annual mean					5.28	2013
Highest daily mean	131	Mar 17	143	Mar 8	2,870	Dec 22, 2010
Lowest daily mean	0.62	Dec 20	0.39	May 11	0.34	Jul 3, 1992
Annual seven-day minimum	1.1	Oct 13	0.51	May 8	0.51	May 8, 2013
Maximum peak flow			757	Mar 8	5,290	Dec 22, 2010
Maximum peak stage			4.37	Mar 8	7.27	Dec 22, 2010
Annual runoff (ac-ft)	5,510		3,820		21,490	
10 percent exceeds	13		7.5		60	
50 percent exceeds	3.4		2.5		12	
90 percent exceeds	1.6		1.1		3.0	

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



11071900 Temescal Creek at Corona Lake, near Corona, CA

Santa Ana River Basin

LOCATION.--Lat 33°45′01″, long 117°26′45″ referenced to North American Datum of 1983, in SE ¼ NW ¼ sec.7, 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 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--November 5, 2012, to September 30, 2013.

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

REMARKS.--Records good except for estimated daily discharges, which are poor. 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 ft^3/s, Feb. 23, 2013, gage height, 37.35 ft; minimum discharge, 0.00 ft^3/s, on many days, gage height, 31.72 ft. No peaks greater than 35 ft^3/s occurred outside of period of published record during this water year.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11071900, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11071900.2013.pdf

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

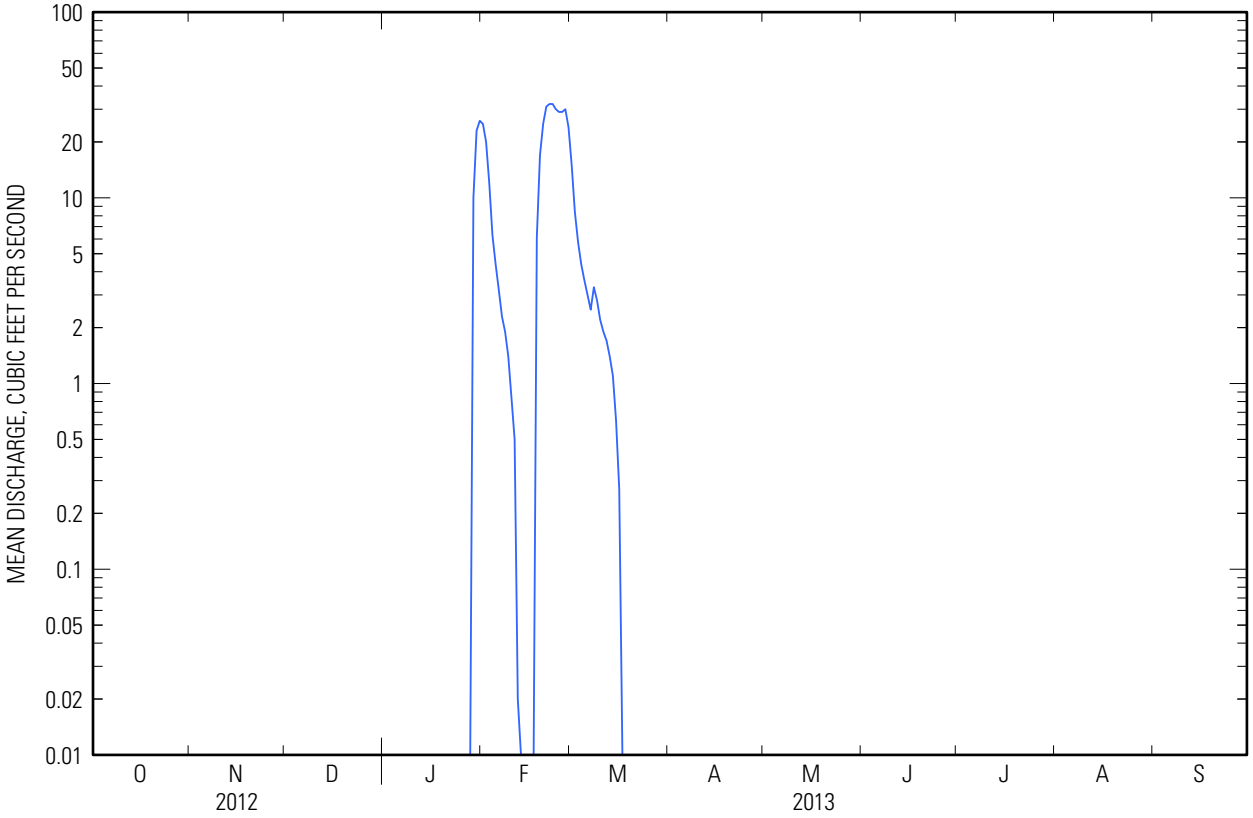
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	---	---	0.00	0.00	25	15	0.00	0.00	0.00	0.00	0.00	0.00
2	---	---	0.00	0.00	20	8.4	0.00	0.00	0.00	0.00	0.00	0.00
3	---	---	0.00	0.00	12	5.8	0.00	0.00	0.00	0.00	0.00	0.00
4	---	---	0.00	0.00	6.3	4.4	0.00	0.00	0.00	0.00	0.00	0.00
5	---	---	0.00	0.00	4.4	3.6	0.00	0.00	0.00	0.00	0.00	0.00
6	---	e0.00	0.00	0.00	3.2	3.0	0.00	0.00	0.00	0.00	0.00	0.00
7	---	0.00	0.00	0.00	2.3	2.5	0.00	0.00	0.00	0.00	0.00	0.00
8	---	0.00	0.00	0.00	1.9	3.3	0.00	0.00	0.00	0.00	0.00	0.00
9	---	0.00	0.00	0.00	1.4	2.8	0.00	0.00	0.00	0.00	0.00	0.00
10	---	0.00	0.00	0.00	0.84	2.2	0.00	0.00	0.00	0.00	0.00	0.00
11	---	0.00	0.00	0.00	0.50	1.9	0.00	0.00	0.00	0.00	0.00	0.00
12	---	0.00	0.00	0.00	0.02	1.7	0.00	0.00	0.00	0.00	0.00	0.00
13	---	0.00	e0.00	0.00	0.00	1.4	0.00	0.00	0.00	0.00	0.00	0.00
14	---	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00	0.00	0.00
15	---	0.00	e0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00
16	---	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00
17	---	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	---	0.00	0.00	0.00	6.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	---	0.00	0.00	0.00	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	---	0.00	0.00	0.00	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	---	0.00	0.00	0.00	31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	---	0.00	0.00	0.00	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	---	0.00	0.00	0.00	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	---	0.00	0.00	0.00	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	---	0.00	0.00	0.00	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	---	0.00	0.00	0.00	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	---	0.00	0.00	0.00	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	---	0.00	0.00	0.00	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	---	0.00	0.00	10	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	---	0.00	0.00	23	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	---	---	0.00	26	---	0.00	---	0.00	---	0.00	0.00	---
Total	---	---	0.00	59.00	362.97	58.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	---	---	0.00	1.90	13.0	1.87	0.00	0.00	0.00	0.00	0.00	0.00
Max	---	---	0.00	26	32	15	0.00	0.00	0.00	0.00	0.00	0.00
Min	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ac-ft	---	---	0.00	117	720	115	0.00	0.00	0.00	0.00	0.00	0.00

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

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	---	---	0.00	1.90	13.0	1.87	0.00	0.00	0.00	0.00	0.00	0.00
Max	---	---	0.00	1.90	13.0	1.87	0.00	0.00	0.00	0.00	0.00	0.00
(WY)	(---)	(---)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)
Min	---	---	0.00	1.90	13.0	1.87	0.00	0.00	0.00	0.00	0.00	0.00
(WY)	(---)	(---)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)

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



Water-Data Report 2013

11073495 Cucamonga Creek near Mira Loma, CA

Santa Ana River Basin

LOCATION.--Lat 33°58′58″, long 117°35′55″ referenced to North American Datum of 1927, in SW ¼ NE ¼ 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 mi^2.

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 ft^3/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 ft^3/s, Oct. 20, 2004, gage height, 6.58 ft, from rating curve extended above 617 ft^3/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 ft^3/s, May 28, 2010.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11073495, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11073495.2013.pdf

11073495 Cucamonga Creek near Mira Loma, CA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	6.1	4.0	15	22	11	4.9	8.4	11	9.0	4.5	4.1	17
2	9.4	8.3	24	20	11	5.1	5.8	12	13	7.7	4.4	11
3	8.9	15	126	24	14	9.0	5.0	10	5.5	10	5.2	8.4
4	13	19	33	21	11	5.3	3.6	19	6.7	11	10	5.0
5	14	9.2	34	29	9.3	4.1	4.3	20	13	4.7	5.5	3.7
6	17	6.7	32	46	17	3.2	6.1	98	11	7.6	5.4	4.5
7	18	10	30	20	18	22	6.8	26	8.2	8.5	5.3	7.7
8	13	16	39	15	66	149	4.7	14	9.1	7.0	4.8	17
9	14	23	26	12	20	29	3.3	13	9.5	7.9	6.7	15
10	17	9.5	27	27	22	18	5.4	10	8.2	12	8.1	4.5
11	64	8.9	36	15	20	20	2.4	9.6	7.8	12	6.8	4.8
12	27	6.3	44	15	20	11	2.5	7.9	12	10	5.5	3.5
13	20	6.2	363	20	14	7.8	3.4	8.9	5.2	9.7	5.0	4.6
14	21	3.3	34	22	11	3.5	5.7	38	6.6	10	4.2	6.6
15	12	4.3	39	15	11	5.8	12	45	11	5.2	3.5	8.2
16	19	4.0	37	13	6.8	4.7	3.1	25	12	6.5	5.1	5.3
17	14	20	38	11	13	8.0	3.4	9.5	6.2	5.8	7.6	3.1
18	9.3	12	122	10	24	5.2	4.1	16	4.9	4.5	9.1	2.8
19	8.7	6.6	34	7.4	73	2.7	5.3	17	4.6	4.0	4.0	2.5
20	10	7.6	30	8.7	57	4.7	4.4	10	4.9	6.6	3.6	2.7
21	15	2.5	33	8.5	15	4.3	6.6	11	4.0	5.9	3.8	6.1
22	16	12	34	8.2	14	2.4	4.4	10	7.6	5.3	2.7	11
23	12	8.2	43	9.2	14	6.2	4.9	14	9.6	3.9	4.7	4.9
24	8.8	8.4	94	67	13	13	6.6	7.9	6.1	4.1	9.3	2.7
25	7.3	10	34	98	10	11	8.2	14	3.4	3.7	13	2.7
26	8.4	13	119	46	7.2	7.8	7.9	23	3.6	3.8	10	2.7
27	12	8.9	34	35	7.0	5.2	7.0	19	9.1	7.3	3.6	3.2
28	27	16	33	27	5.5	6.1	16	11	5.7	9.0	3.3	3.8
29	12	23	40	16	---	9.3	14	12	6.1	3.7	10	9.7
30	4.4	72	38	16	---	9.8	13	12	6.0	4.2	18	6.1
31	4.7	---	22	14	---	14	---	5.0	---	6.4	19	---
Total	463.0	373.9	1,687	718.0	534.8	412.1	188.3	558.8	229.6	212.5	211.3	190.8
Mean	14.9	12.5	54.4	23.2	19.1	13.3	6.28	18.0	7.65	6.85	6.82	6.36
Max	64	72	363	98	73	149	16	98	13	12	19	17
Min	4.4	2.5	15	7.4	5.5	2.4	2.4	5.0	3.4	3.7	2.7	2.5
Ac-ft	918	742	3,350	1,420	1,060	817	373	1,110	455	421	419	378

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1977, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	.021	1.15	1.55	18.2	4.65	1.91	1.35	.065	.001	.000	.000	.11
Max	.19	6.07	7.91	149	30.7	7.94	13.1	.54	.007	.000	.000	1.03
(WY)	(1972)	(1971)	(1972)	(1969)	(1969)	(1969)	(1969)	(1977)	(1969)	(1968)	(1968)	(1976)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(1969)	(1969)	(1970)	(1975)	(1972)	(1972)	(1968)	(1968)	(1968)	(1968)	(1968)	(1968)

11073495 Cucamonga Creek near Mira Loma, CA—Continued

SUMMARY STATISTICS

	Water Years 1968 - 1977	
Annual mean	2.73	
Highest annual mean	16.8	1969
Lowest annual mean	.16	1976
Highest daily mean	2,600	Jan 25, 1969
Lowest daily mean	.00	Feb 1, 1968
Annual seven-day minimum	.00	Feb 1, 1968
Maximum peak flow	9,100	Jan 25, 1969
Maximum peak stage	7.08	Jan 25, 1969
Annual runoff (ac-ft)	1,980	
10 percent exceeds	.10	
50 percent exceeds	.00	
90 percent exceeds	.00	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 1984, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	3.49	11.3	7.69	34.1	65.0	46.3	12.1	3.43	.48	.37	1.47	1.08
Max	11.1	27.9	24.7	149	216	205	63.4	19.8	2.30	1.22	6.99	3.45
(WY)	(1984)	(1983)	(1984)	(1983)	(1980)	(1983)	(1983)	(1983)	(1983)	(1983)	(1983)	(1983)
Min	.091	.002	.006	1.67	1.29	2.44	.056	.063	.008	.019	.009	.011
(WY)	(1981)	(1980)	(1980)	(1984)	(1984)	(1984)	(1981)	(1979)	(1979)	(1981)	(1979)	(1979)

SUMMARY STATISTICS

	Water Years 1979 - 1984	
Annual mean	17.5	
Highest annual mean	53.4	1983
Lowest annual mean	1.51	1981
Highest daily mean	2,530	Mar 1, 1983
Lowest daily mean	.00	Feb 6, 1979
Annual seven-day minimum	.00	Feb 6, 1979
Maximum peak flow	16,100	Feb 27, 1983
Maximum peak stage	7.85	Feb 27, 1983
Annual runoff (ac-ft)	12,700	
10 percent exceeds	10	
50 percent exceeds	.13	
90 percent exceeds	.01	

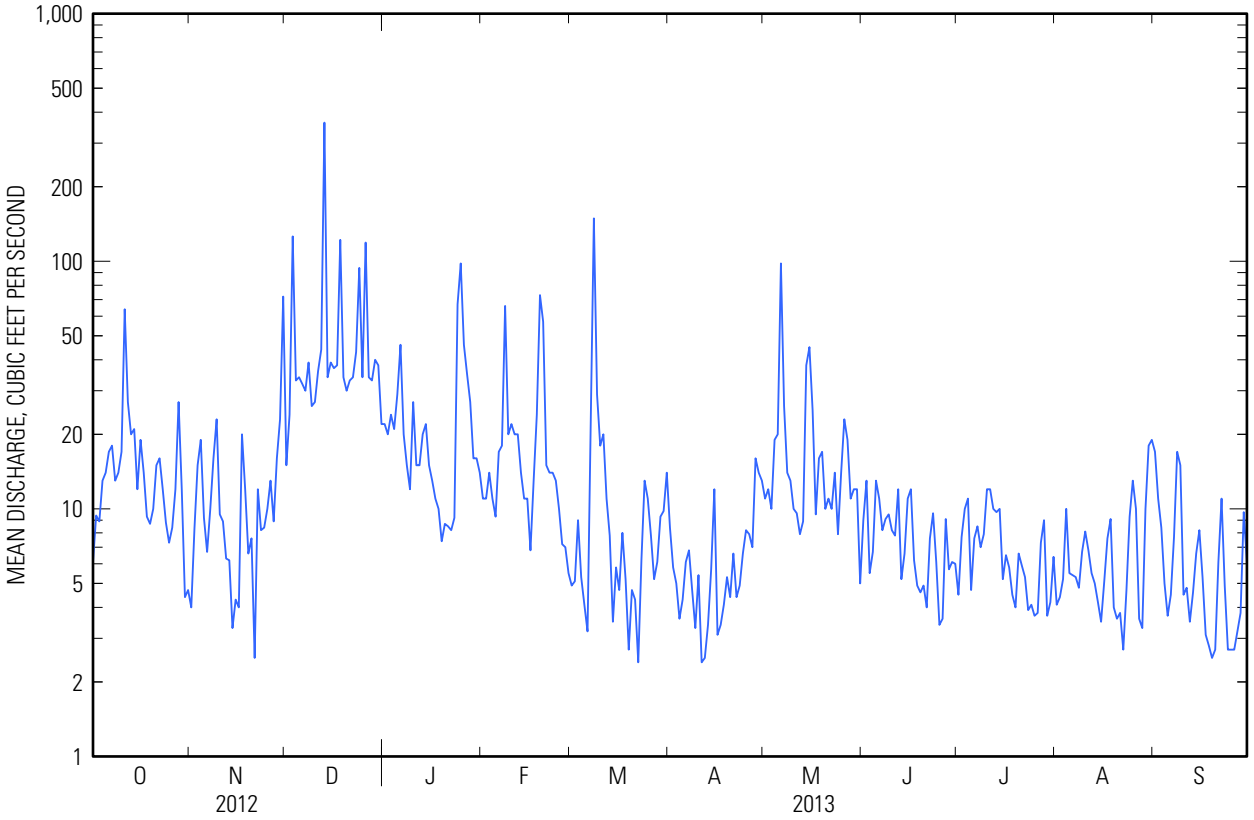
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	44.3	43.6	65.5	88.8	105	65.6	46.4	35.8	32.9	30.9	30.7	34.0
Max	223	102	327	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	14.9	12.5	21.0	23.2	19.1	13.3	6.28	11.2	7.23	5.41	6.82	6.36
(WY)	(2013)	(2013)	(1987)	(2013)	(2013)	(2013)	(2013)	(2010)	(2010)	(2010)	(2013)	(2013)

11073495 Cucamonga Creek near Mira Loma, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1986 - 2013	
Annual total	9,229.5		5,780.1			
Annual mean	25.2		15.8		51.7	
Highest annual mean					137	2005
Lowest annual mean					15.8	2013
Highest daily mean	426	Mar 17	363	Dec 13	5,200	Jan 9, 2005
Lowest daily mean	2.5	Nov 21	2.4	Mar 22	1.3	May 28, 2010
Annual seven-day minimum	5.6	Jun 2	3.9	Apr 8	3.5	Jul 24, 2010
Maximum peak flow			2,360	Mar 8	17,300	Oct 20, 2004
Maximum peak stage			3.41	Mar 8	6.58	Oct 20, 2004
Annual runoff (ac-ft)	18,310		11,460		37,420	
10 percent exceeds	41		33		61	
50 percent exceeds	16		9.5		35	
90 percent exceeds	6.6		4.0		18	



Water-Data Report 2013

11073360 Chino Creek at Schaefer Avenue, near Chino, CA

Santa Ana River Basin

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 mi^2.

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 25, 1969, reached a stage of 9.23 ft, present datum, discharge, 9,200 ft^3/s, on basis of contracted-opening measurement at site 6.1 mi downstream.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 11073360, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/11073360.2013.pdf

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.37	0.26	0.51	0.23	0.28	1.0	0.36	0.36	0.48	0.33	0.38	0.46
2	0.40	0.31	8.8	0.22	0.32	0.69	0.37	0.39	0.66	0.37	0.36	0.68
3	0.35	0.28	54	0.20	0.35	0.53	0.37	0.42	0.52	0.40	0.39	0.45
4	0.35	0.28	0.42	0.20	0.29	0.51	0.36	0.35	0.44	0.36	0.32	0.40
5	0.37	0.30	0.29	0.19	0.27	0.40	0.32	0.35	0.50	0.38	0.33	0.41
6	0.37	0.29	0.25	0.56	0.29	0.41	0.31	30	0.37	0.35	0.36	0.39
7	0.40	0.29	0.27	0.28	0.27	1.9	0.31	1.9	0.43	0.31	0.34	0.39
8	0.34	4.9	0.26	0.30	10	89	0.32	0.35	0.36	0.32	0.37	0.33
9	0.35	3.7	0.20	0.23	0.43	4.2	0.33	0.32	0.35	0.35	0.32	1.6
10	0.38	0.28	0.20	0.83	0.25	0.73	e0.32	0.33	0.40	0.32	0.36	0.80
11	49	0.19	0.21	0.20	0.23	1.1	e0.30	0.36	0.39	0.36	0.34	0.76
12	0.52	0.23	0.29	0.20	0.22	1.2	0.28	0.34	0.41	0.36	0.38	0.73
13	0.33	11	101	0.20	0.24	0.73	0.28	0.36	0.37	0.36	0.42	0.55
14	0.33	34	0.33	0.22	0.28	0.52	0.27	0.30	0.38	0.35	0.45	0.34
15	0.38	33	2.4	0.24	0.32	0.54	0.37	0.35	0.30	0.42	0.47	0.32
16	0.38	20	0.33	0.22	0.32	0.43	0.31	0.35	0.30	0.39	0.48	0.38
17	0.37	10	0.40	0.22	0.30	0.38	0.34	0.36	0.32	0.37	0.48	0.43
18	0.36	1.1	23	0.22	0.39	0.36	0.30	0.39	0.33	0.35	0.40	0.39
19	0.36	0.32	0.22	0.25	35	0.39	0.31	0.43	0.34	0.33	0.48	0.36
20	0.41	0.29	0.29	0.22	4.9	0.47	0.32	0.45	0.35	0.38	0.44	0.41
21	0.33	0.28	0.17	0.23	0.37	0.40	0.33	0.33	0.31	0.48	0.46	0.39
22	0.34	0.23	0.20	0.28	0.30	0.39	0.37	0.35	0.29	0.39	0.42	0.33
23	0.29	0.25	0.20	0.27	0.33	0.30	0.37	0.35	0.34	0.36	0.43	0.41
24	0.29	0.25	44	37	0.33	0.31	0.38	0.33	0.31	0.38	0.41	0.39
25	0.28	0.23	0.39	38	0.32	0.36	0.34	0.35	0.38	0.41	0.41	0.45
26	0.38	0.24	42	4.2	0.54	0.32	0.37	0.34	0.38	0.37	0.43	0.41
27	0.26	0.30	0.43	0.46	0.53	0.31	0.35	0.38	0.33	0.41	0.49	0.31
28	0.26	0.21	0.24	0.38	0.71	0.34	0.34	0.42	0.45	0.33	0.55	0.30
29	0.29	1.7	7.1	0.28	---	0.34	0.42	0.44	0.35	0.33	0.52	0.25
30	0.27	18	4.3	0.28	---	0.34	0.38	0.45	0.35	0.38	0.53	0.32
31	0.28	---	0.29	0.27	---	0.32	---	0.42	---	0.37	0.58	---
Total	59.39	142.71	292.99	87.08	58.38	109.22	10.10	42.62	11.49	11.37	13.10	14.14
Mean	1.92	4.76	9.45	2.81	2.08	3.52	0.34	1.37	0.38	0.37	0.42	0.47
Max	49	34	101	38	35	89	0.42	30	0.66	0.48	0.58	1.6
Min	0.26	0.19	0.17	0.19	0.22	0.30	0.27	0.30	0.29	0.31	0.32	0.25
Ac-ft	118	283	581	173	116	217	20	85	23	23	26	28

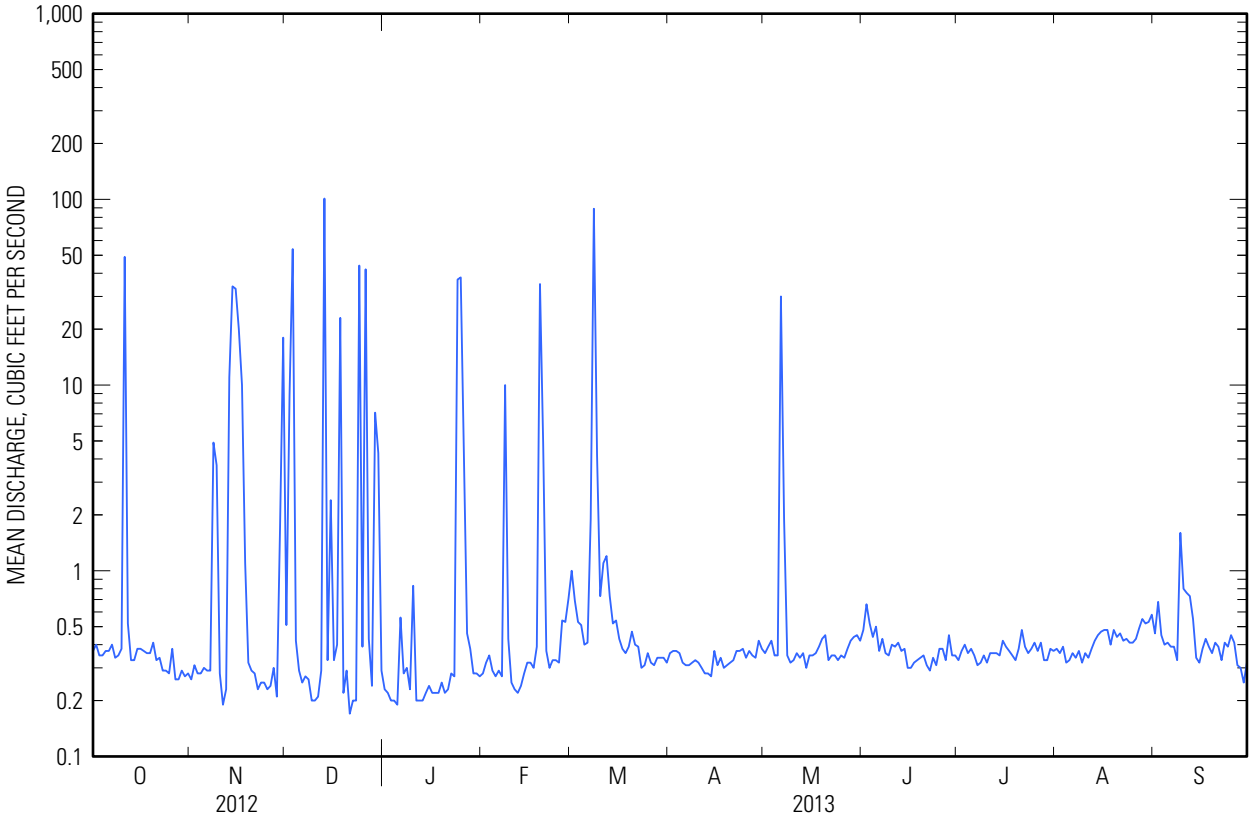
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	15.8	14.9	24.9	33.7	36.9	24.7	9.07	11.1	14.9	17.1	14.8	12.8
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	0.06	0.23	0.53	0.55	0.33	0.30	0.14	0.22	0.06	0.07	0.14	0.13
(WY)	(1978)	(1978)	(1970)	(1972)	(1972)	(1972)	(1977)	(1973)	(1977)	(1977)	(1976)	(1977)

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

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1970 - 2013	
Annual total	1,628.12		852.59			
Annual mean	4.45		2.34		19.2	
Highest annual mean					92.4	1974
Lowest annual mean					2.34	2013
Highest daily mean	205	Mar 17	101	Dec 13	2,060	Mar 1, 1978
Lowest daily mean	0.17	Dec 21	0.17	Dec 21	0.00	May 21, 1977
Annual seven-day minimum	0.24	Dec 5	0.21	Jan 11	0.02	Oct 28, 1977
Maximum peak flow			1,260	Mar 8	12,700	Feb 27, 1983
Maximum peak stage			5.81	Mar 8	10.32	Feb 27, 1983
Annual runoff (ac-ft)	3,230		1,690		13,880	
10 percent exceeds	1.7		0.81		60	
50 percent exceeds	0.67		0.36		1.3	
90 percent exceeds	0.29		0.25		0.39	



APPENDIX B

DAILY PRECIPITATION DATA
FOR SAN BERNARDINO

WATER YEAR 2012-13

TABLE B-1

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

	2012			2013								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0	0	0.07	0	0	0	0	0	0	0	0	0
2	0	0	0.11	0	0	0	0	0	0	0	0	0
3	0	0	0.06	0	0.01	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0.24	0	0	0	0.04	0	0	0	0
7	0	0	0	0.01	0	0.20	0	0.01	0	0	0	0
8	0	0.48	0	0	0.61	0.73	0.05	0	0	0	0	0
9	0	0.02	0	0	0	0.02	0	0	0	0	0	0
10	0	0	0	0.03	0	0	0	0	0	0	0	0.01
11	0.43	0	0	0	0	0	0	0	0	0.01	0	0
12	0.01	0	0.19	0	0	0	0	0	0	0	0	0
13	0	0	2.04	0	0	0	0	0	0	0	0	0
14	0	0	0.03	0	0	0	0	0	0	0	0	0
15	0	0	0.08	0	0	0	0	0	0	0	0	0
16	0	0.01	0	0	0	0	0	0	0	0	0	0
17	0	0.07	0	0	0	0	0	0	0	0	0	0
18	0	0	0.34	0	0	0	0	0	0.01	0	0	0
19	0	0	0	0	0.48	0	0	0	0	0	0.02	0
20	0	0	0	0	0.11	0	0	0	0	0.09	0	0
21	0	0	0	0	0	0	0	0	0	0.01	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0.27	0.34	0	0	0	0	0	0	0	0
25	0	0	0	0.58	0	0	0	0	0	0	0	0
26	0	0	0.51	0.14	0	0	0	0	0	0	0	0
27	0	0	0	0.20	0	0	0	0	0	0	0	0
28	0	0	0	0.01	0	0	0	0	0	0	0	0
29	0	0.04	0.30	0		0	0	0	0	0	0	0
30	0	0.40	0.08	0		0	0	0	0	0	0.03	0
31	0		0	0		0		0		0	0	
Total	0.44	1.02	4.08	1.55	1.21	0.95	0.05	0.05	0.01	0.11	0.05	0.01

Total Rainfall = 9.53 Inches

APPENDIX C

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

WATER YEAR 2012-13

ORANGE COUNTY WATER DISTRICT
SINCE 1933
ORANGE COUNTY'S GROUNDWATER AUTHORITY

March17, 2014

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

Subject: Review of Fiscal Year 2012-13 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, 2013. 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

PO Box 8300
Fountain Valley, CA 92728-8300
18700 Ward Street
Fountain Valley, CA 92708
(714) 378-3200
(714) 378-3373 fax
www.ocwd.com

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

JUNE 30, 2013

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

JUNE 30, 2013

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, 2012 - JUNE 30, 2013

	Actual	Budget	Variance - Favorable (Unfavorable)	
REVENUE COLLECTED:				
Water District Contributions				
Orange County Water District	$ 5,600	$ 5,600	0	
Inland Empire Utilities Agency	2,800	2,800	0	
Western Municipal Water District	2,800	2,800	0	
San Bernardino Valley Municipal Water District	2,800	2,800	0	
TOTAL REVENUE COLLECTED	$ 14,000	$ 14,000	$ -	
EXPENSES PAID:				
Professional Engineering Services	$ 21,240	$ 12,500	(8,740)	(A)
Administrative Expenses:				
Auditing Services				
Reproduction of Annual Report	1,359	1,500	141	(B)
Bank service charges				
	$ 22,599	$ 14,000	$ (8,599)	
CHANGE IN NET ASSETS	$ (8,599)			
NET ASSETS - BEGINNING OF THE YEAR	$ 21,299			
NET ASSETS - END OF THE YEAR	$ 12,701			

(A) Engineering services represent 2010-2011 and 2011-12 expenditure paid in fiscal year 2012-13 to WMWD and OCWD

(B) Administrative expenes represent 2010-11 and 2011-12 expenditur paid in fiscal year 2012-13 to WMWD and OCWD

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 2013

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, 2013 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 2012-13

There was no discharge of HGMP water to Santa Ana River in the Bunker Hill area during the 2012-13 water year.

APPENDIX E

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

WATER YEAR 2012-13

TABLE E-1

NONTRIBUTARY WATER FROM OC-59
MONTHLY TOTALS
WATER YEAR 2012-13
(acre-feet)

Month	Released at OC-59 for OCWD	12-Hour Delay [1]	Evaporative Losses [2]	Calculated Flow at Prado
2012				
October	0	0	0	0
November	280	280	12	268
December	0	0	0	0
2013				
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Total	280	280	12	268

(1) Released nontributary water is delayed 12 hours to reflect the estimated travel time between OC-59 and Prado Dam.

(2) Monthly evaporative losses calculated per the procedures referenced in the Twelfth Annual Watermaster Report, Appendix C and shown in Table E-3.

TABLE E-2

NONTRIBUTARY WATER FROM OC-59
NOVEMBER 2012
(cfs)

Day	Released at OC-59 for OCWD	12-Hour Delay	Calculated Flow At Prado Dam [1]
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	19	9	9
14	49	34	32
15	49	49	47
16	25	37	35
17	0	12	12
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
Total (cfs-days)	141	141	135
(AF)	280	280	268

(1) Reflects the monthly evapotrative loss listed in Table E-3.

TABLE E-3
EVAPORATIVE LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2012-13
SUM OF ALL CHANNEL REACHES
(acre-feet)

Month	State Water Released with 12-hour delay	Rialto Pipeline to Los Serranos Road	Los Serranos to Prado Dam w/o vegetation	Los Serranos to Prado Dam w/ vegetation	Total Evaporative Losses	Percent of Monthly Release
2012						
October	0	0	0	0	0	0%
November	280	2	8	2	12	4.3%
December	0	0	0	0	0	0%
2013						
January	0	0	0	0	0	0%
February	0	0	0	0	0	0%
March	0	0	0	0	0	0%
April	0	0	0	0	0	0%
May	0	0	0	0	0	0%
June	0	0	0	0	0	0%
July	0	0	0	0	0	0%
August	0	0	0	0	0	0%
September	0	0	0	0	0	0%
Total	280	2	8	2	12	

Percent of Annual Releases = 4.3%

TABLE E-3.1
EVAPORATIVE LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2012-13
RIALTO PIPELINE TO LOS SERRANOS ROAD

Month	State Water Released with 12-hour delay (AF)	Days of Evaporation	Historic Pan Evaporation (in) [a]	Computed Evaporation Losses[b]	
				(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]
2012					
October	0	0	---	0	0%
November	280	4	3.73	2	0.8%
December	0	0	---	0	0%
2006					
January	0	0	---	0	0%
February	0	0	---	0	0%
March	0	0	---	0	0%
April	0	0	---	0	0%
May	0	0	---	0	0%
June	0	0	---	0	0%
July	0	0	---	0	0%
August	0	0	---	0	0%
September	0	0	---	0	0%

(a) Average from Riverside Citrus Experimental Station from 1956-57 through 1972-73.
(b) Evaporative losses=[4]/(days/month)x[3]x(Pan Factor of 1.0)x(area of 56.1 acres)x(1 foot/12 inches)

TABLE E-3.2
EVAPORATIVE LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2012-13
LOS SERRANOS ROAD TO PRADO DAM (AREA WITHOUT VEGETATION COVER)

Month	State Water Released with 12-hour delay (AF)	Days of Evapotrans-piration[a]	Evaporation (in)[b]	Average Wetted Area (acre)[c]	Computed Evaporation Losses[d]	
					(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]	[7]
2012						
October	0	0	---	0	0	0%
November	280	11	3.73	72	8	2.9%
December	0	0	---	0	0	0%
2013						
January	0	0	---	0	0	0%
February	0	0	---	0	0	0%
March	0	0	---	0	0	0%
April	0	0	---	0	0	0%
May	0	0	---	0	0	0%
June	0	0	---	0	0	0%
July	0	0	---	0	0	0%
August	0	0	---	0	0	0%
September	0	0	---	0	0	0%

(a) Period of delivery plus 7 days after stoppage of delivery.
(b) Average from Riverside Citrus Experimental Station from 1956-57 through 1972-73.
(c) Equals 1/2 of 144 acres if the maximum flow rate of the month is less than 200 cfs and 1/2 of 369 acres if the maximum flow rate is greater or equal to 200 cfs.
(d) Evaporative losses=[3]x[4]/(days/month)x[5]x(1 foot/12 inches)

TABLE E-3.3
EVAPORATIVE LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2012-13
LOS SERRANOS ROAD TO PRADO DAM (AREA WITH VEGETATION COVER)

Month	State Water Released with 12-hour delay (AF)	Days of Evaporation[a]	Historic Pan Evaporation (in)[b]	Evapotrans-piration (in)[c]	Average Wetted Area (acre)[d]	Computed Evaporative Losses[e]	
						(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
2012							
October	0	0	---	---	0	0	0%
November	280	11	3.73	2.72	72	2	0.8%
December	0	0	---	---	0	0	0%
2013							
January	0	0	---	---	0	0	0%
February	0	0	---	---	0	0	0%
March	0	0	---	---	0	0	0%
April	0	0	---	---	0	0	0%
May	0	0	---	---	0	0	0%
June	0	0	---	---	0	0	0%

July	0	0	---	---	0	0	0%
August	0	0	---	---	0	0	0%
September	0	0	---	---	0	0	0%

(a) Period of delivery plus 7 days after stoppage of delivery.
(b) Average from Riverside Citrus Experimental Station from 1956-57 through 1972-73.
(c) From UCR Station #44
(d) Equals 1/2 of 144 acres if the maximum flow rate of the month is less than 200 cfs and 1/2 of 369 acres if the maximum flow rate is greater or equal to 200 cfs.
(e) Evaporative losses=[3]x([4]-[5])/(days/month)x[6]x(1 foot/12 inches)

TABLE E-4

CALCULATION OF WEIGHTED TDS OF
OC-59 RELEASES

WATER YEAR 2012-13

Month	Released at OC-59 for OCWD (acre-feet)	TDS at Release[1] (mg/L)	Flow X TDS at Release	Calculated OC-59 Flow at Prado (acre-feet)
2012				
October	0	-	0	0
November	280	296	82,880	268
December	0	-	0	0
2013				
January	0	-	0	0
February	0	-	0	0
March	0	-	0	0
April	0	-	0	0
May	0	-	0	0
June	0	-	0	0
July	0	-	0	0
August	0	-	0	0
September	0	-	0	0
Total	280		82,880	268

At Discharge:
Flow-weighted TDS = $\frac{82,880}{280}$ = 296 mg/L

At Prado:
Flow-weighted TDS = $\frac{82,880}{268}$ = 309 mg/L

(1) TDS values from monthly analyses of State Water Project water for Devil Canyon.

APPENDIX F

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

WATER YEAR 2012-13

There was no discharge of Arlington Desalter water to the Arlington Valley Drain for Orange County Water District during the 2012-13 water year.

APPENDIX G

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2012-13

TABLE G-1

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2012-13
JANUARY 2013

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	0.8	0.8	0	0	0	0	0
2	0.9	0.9	0	0	0	0	0
3	1.0	1.0	0	0	0	0	0
4	0.8	0.8	0	0	0	0	0
5	0.8	0.8	0	0	0	0	0
6	1.5	1.5	0	0	0	0	0
7	1.6	1.6	0	0	0	0	0
8	1.4	1.4	0	0	0	0	0
9	1.6	1.6	0	0	0	0	0
10	2.2	2.2	0	0	0	0	0
11	1.3	1.3	0	0	0	0	0
12	1.3	1.3	0	0	0	0	0
13	1.4	1.4	0	0	0	0	0
14	1.1	1.1	0	0	0	0	0
15	1.4	1.4	0	0	0	0	0
16	1.9	1.9	0	0	0	0	0
17	2.1	2.1	0	17	0	0	0
18	2.0	2.0	0	61	0	0	0
19	1.8	1.8	0	68	0	0	0
20	2.3	2.3	0	70	0	0	0
21	2.2	2.2	0	60	0	0	0
22	1.7	1.7	0	66	0	0	0
23	2.1	2.1	0	59	0	0	0
24	26	2.0	24	51	0	42	0
25	91	2.0	89	47	0	0	0
26	28	2.0	26	47	0	0	0
27	2.5	2.5	0	47	0	0	0
28	2.5	2.5	0	53	0	0	0
29	2.1	2.1	0	53	0	0	0
30	1.8	1.8	0	57	0	0	0
31	2.2	2.2	0	34	0	0	0
Total (cfs)	191	52	139	788	0	42	0
(acre-feet)	379	104	276	1,563	0	83	0

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2012-13
FEBRUARY 2013

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	1.5	1.5	0	0	0	0	0
2	1.6	1.6	0	0	0	0	0
3	1.9	1.9	0	0	0	0	0
4	2.0	2.0	0	0	0	0	0
5	2.7	2.7	0	0	0	0	0
6	1.9	1.9	0	0	0	0	0
7	1.9	1.9	0	0	0	0	0
8	100	2.0	98	0	0	14	0
9	6.4	2.4	4	0	0	0	0
10	1.9	1.9	0	0	0	0	0
11	1.6	1.6	0	0	0	0	0
12	1.4	1.4	0	0	0	0	0
13	1.6	1.6	0	0	0	0	0
14	1.6	1.6	0	0	0	0	0
15	1.6	1.6	0	9	0	0	0
16	1.8	1.8	0	36	0	0	0
17	1.8	1.8	0	49	0	0	0
18	2.1	2.1	0	57	0	0	0
19	14	2.0	12	63	0	0	0
20	29	3.0	26	61	0	0	0
21	2.6	2.6	0	60	0	0	0
22	2.6	2.6	0	55	0	0	0
23	2.9	2.9	0	54	0	0	0
24	2.7	2.7	0	53	0	0	0
25	2.6	2.6	0	54	0	0	0
26	4.2	3.0	0	35	1	0	1
27	21	3.0	0	0	18	0	18
28	38	3.0	0	0	35	0	35
Total (cfs)	255	61	140	586	54	14	54
(acre-feet)	506	120	278	1,163	108	28	108

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2012-13
MARCH 2013

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	35	3.0	0	0	32	0	32
2	29	3.0	0	0	26	0	26
3	25	3.0	0	0	22	0	22
4	22	3.0	0	0	19	0	19
5	17.0	3.0	0	0	14	0	14
6	13.0	3.0	0	0	10	0	10
7	16.0	3.0	4	0	9	0	9
8	143	3.0	132	0	8	33	0
9	36	3.0	26	0	7	0	7
10	10.0	3.0	1	0	6	0	6
11	7.7	3.0	0	0	5	0	5
12	7.0	3.0	0	0	4	0	4
13	6.7	3.0	0	0	4	0	4
14	7.6	3.0	0	0	5	0	5
15	6.7	3.0	0	0	4	0	4
16	6.7	3.0	0	0	4	0	4
17	5.9	3.0	0	0	3	0	3
18	5.9	3.0	0	0	3	0	3
19	5.9	3.0	0	0	3	0	3
20	5.5	3.0	0	0	3	0	3
21	5.3	3.0	0	0	2	0	2
22	5.2	3.0	0	0	2	0	2
23	5.1	3.0	0	0	2	0	2
24	4.6	3.0	0	0	2	0	2
25	4.1	3.0	0	0	1	0	1
26	3.6	3.0	0	0	1	0	1
27	3.5	3.0	0	0	1	0	1
28	3.2	3.2	0	0	0	0	0
29	3.8	3.8	0	0	0	0	0
30	2.9	2.9	0	0	0	0	0
31	4.0	4.0	0	0	0	0	0
Total (cfs)	457	95	163	0	199	33	191
(acre-feet)	906	188	323	0	395	65	379

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2012-13

1. USGS measured flow of Temescal Creek above Main St. at Corona, which can be found in Appendix A.

2. Temescal base flow was assumed to be the flow present when there are no sources of non-tributary flow and there has been no precipitation to cause storm flow.

3. Temescal Creek flow attributed to storm events.

4. Eastern Municipal Water District wastewater discharge to Temescal Creek at Wasson Canyon.

5. Flow in Temescal Creek at Corona attributed to EMWD discharge of wastewater to Temescal Creek.

6. Flow of the Santa Ana River at Ball Road has historically been lost to the ocean. OCWD Forebay Operations currently percolates approximately 20 cfs between Ball Road and Orangewood Avenue. Therefore, the Ball Road figure minus 20 cfs was used for "Santa Ana River Flow Lost to the Ocean."

7. When the Santa Ana River flow lost to the ocean is greater than the San Jacinto watershed outflow reaching Prado Dam, it is assumed that no San Jacinto watershed outflow could be recharged by OCWD. When San Jacinto watershed outflow reaching Prado Dam was greater than the Santa Ana River flow lost to the ocean, San Jacinto watershed outflow recharged by OCWD was calculated as the difference between the two.

TABLE G-2

SUMMARY OF SAN JACINTO WATERSHED DISCHARGE
WATER YEAR 2012-13

MONTHLY TOTALS

Month	EMWD Discharge to Temescal Creek	San Jacinto Watershed Outflow At Prado	Santa Ana River Flow Lost to the Ocean	San Jacinto Outflow Recharged By OCWD
2012				
October	0	0	0	0
November	0	0	0	0
December	0	0	113	0
2013				
January	788	0	42	0
February	586	54	14	54
March	0	199	33	191
April	0	0	0	0
May	0	0	4	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Total (cfs)	1,375	253	206	245
(acre-feet)	2,727	502	409	486

TABLE G-3

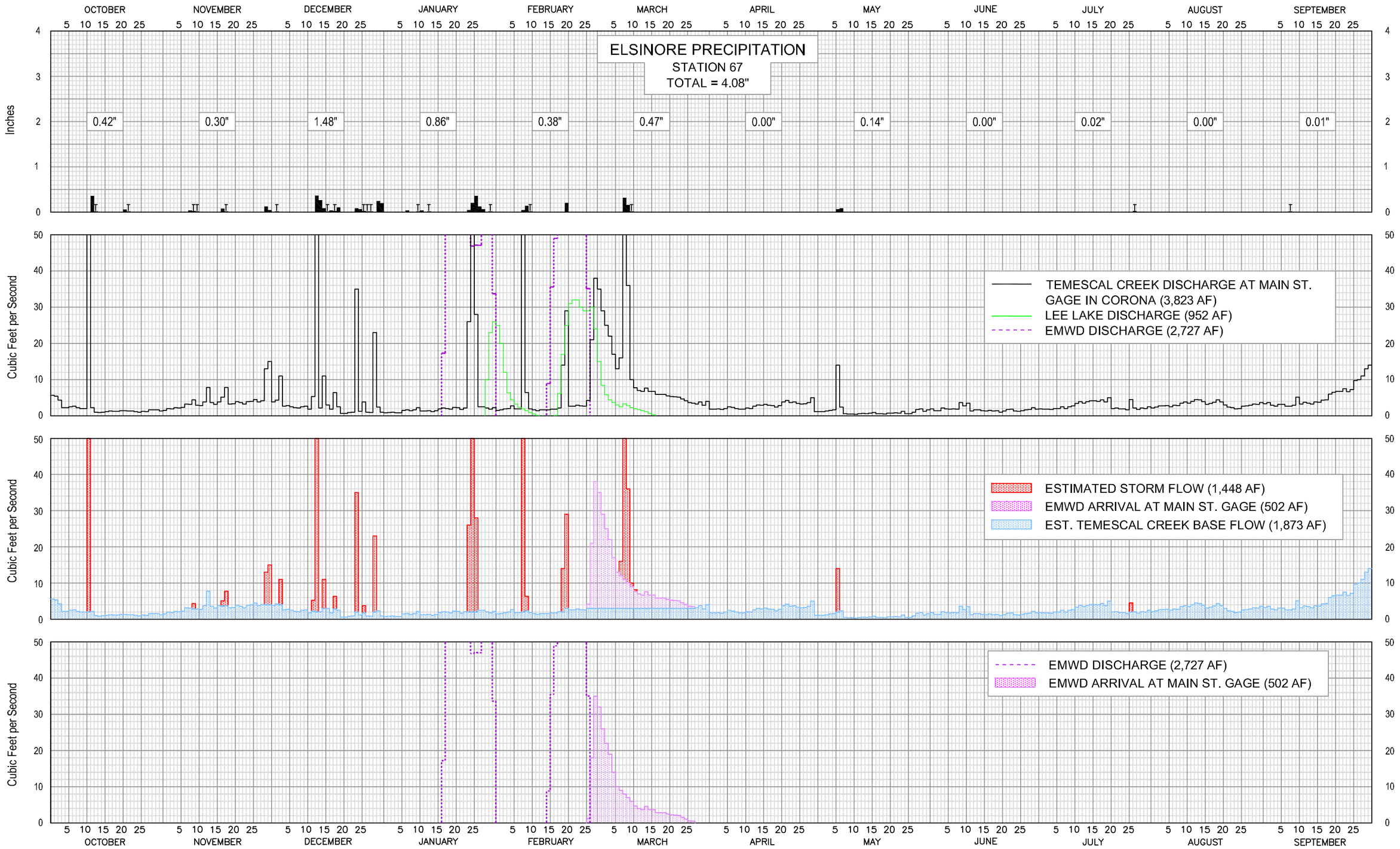
SUMMARY OF FLOW-WEIGHTED AVERAGE TDS
OF SAN JACINTO WATERSHED DISCHARGE
CALCULATED TO REACH PRADO RESERVOIR
WATER YEAR 2012-13

Month	EMWD Discharge to Temescal Creek (acre-feet) [1]	EMWD Discharge TDS (mg/L) [2]	San Jacinto Watershed Outflow At Prado (acre-feet)	EMWD Flow at Prado Reservoir x TDS
2012				
October	0	---	0	0
November	0	---	0	0
December	0	---	0	0
2013				
January	1,563	655	0	1,023,765
February	1,163	685	107	796,655
March	0	---	395	0
April	0	---	0	0
May	0	---	0	0
June	0	---	0	0
July	0	---	0	0
August	0	---	0	0
September	0	---	0	0
Total	2,726		502	1,820,420

Flow-weighted TDS at Discharge [3] = 668 mg/L

Flow-weighted TDS of San Jacinto Watershed Outflow At Prado [4] = 703 mg/L

(1) Actual EMWD discharge to Temescal Creek at Wasson Canyon.
(2) Monthly Average TDS of EMWD Surface Water Discharge to Wasson Canyon.
(3) Water quality for EMWD discharge at Wasson Canyon =
(Sum of Monthly Discharge Volume X Discharge TDS)/Total Discharge Volume.
(4) Water quality for EMWD discharge arriving at Prado reservoir =
(Sum of Volume Arriving at Prado X Discharge TDS)/(Sum of Monthly Volume Arriving at Prado less 5%)



DISCHARGE OF TEMESCAL CREEK AT MAIN STREET AND AT LEE LAKE IN CORONA, EMWD DISCHARGE, AND ELSINORE PRECIPITATION

WATER YEAR 2012-13

APPENDIX H

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

WATER YEAR 2012-13

TABLE H-1

WATER QUALITY SAMPLES BELOW PRADO DAM
WATER YEAR 2012-13

Date	EC (microsiemens/cm)	TDS (mg/L)	Source
10/1/2012	1,100	659	USGS
10/1/2012	1090	666	OCWD
10/17/2012	1,090	651	USGS
11/13/2012	1120	674	OCWD
11/14/2012	1,080	649	USGS
11/28/2012	1,100	673	USGS
12/4/2012	818	498	OCWD
12/12/2012	1,030	633	USGS
12/31/2012	847	510	USGS
1/8/2013	1110	644	OCWD
1/30/2013	790	483	USGS
2/5/2013	1090	666	OCWD
2/13/2013	1,090	626	USGS
2/26/2013	1,090	687	USGS
3/12/2013	764	460	OCWD
3/15/2013	1,060	623	USGS
3/29/2013	1,120	681	USGS
4/2/2013	1090	672	OCWD
4/15/2013	1,110	685	USGS
4/30/2013	1,100	671	USGS
5/14/2013	1,120	675	USGS
5/14/2013	1170	706	OCWD
5/29/2013	1,120	659	USGS
6/4/2013	1160	710	OCWD
6/19/2013	1,160	687	USGS
7/3/2013	1,140	682	USGS
7/9/2013	1180	724	OCWD
7/17/2013	1,130	709	USGS
8/6/2013	1160	716	OCWD
8/13/2013	1220	770	OCWD
8/14/2013	1,130	699	USGS
8/20/2013	1210	718	OCWD
8/27/2013	1160	698	OCWD
9/10/2013	1110	662	OCWD
9/13/2013	1,170	711	USGS
9/26/2013	1,190	716	USGS

TABLE H-2

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

OCTOBER 2012

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	91	1,094	655	59,605
2	77	1,107	663	51,051
3	70	1,100	659	46,130
4	68	1,093	655	44,540
5	75	1,081	648	48,600
6	83	1,086	651	54,033
7	90	1,098	658	59,220
8	94	1,082	648	60,912
9	95	1,094	655	62,225
10	96	1,097	657	63,072
11	109	1,037	621	67,689
12	268	783	469	125,692
13	254	1,029	616	156,464
14	147	1,081	648	95,256
15	118	1,083	649	76,582
16	101	1,097	657	66,357
17	112	1,086	651	72,912
18	73	1,148	688	50,224
19	105	1,134	679	71,295
20	127	1,109	664	84,328
21	155	1,078	646	100,130
22	160	1,047	627	100,320
23	126	1,047	627	79,002
24	116	1,053	631	73,196
25	103	1,064	637	65,611
26	94	1,093	655	61,570
27	96	1,097	657	63,072
28	98	1,088	652	63,896
29	99	1,061	635	62,865
30	95	1,059	634	60,230
31	97	1,072	642	62,274
Total	3,492			2,208,353

Monthly Flow-weighted TDS = 632 mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

NOVEMBER 2012

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	99	1,075	644	63,756
2	100	1,077	645	64,500
3	100	1,074	644	64,400
4	101	1,065	638	64,438
5	142	1,050	629	89,318
6	166	1,040	623	103,418
7	185	1,034	619	114,515
8	194	1,035	620	120,280
9	188	1,026	615	115,620
10	186	965	578	107,508
11	184	1,031	617	113,528
12	176	1,062	636	111,936
13	167	1,076	644	107,548
14	162	1,070	641	103,842
15	160	975	584	93,440
16	158	971	582	91,956
17	153	1,022	612	93,636
18	157	972	582	91,374
19	153	1,026	615	94,095
20	150	1,088	652	97,800
21	147	1,124	674	99,078
22	141	1,115	668	94,188
23	151	1,095	656	99,056
24	145	1,104	661	95,845
25	146	1,090	653	95,338
26	151	1,079	647	97,697
27	157	1,080	647	101,579
28	155	1,091	654	101,370
29	188	1,026	615	115,620
30	241	861	516	124,356
Total	4,703			2,931,035

Monthly Flow-weighted TDS = 623 mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

DECEMBER 2012

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	309	853	511	157,899
2	253	---	---	---
3	199	---	---	---
4	163	---	---	---
5	188	---	---	---
6	210	---	---	---
7	182	---	---	---
8	190	---	---	---
9	190	---	---	---
10	184	---	---	---
11	186	---	---	---
12	157	---	---	---
13	122	---	---	---
14	130	---	---	---
15	132	---	---	---
16	131	---	---	---
17	162	---	---	---
18	255	---	---	---
19	313	---	---	---
20	339	---	---	---
21	338	---	---	---
22	336	---	---	---
23	331	---	---	---
24	322	---	---	---
25	323	---	---	---
26	321	---	---	---
27	319	---	---	---
28	317	---	---	---
29	315	---	---	---
30	313	---	---	---
31	338	---	---	---
Total	7,568			157,899

Monthly Flow-weighted TDS[3] = 511 mg/L

1. TDS = EC x 0.599072
2. EC data missing 12/02/2012-12/31/2012
3. Flow data for period of missing EC is excluded in the Monthly Flow-weighted TDS calculation

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

JANUARY 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	357	---	---	---
2	371	---	---	---
3	369	---	---	---
4	348	---	---	---
5	326	---	---	---
6	293	---	---	---
7	256	---	---	---
8	213	---	---	---
9	196	---	---	---
10	203	---	---	---
11	200	---	---	---
12	195	---	---	---
13	201	---	---	---
14	197	---	---	---
15	189	---	---	---
16	187	---	---	---
17	184	---	---	---
18	179	---	---	---
19	174	---	---	---
20	169	---	---	---
21	172	---	---	---
22	169	---	---	---
23	175	---	---	---
24	179	---	---	---
25	180	---	---	---
26	203	---	---	---
27	210	---	---	---
28	320	---	---	---
29	393	---	---	---
30	410	---	---	---
31	426	913	547	233,022
Total	7,644 (2)			233,022

Monthly Flow-weighted TDS(3)= 547 mg/L

1. TDS = EC x 0.599072
2. EC data missing 1/01/2013-1/29/2013
3. Flow data for period of missing EC is excluded in the Monthly Flow-weighted TDS calculation

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

FEBRUARY 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	399	1,027	615	245,385
2	299	1,109	664	198,536
3	191	1,122	672	128,352
4	189	1,108	664	125,496
5	191	1,107	663	126,633
6	190	1,104	661	125,590
7	178	1,103	661	117,658
8	227	931	558	126,666
9	355	581	348	123,540
10	344	728	436	149,984
11	306	973	583	178,398
12	243	1,056	633	153,819
13	195	1,095	656	127,920
14	179	1,099	658	117,782
15	167	1,104	661	110,387
16	157	1,120	671	105,347
17	166	1,101	660	109,560
18	177	1,080	647	114,519
19	151	1,058	634	95,734
20	163	808	484	78,892
21	236	596	357	84,252
22	274	730	437	119,738
23	262	913	547	143,314
24	244	1,021	612	149,328
25	229	1,079	646	147,934
26	238	1,104	662	157,556
27	169	1,122	672	113,568
28	157	1,121	672	105,504
Total	6,276 [2]			3,681,392

Monthly Flow-weighted TDS[3] = 587 mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

MARCH 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	152	1,123	673	102,296
2	151	1,130	677	102,227
3	155	1,127	675	104,625
4	155	1,118	670	103,850
5	150	1,123	673	100,950
6	144	1,125	674	97,056
7	158	1,064	637	100,646
8	191	715	429	81,939
9	216	549	329	71,064
10	219	572	343	75,117
11	267	641	384	102,528
12	292	746	447	130,524
13	279	880	527	147,033
14	267	964	578	154,326
15	251	1,044	625	156,875
16	227	1,127	675	153,225
17	187	1,132	678	126,786
18	166	1,110	665	110,390
19	144	1,099	658	94,752
20	136	1,109	664	90,304
21	134	1,109	664	88,976
22	120	1,111	666	79,920
23	115	1,153	691	79,465
24	120	1,137	681	81,720
25	124	1,119	671	83,204
26	131	1,109	664	86,984
27	131	1,118	670	87,770
28	130	1,117	669	86,970
29	127	1,117	669	84,963
30	125	1,114	667	83,375
31	133	1,100	659	87,647
Total	5,297			3,137,507

Monthly Flow-weighted TDS = 592 mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

APRIL 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	134	1,089	653	87,502
2	131	1,083	649	85,019
3	126	1,100	659	83,034
4	119	1,130	677	80,563
5	113	1,130	677	76,501
6	115	1,121	672	77,280
7	117	1,120	671	78,507
8	118	1,125	674	79,532
9	121	1,105	662	80,102
10	115	1,110	665	76,475
11	113	1,113	667	75,371
12	116	1,121	671	77,836
13	114	1,122	672	76,608
14	115	1,122	672	77,280
15	124	1,103	661	81,964
16	118	1,089	652	76,936
17	113	1,121	671	75,823
18	109	1,117	669	72,921
19	108	1,126	675	72,900
20	105	1,144	685	71,925
21	105	1,140	683	71,715
22	107	1,110	665	71,155
23	109	1,091	654	71,286
24	116	1,071	642	74,472
25	117	1,066	638	74,646
26	112	1,060	635	71,120
27	105	1,057	633	66,465
28	112	1,052	630	70,560
29	118	1,037	622	73,396
30	123	1,032	619	76,137
Total	3,468			2,285,031
		Monthly Flow-weighted TDS =	659	mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

MAY 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	113	1,048	628	70,964
2	114	1,056	633	72,162
3	105	1,074	643	67,515
4	105	1,077	645	67,725
5	113	1,059	634	71,642
6	146	856	513	74,898
7	171	741	444	75,924
8	197	984	590	116,230
9	179	1,067	639	114,381
10	122	1,108	663	80,886
11	123	1,113	667	82,041
12	121	1,116	669	80,949
13	105	1,121	672	70,560
14	107	1,097	657	70,299
15	120	1,024	614	73,680
16	111	1,051	629	69,819
17	107	1,123	673	72,011
18	109	1,121	672	73,248
19	111	1,109	665	73,815
20	114	1,091	654	74,556
21	104	1,095	656	68,224
22	95	1,098	658	62,510
23	94	1,107	663	62,322
24	88	1,103	661	58,168
25	86	1,110	665	57,190
26	90	1,098	658	59,220
27	92	1,080	647	59,524
28	94	1,067	639	60,066
29	85	1,088	652	55,420
30	85	1,085	650	55,250
31	78	1,100	659	51,402
Total	3,484			2,202,601
		Monthly Flow-weighted TDS =	632	mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

JUNE 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	77	1,121	671	51,667
2	81	1,097	657	53,217
3	82	1,102	660	54,120
4	81	1,113	667	54,027
5	87	1,125	674	58,638
6	90	1,100	659	59,310
7	84	1,115	668	56,112
8	82	1,124	673	55,186
9	83	1,114	667	55,361
10	84	1,109	664	55,776
11	78	1,111	666	51,948
12	80	1,135	680	54,400
13	81	1,126	674	54,594
14	72	1,160	695	50,040
15	77	1,152	690	53,130
16	79	1,146	686	54,194
17	86	1,134	679	58,394
18	85	1,141	684	58,140
19	81	1,155	692	56,052
20	78	1,122	672	52,416
21	69	1,122	672	46,368
22	59	1,152	690	40,710
23	67	1,151	689	46,163
24	73	1,148	688	50,224
25	77	1,124	673	51,821
26	78	1,120	671	52,338
27	72	1,126	675	48,600
28	73	1,131	677	49,421
29	67	1,127	675	45,225
30	70	1,122	672	47,040
Total	2,333			1,574,632
		Monthly Flow-weighted TDS =	675	mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

JULY 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	73	1,110	665	48,545
2	69	1,111	666	45,954
3	73	1,090	653	47,669
4	74	1,100	659	48,766
5	67	1,108	664	44,488
6	64	1,132	678	43,392
7	69	1,121	672	46,368
8	71	1,111	666	47,286
9	69	1,113	667	46,023
10	70	1,107	663	46,410
11	75	1,092	654	49,050
12	77	1,090	653	50,281
13	75	1,097	657	49,275
14	68	1,114	667	45,356
15	66	1,095	656	43,296
16	64	1,093	655	41,920
17	69	1,087	651	44,919
18	63	1,072	642	40,446
19	64	1,104	661	42,304
20	67	1,121	671	44,957
21	86	1,084	650	55,900
22	83	1,068	640	53,120
23	79	1,062	636	50,244
24	76	1,073	643	48,868
25	73	1,063	637	46,501
26	69	1,071	642	44,298
27	69	1,069	640	44,160
28	70	1,054	631	44,170
29	67	1,048	628	42,076
30	62	1,060	635	39,370
31	62	1,080	647	40,114
Total	2,183			1,425,526
		Monthly Flow-weighted TDS =	653	mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

AUGUST 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	67	1,084	650	43,550
2	65	1,097	657	42,705
3	67	1,083	649	43,483
4	68	1,091	654	44,472
5	71	1,077	645	45,795
6	64	1,101	660	42,240
7	65	1,108	664	43,160
8	61	1,110	665	40,565
9	60	1,114	668	40,080
10	62	1,108	664	41,168
11	61	1,097	657	40,077
12	60	1,100	659	39,540
13	62	1,092	654	40,548
14	62	1,104	661	40,982
15	61	1,116	669	40,809
16	57	1,121	671	38,247
17	58	1,116	668	38,744
18	57	1,119	670	38,190
19	60	1,082	648	38,880
20	60	1,085	650	39,000
21	57	1,099	658	37,506
22	56	1,118	670	37,520
23	53	1,097	657	34,821
24	55	1,101	659	36,245
25	58	1,070	641	37,178
26	63	1,021	612	38,556
27	68	989	592	40,256
28	58	1,018	610	35,380
29	57	1,066	638	36,366
30	106	986	590	62,540
31	121	940	563	68,123
Total	2,000			1,286,726
		Monthly Flow-weighted TDS =	643	mg/L

1. TDS = EC x 0.599072

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2012-13

SEPTEMBER 2013

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	86	931	558	47,988
2	76	903	541	41,116
3	74	897	537	39,738
4	63	907	543	34,209
5	59	908	544	32,096
6	56	900	539	30,184
7	56	881	528	29,568
8	59	877	525	30,975
9	62	863	517	32,054
10	68	880	527	35,836
11	60	918	550	33,000
12	65	961	575	37,375
13	61	1,077	645	39,345
14	60	1,142	684	41,040
15	61	1,126	675	41,175
16	62	1,116	669	41,478
17	70	1,142	684	47,880
18	71	1,126	675	47,925
19	68	1,145	686	46,648
20	72	1,142	684	49,248
21	72	1,130	677	48,744
22	71	1,118	670	47,570
23	74	1,102	660	48,840
24	68	1,110	665	45,220
25	60	1,116	669	40,140
26	76	1,112	666	50,616
27	59	1,103	661	38,999
28	57	1,095	656	37,392
29	58	1,079	646	37,468
30	66	1,062	636	41,976
Total	1,970			1,215,843

Monthly Flow-weighted TDS = 617 mg/L

1. TDS = EC x 0.599072

TABLE H-3

ANNUAL SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM

WATER YEAR 2012-13

Month	Monthly Flow (1) (cfs-days)	Monthly Flow-weighted TDS (1) (mg/L)	Monthly Flow x TDS
2012			
October	3,492	632	2,206,944
November	4,703	623	2,929,969
December	309	511	157,899
2013			
January	426	547	233,022
February	6,276	587	3,681,392
March	5,297	592	3,135,824
April	3,468	659	2,285,412
May	3,484	632	2,201,888
June	2,333	675	1,574,775
July	2,183	653	1,425,499
August	2,000	643	1,286,000
September	1,970	617	1,215,490
Total	35,941 (1)		22,334,114
Yearly Flow-weighted TDS (1) =		621	

1. Prado Outflow Total and Flow Weighted TDS exclude days when EC data was missing.

APPENDIX I

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

WATER YEAR 2012-13

PREPARED BY

JOHN V. ROSSI

TABLE I-1

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

WATER YEAR 2012-13

MONTH	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2012			
October	188	836	157,168
November	181	780	141,180
December	184	754	138,736
2013			
January	183	732	133,956
February	166	764	126,824
March	185	768	142,080
April	180	736	132,480
May	184	828	152,352
June	179	758	135,682
July	185	840	155,400
August	192	836	160,512
September	186	792	147,312
Total	2,193		1,723,682

Flow-weighted TDS = $\frac{1,723,682}{2,193}$ = 786 mg/L

APPENDIX J

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

WATER YEAR 2012-13

PREPARED BY

JOHN V. ROSSI

TABLE J-1

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2012-13

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2012	10/03/12	1085	668	C of R		0.62	
	10/09/12	982	584	USGS		0.59	
	10/10/12	1060	656	C of R		0.62	
	10/17/12	1043	696	C of R		0.67	
	10/18/12	992	621	USGS		0.63	
	10/24/12	1040	612	C of R		0.59	640
	11/07/12	973	604	USGS		0.62	
	11/08/12	1040	628	C of R		0.60	
	11/14/12	1027	700	C of R		0.68	
	11/20/12	991	613	USGS	*	0.62	
	11/21/12	1015	636	C of R	*	0.63	
	11/29/12	1010	634	C of R	*	0.63	644
	12/05/12	1009	624	C of R	*	0.62	
	12/07/12	990	612	USGS		0.62	
	12/12/12	1006	616	C of R		0.61	
	12/17/12	997	591	USGS	*	0.59	
	12/19/12	867	537	C of R	*	0.62	
	12/26/12	812	503	C of R	*	0.62	614
2013	01/02/13	1076	664	C of R		0.62	
	01/08/13	1020	625	USGS	*	0.61	
	01/09/13	1046	651	C of R	*	0.62	
	01/16/13	1035	624	C of R		0.60	
	01/23/13	1048	661	C of R		0.63	
	01/24/13	965	609	USGS	*	0.63	
	01/30/13	1040	662	C of R		0.64	653

* Data not used in determining monthly averages; storm flow
C of R City of Riverside
USGS U.S. Geological Survey

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2012-13

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2013	02/01/13	993	612	USGS		0.62	
	02/05/13	1085	686	C of R		0.63	
	02/13/13	1024	629	C of R		0.61	
	02/20/13	386	232	C of R	*	0.60	
	02/21/13	907	552	USGS	*	0.61	
	02/27/13	1066	658	C of R	*	0.62	642
	03/06/13	1030	642	USGS	*	0.62	
	03/06/13	1067	673	C of R	*	0.63	
	03/13/13	983	603	C of R		0.61	
	03/20/13	1121	682	C of R		0.61	
	03/26/13	1010	651	USGS		0.64	
	03/27/13	1094	666	C of R		0.61	651
	04/03/13	1084	696	C of R		0.64	
	04/05/13	1010	610	USGS		0.60	
	04/10/13	1108	666	C of R		0.60	
	04/17/13	1106	659	C of R		0.60	
	04/24/13	1082	654	C of R		0.60	
	04/25/13	990	616	USGS		0.62	650
	05/01/13	1155	697	C of R		0.60	
	05/08/13	1112	671	C of R		0.60	
	05/09/13	992	621	USGS		0.63	
	05/15/13	1123	716	C of R		0.64	
	05/21/13	987	614	USGS		0.62	
	05/22/13	1107	665	C of R		0.60	
	05/29/13	1116	669	C of R		0.60	665

* Data not used in determining monthly averages; storm flow
C of R City of Riverside
USGS U.S. Geological Survey

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2012-13

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Average
2013	06/05/13	1107	663	C of R		0.60	
	06/11/13	974	598	USGS		0.61	
	06/12/13	1116	713	C of R		0.64	
	06/19/13	1100	652	C of R		0.59	
	06/25/13	1010	633	USGS		0.63	
	06/26/13	1111	722	C of R		0.65	664
	07/03/13	1116	679	C of R		0.61	
	07/10/13	1080	693	USGS		0.64	
	07/10/13	1135	792	C of R	*	0.70	
	07/17/13	1207	780	C of R		0.65	
	07/22/13	1050	639	USGS	*	0.61	
	07/24/13	1181	763	C of R	*	0.65	717
	08/07/13	1211	760	C of R		0.63	
	08/14/13	1182	680	C of R		0.58	
	08/16/13	1030	638	USGS		0.62	
	08/21/13	1102	661	C of R		0.60	
	08/28/13	1132	683	C of R		0.60	
	08/30/13	860	527	USGS	*	0.61	684
	09/04/13	1098	693	C of R		0.63	
	09/10/13	1030	644	USGS		0.63	
	09/11/13	1127	663	C of R		0.59	
	09/18/13	1082	673	C of R		0.62	
	09/25/13	1081	665	C of R		0.62	
	09/26/13	1020	620	USGS		0.61	660

* Data not used in determining monthly averages; storm flow
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 2012-13

	Month	Stream Flow [1] (acre-feet)	Monthly Average TDS [2] (mg/L)	Monthly Flow x TDS
2012	October	3,251	640	2,080,640
	November	3,338	644	2,149,672
	December	3,399	614	2,086,986
2013	January	3,013	653	1,967,489
	February	2,930	642	1,881,060
	March	3,501	651	2,279,151
	April	3,295	650	2,141,750
	May	2,769	665	1,841,385
	June	2,766	664	1,836,624
	July	2,212	717	1,586,004
	August	1,699	684	1,162,116
	September	2,041	660	1,347,060
	Total Stream Flow	34,214		22,359,937

$$\text{Flow-weighted TDS} = \frac{22{,}359{,}937}{34{,}214} = 654 \text{ mg/L}$$

APPENDIX K

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

WATER YEAR 2012-13

There was no discharge of WMWD Transfer Program water to the Santa Ana River above Riverside Narrows during the 2012-13 water year.