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, 2018

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

Re: Watermaster Report for Water Year October 1, 2016 - September 30, 2017

Ladies and Gentlemen:

We have the honor of submitting herewith the Forty-Seventh 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 2016-17 are as follows:

At Prado

1	Measured Outflow at Prado	191,539	acre-feet
2	Base Flow at Prado	70,010	acre-feet
3	Annual Weighted TDS in Base and Storm Flows	408	mg/L
4	Annual Adjusted Base Flow	87,046	acre-feet
5	Cumulative Adjusted Base Flow	5,522,795	acre-feet
6	Other Credits (Debits)	0	acre-feet
7	Cumulative Entitlement of OCWD	1,974,000	acre-feet
8	Cumulative Credit	3,588,803	acre-feet
9	One-Third of Cumulative Debit	0	acre-feet
10	Minimum Required Base Flow in 2016-17	34,000	acre-feet

At Riverside Narrows

1	Base Flow at Riverside Narrows	36,090 acre-feet
2	Annual Weighted TDS in Base Flow	650 mg/L
3	Annual Adjusted Base Flow	36,090 acre-feet
4	Cumulative Adjusted Base Flow	2,053,513 acre-feet
5	Cumulative Entitlement of IEUA and WMWD	716,750 acre-feet
6	Cumulative Credit	1,386,763 acre-feet
7	One-Third of Cumulative Debit	0 acre-feet
8	Minimum Required Base Flow in 2016-17	12,420 acre-feet

Based on these findings, the Watermaster concludes that there was full compliance with the provisions of the Stipulated Judgment in 2016-17.

At the end of the 2016-17 Water Year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit of 3,588,803 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 1,386,763 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: Douglas D. Headrick
Douglas D. Headrick

Craig Miller
Craig Miller

Roy L. Herndon
Roy L. Herndon

Halla Razak
Halla Razak

Michael R. Markus
Michael R. Markus

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO, et al.

CASE NO. 117628 - COUNTY OF ORANGE

FORTY- SEVENTH

ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2016 - SEPTEMBER 30, 2017

APRIL 30, 2018

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CHAPTER I

WATERMASTER ACTIVITIES AND WATER CONDITIONS

Introduction

This Forty-Seventh Annual Report of the Santa Ana River Watermaster covers Water Year 2016-17. 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).

The Watermaster Committee signing the Water Year 2016-17 Annual Report consisted of Roy L. Herndon, Michael R. Markus, Douglas D. Headrick, Halla Razak, and Craig D. Miller. Prior to the preparation of the Forty-Seventh Annual Report of the Santa Ana River Watermaster, Halla Razak was nominated by Inland Empire Utilities Agency and appointed by the court to replace P. Joseph Grindstaff and Craig D. Miller was nominated by Western Municipal Water District to replace John V. Rossi. Mr. Herndon was elected Chairman and Mr. Headrick was re-elected Secretary/Treasurer at the January 12, 2018 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 2016-17 the United States Geological Survey (USGS) provided discharge and water quality data for the River at two gaging stations, "Santa Ana River Below Prado Dam" (Prado) and "Santa Ana River at Metropolitan Water District (MWD) Crossing" (Riverside Narrows). The discharge data at both stations consist of computed daily mean discharges, expressed in cubic feet per second (cfs), and are based on continuous recordings. At times the USGS must estimate daily mean discharges due to damaged or malfunctioning recording equipment.

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, Temescal Creek above Main Street in Corona, Cucamonga Creek near Mira Loma, Chino Creek at Schaefer Avenue, Lytle Creek at Colton, Warm Creek near San Bernardino, and San Timoteo Creek near Loma Linda (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. 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 (also included in Appendix A) to assist in the determination of the amount of water discharged from the San Jacinto Watershed that arrived at Prado.

The Water Year 2016-17 daily mean discharge records at Prado are rated "good" by the USGS. 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, 4,930 cfs on January 23, 2017 and 54.5 cfs on June 29, 2017. The Water Year 2016-17 daily mean discharge record at Riverside Narrows was rated "poor" by the USGS. The maximum and minimum daily mean discharge values during the year were 3,820 cfs on January 23, 2017 and 23 cfs on June 28, 2017, respectively.

The water quality data at Prado consist of daily maximum and minimum and median values for electrical conductivity (EC), measured as specific conductance and expressed in microsiemens per centimeter (μs/cm) based on a continuous recording, and 41 measured values (three to four per month) for EC and/or total dissolved solids (TDS) expressed in milligrams per liter (mg/L). The water quality data at Riverside Narrows consist of 24 values measured by the USGS (generally twice per month) for both EC and TDS. The maximum and minimum, daily, flow-weighted median EC values reported by the USGS for the River at Prado were 1,350 μs/cm on April 20, 2017 and 350 μs/cm on January 26,

2017, respectively. The corresponding calculated TDS concentrations were 817 and 207 mg/L.

At Riverside Narrows, the maximum and minimum EC values reported by the USGS were 1,130 μs/cm on September 21, 2017 and 220 μs/cm on December 22, 2017, respectively. The corresponding measured TDS concentrations were 641 and 133 mg/L. There were interruptions in the records at times due to malfunction of recording or sensing equipment. EC records were affected by releases from Prado Dam. Interruptions in records are at times due to malfunction of recording or sensing equipment. A portion of the chemical data were collected for the National Water-Quality Assessment (NAWQA) Program. Rating for specific conductance records for the Water Year 2016-17 was not specified by the USGS.

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 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, 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 2016-17, the total precipitation recorded at the Gilbert Street gage was 21.57 inches, or 120% 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 1935-36 through 2016-17.

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 2016-17 there were no sources of Nontributary Flow in the River at Riverside Narrows or Prado Dam.

The determinations of the Watermaster for Water Year 2016-17 are explained in detail for Prado in Chapter II and for Riverside Narrows in Chapter III. A summary of the annual determinations by the Watermaster is presented in Table 1 for both locations for the period of 1970-71 through 2016-17. Note that the Base Flow obligations set forth in the Judgment at both Prado and Riverside Narrows have been met for the water year and cumulative credits have accrued to the upper respective Districts.

TABLE 1

SUMMARY OF FINDINGS AT PRADO

Water Year	Rainfall (in)[1]	USGS Measured Flow (ac-ft)	Total Flow (ac-ft)[2]	Base Flow (ac-ft)[3]	Weighted TDS (mg/L)[4]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)[5]
1971-72	9.62	51,743	51,743	40,416	707	40,416	-5,182
1972-73	18.46	76,848	77,484	48,999	638	51,531	4,349
1973-74	12.72	128,436	62,511	43,106	633	45,513	7,862
1974-75	13.49	93,397	61,855	50,176	694	51,263	17,125
1975-76	15.86	120,590	59,209	45,627	635	48,098	23,223
1976-77	11.95	72,278	62,953	48,387	660	50,000	31,223
1977-78	30.47	255,043	252,850	58,501	383	73,955	63,178
1978-79	17.51	145,198	134,506	71,863	580	79,049	100,227
1979-80	30.93	536,174	527,760	82,509	351	106,505	164,732
1980-81	10.45	118,300	117,888	74,875	728	74,875	205,652
1981-82	18.34	143,702	143,367	81,548	584	89,431	253,083
1982-83	32.36	426,273	426,750	111,692	411	138,591	353,036
1983-84	10.81	178,730	177,606	109,231	627	115,876	431,514
1984-85	12.86	163,247	162,912	125,023	617	133,670	523,184
1985-86	17.86	196,900	197,373	127,215	567	141,315	622,499
1986-87	8.08	140,872	143,191	119,848	622	127,638	708,137
1987-88	13.78	176,292	166,818	124,104	582	136,308	802,445
1988-89	12.64	159,659	152,743	119,572	583	131,230	891,675
1989-90	8.53	144,817	143,463	119,149	611	127,986	977,661
1990-91	15.48	195,186	186,426	111,151	514	128,379	1,064,040
1991-92	16.54	198,280	189,677	106,948	499	124,862	1,146,902
1992-93	30.92	571,138	566,630	128,067	368	163,499	1,268,401
1993-94	11.62	159,560	152,808	111,186	611	119,432	1,345,833
1994-95	25.14	429,270	422,816	123,468	415	152,792	1,458,387
1995-96	11.92	217,160	190,553	131,861	514	152,299	1,568,686
1996-97	18.64	249,685	198,459	136,676	514	157,861	1,684,547
1997-98[6]	33.41	462,646	456,316	155,711	392	195,677	1,838,224
1998-99	8.02	184,998	182,310	158,637	581	174,369	1,970,593
1999-00	11.09	207,850	188,538	148,269	527	169,644	2,098,237
2000-01	16.13	222,559	208,535	153,914	525	176,360	2,232,597
2001-02	5.08	174,968	156,596	145,981	587	159,728	2,350,325
2002-03	16.22	256,157	245,947	146,113	463	174,970	2,484,182
2003-04[7]	10.80	214,102	201,967	143,510	502	167,190	2,609,619
2004-05	29.89	638,513	637,568	154,307	348	199,570	2,769,555
2005-06	13.23	247,593	246,101	147,736	517	170,266	2,901,383
2006-07	4.61	156,147	153,823	129,830	604	140,216	3,005,130
2007-08	13.70	199,690	194,309	116,483	495	136,382	3,103,677
2008-09	10.14	162,698	161,026	102,711	527	117,519	3,181,385
2009-10	17.79	243,776	243,690	103,099	443	125,179	3,266,053
2010-11[7]	23.50	324,892	313,018	102,031	522	117,166	3,342,412
2011-12	9.01	121,123	121,123	93,068	597	101,056	3,401,833
2012-13	9.53	100,003	99,735	81,452	621	86,814	3,446,890
2013-14	12.42	86,486	86,486	63,536	582	69,784	3,474,674
2014-15	11.09	107,600	107,600	64,048	522	73,548	3,506,222
2015-16	8.84	115,023	102,610	71,225	560	79,535	3,543,757
2016-17	21.57	191,539	191,539	70,010	408	87,046	3,588,803

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]
1971-72	9.62	41,257	22,253	16,157	712	16,017	2,529
1972-73	18.46	33,048	32,571	17,105	700	17,105	4,384
1973-74	12.72	25,494	24,494	16,203	700	16,203	5,337
1974-75	13.49	20,970	19,644	15,445	731	15,100	5,187
1975-76	15.86	27,627	26,540	17,263	723	16,977	6,914
1976-77	11.95	24,871	23,978	18,581	722	18,286	9,950
1977-78	30.47	182,500	181,760	22,360	726	21,941	16,641
1978-79	17.51	47,916	47,298	26,590	707	26,456	27,847
1979-80	30.93	254,333	253,817	25,549	676	25,549	38,146
1980-81	10.45	34,698	34,278	19,764	715	19,550	42,446
1981-82	18.34	83,050	82,708	32,778	678	32,778	59,974
1982-83	32.36	279,987	279,645	57,128	610	57,128	101,852
1983-84	10.81	83,087	82,745	56,948	647	56,948	143,550
1984-85	12.86	79,113	78,771	69,772	633	69,772	198,072
1985-86	17.86	99,600	99,258	68,220	624	68,220	251,042
1986-87	8.08	78,093	77,752	59,808	649	59,808	295,600
1987-88	13.78	80,047	79,706	55,324	620	55,324	335,674
1988-89	12.64	62,717	62,376	52,259	607	52,259	372,683
1989-90	8.53	58,500	58,159	53,199	590	53,583	411,016
1990-91	15.48	74,525	73,790	45,041	616	45,041	440,807
1991-92	16.54	71,768	71,427	40,306	620	40,306	465,863
1992-93	30.92	267,384	267,043	41,434	634	41,434	492,047
1993-94	11.62	45,477	45,006	31,278	677	31,278	508,075
1994-95	25.14	245,617	243,411	45,562	646	45,562	538,387
1995-96	11.92	83,256	81,786	54,548	625	54,548	577,685
1996-97	18.64	107,280	104,518	62,618	624	62,618	625,053
1997-98	33.41	214,375	213,033	65,013	601	65,013	674,816
1998-99	8.02	76,294	76,294	73,094	603	73,094	732,660
1999-00	11.09	75,572	75,572	63,499	602	63,499	780,909
2000-01	16.13	78,091	75,331	61,872	603	61,872	827,531
2001-02	5.08	68,844	59,434	58,705	606	58,705	870,986
2002-03	16.22	92,166	88,502	57,747	617	57,747	913,483
2003-04	10.80	77,336	75,799	54,788	634	54,788	953,021
2004-05	29.89	355,503	355,503	65,760	616	65,760	1,003,531
2005-06	13.23	111,840	111,113	67,161	608	67,161	1,055,442
2006-07	4.61	57,868	56,022	56,123	635	56,123	1,096,315
2007-08[8]	13.70	78,619	74,554	46,776	674	46,776	1,127,841
2008-09	10.14	69,027	67,567	43,902	663	43,902	1,156,493
2009-10	17.79	112,631	112,631	45,887	643	45,887	1,187,130
2010-11	23.50	174,075	174,075	49,753	654	49,753	1,221,633
2011-12	9.01	45,049	45,049	42,641	664	42,641	1,249,024
2012-13	9.53	41,337	41,337	36,407	662	36,407	1,270,181
2013-14	12.42	42,766	42,766	32,313	646	32,313	1,287,244
2014-15	11.09	41,958	41,958	28,302	630	28,302	1,300,296
2015-16	8.84	41,007	41,007	30,877	635	30,877	1,315,923
2016-17	21.57	83,601	83,601	36,090	650	36,090	1,336,763

TABLE 1 (Continued)

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

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

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

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

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

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

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

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

Notable Watershed Programs and Activities

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

Upper Area Treated Wastewater Discharges

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

Salt Exports from the Upper Area

High salinity water, mostly from groundwater desalters, is exported from the Upper Area to the ocean through Santa Ana Watershed Project Authority's Santa Ana Regional Interceptor (SARI) in Orange County and Inland Empire Brine Line (IEBL) in San Bernardino and Riverside Counties and IEUA's Non-Reclaimable Wastewater System (NRWS). This salt export helps to protect River water quality and, therefore, helps the Upper Area parties comply with the Judgment. The available historical data on salt export are summarized in Table 3. The SARI/IEBL first went into service in Water Year 1985-86. The NRWS went into service prior to 1970, but records of NRWS flow data are only available beginning with Water Year 1981-82. The locations of the SARI/IEBL and NRWS pipelines are shown on Plate 2.

Arundo donax Eradication

Arundo donax is a non-native species of reed that has invaded many waterways in California. It displaces native vegetation, resulting in undesirable habitat for animals. *Arundo* also consumes water at the rate of about 5.6 acre-feet per acre per year compared to only about 1.9 for native plants, a net water loss of about 3.7 acre-feet per year per acre of *Arundo*. By the early 1990s there were about 10,000 acres of *Arundo* in the Santa Ana River Watershed. In 1997 a consortium of local, state and federal agencies launched a long-term eradication program in the watershed for reasons of both habitat restoration and water savings. *Arundo* spreads quickly downstream as roots and rhizomes break off during high stream flows. 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 6,000 acres of *Arundo* in the watershed.

TABLE 2
TREATED WASTEWATER EFFLUENT DISCHARGED ABOVE PRADO
(acre-feet)

	Wastewater discharges upstream from Colton that generally do not flow continuously to Santa Ana River above E Street				Wastewater discharges to Santa Ana River and its tributaries that have hydraulic continuity to the Santa Ana River above Riverside Narrows					Wastewater discharges to the Santa Ana River between Riverside Narrows and Prado Dam								Wastewater discharges to Temescal Creek or its tributaries which have hydraulic continuity to the Santa Ana River					Total Discharge to surface flow of the Ana River	Total Waste Water Discharged in the Watershed
Water Year	Redlands	Beaumont	Yucaipa	Subtotal (A)	San Bernardino[7]	Colton	Rialto	RIX[1]	Subtotal (B)	Riverside	Corona[2]	IEUA RP 1[3]	IEUA RP 2	IEUA RP 5	IEUA CCWRF[4]	WRCRW[5]	Subtotal (C)	EMWD Discharge (1)	Est. EMWD Arriving at Prado (2)	Temescal Valley[6] WRP (3)	Elsinore Valley MWD (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	1690	-	-	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	109,300	-	-	-	3,049	3,049	166,460	178,334
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	-	-	352	4,477	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	444	5,012	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	549	5,037	6,726	166,386	181,907
2004-05	7,632	2,051	3,899	13,583	4,406	183	7,815	42,025	54,428	38,123	12,558	40,644	-	8,777	8,637	3,521	112,260	15,195	13,746	653	7,025	21,424	188,112	203,144
2005-06	5,789	2,246	3,945	11,981	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	701	6,259	19,591	180,618	194,637
2006-07	4,991	2,555	4,056	11,601	10	-	7,654	44,011	51,676	36,355	11,727	31,829	-	12,534	6,851	4,376	103,672	13,105	11,092	691	4,792	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	811	1,553	11,294	158,839	171,293
2008-09	2,386	2,894	3,993	9,273	263	0	6,724	40,311	47,299	33,636	9,062	23,854	-	9,711	8,920	6,374	91,557	6,669	4,653	948	518	6,119	144,975	156,264
2009-10	2,876	2,956	4,105	9,937	298	-	6,658	40,672	47,628	33,731	8,808	21,983	-	8,046	7,258	6,153	85,978	4,961	4,814	934	876	6,624	140,231	150,315
2010-11	3,271	3,050	4,196	10,516	1,292	-	6,710	39,333	47,335	33,487	9,275	18,177	-	7,279	5,987	6,486	80,690	5,680	5,418	622	4,464	10,504	138,529	149,308
2011-12	3,503	3,054	4,112	10,669	76	-	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	2,027	120,936	132,096
2012-13	3,652	3,139	4,191	10,982	13	-	6,611	35,390	42,014	31,996	9,406	10,647	-	5,388	5,015	6,994	69,446	2,727	502	502	650	1,654	113,113	126,321
2013-14	3,549	3,345	4,133	11,028	175	-	6,527	33,271	39,973	30,302	8,662	9,898	-	3,188	3,606	6,402	62,058	-	-	533	623	1,156	103,187	114,215
2014-15	3,149	3,428	2,920	9,497	-	-	6,285	31,668	37,954	29,673	9,611	11,589	-	3,957	4,124	6,690	65,644	-	-	605	626	1,231	104,828	114,325
2015-16	3,274	3,372	3,765	10,411	15	-	6,420	32,343	38,778	29,074	10,425	12,531	-	2,910	3,368	7,097	65,405	-	-	174	644	818	105,001	115,411
2016-17	3,084	3,645	3,976	10,705	327	-	6,755	35,306	42,387	30,030	8,445	12,390	-	3,324	3,813	6,882	64,884	-	-	894	589	1,482	108,754	119,458

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. In 2016-17 RP1 effluent includes flows into Prado Regional Park Lake.
4. CCWRF = Carbon Canyon Water Reclamation Facility
5. WRCRW = Western Riverside County Regional Wastewater Treatment Plant
6. Lee Lake WTP name changed to Temescal Valley WRP in WY 2014-15
7. Discharge numbers were updated during the 2016-17 reporting cycle.

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

TABLE 3

HIGH SALINITY WATER EXPORTED
FROM THE SANTA ANA RIVER WATERSHED

Water Year	Inland Empire Utility Agency Non-Reclaimable Wastewater	Santa Ana Watershed Project Authority Santa Ana Regional Interceptor (SARI)[1]		
	North System (acre-feet)	SARI Flow[2] (acre-feet)	Average TDS (mg/L)	Total Flow (acre-feet)
1970-71	NA	---	---	---
1971-72	NA	---	---	---
1972-73	NA	---	---	---
1973-74	NA	---	---	---
1974-75	NA	---	---	---
1975-76	NA	---	---	---
1976-77	NA	---	---	---
1977-78	NA	---	---	---
1978-79	NA	---	---	---
1979-80	NA	---	---	---
1980-81	NA	---	---	---
1981-82	4,236	---	---	4,236
1982-83	4,651	---	---	4,651
1983-84	4,142	---	---	4,142
1984-85	2,346	---	---	2,346
1985-86	2,995	2,791 [3]	NA	5,786 [3]
1986-87	4,943	2,869 [3]	NA	7,813 [3]
1987-88	5,177	2,948 [3]	NA	8,125 [3]
1988-89	5,949	3,622 [3]	NA	9,572 [3]
1989-90	5,240	7,393	1,649	12,633
1990-91	2,847	7,340	1,906	10,187
1991-92	3,421	6,457	2,346	9,878
1992-93	3,774	5,277	2,516	9,051
1993-94	3,764	7,860	2,302	11,624
1994-95	4,131	8,656	1,903	12,787
1995-96	3,863	9,597	2,175	13,460
1996-97	4,191	10,225	2,292	14,417
1997-98	4,575	8,210	2,456	12,785
1998-99	3,666	4,305	2,611	7,971
1999-00	4,272	7,711	2,154	11,983
2000-01	5,075	8,205	2,504	13,280
2001-02	4,297	8,385	3,289	12,682
2002-03	3,926	9,331	3,482	13,257
2003-04	3,950	10,505	3,798	14,455
2004-05	4,220	10,971	3,460	15,191
2005-06	5,085	12,847	4,118	17,932
2006-07	4,609	13,168	4,120	17,777
2007-08	4,658	12,123	4,986	16,781
2008-09	4,284	12,993	5,037	17,277
2009-10	3,865	13,325	5,003	17,190
2010-11	3,443	13,282	5,066	16,725
2011-12	3,668	13,471	5,884	17,139
2012-13	3,862	12,061	5,626	15,923
2013-14	4,190	12,185	5,350	16,375
2014-15	4,063	12,056	5,460	16,119
2015-16	4,110	11,396	5,364	15,506
2016-17	4,324	11,957	5,361	16,281

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

NA = Data Not Available

Chino Groundwater Basin Hydraulic Control

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

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

The Chino Basin Watermaster files an annual report with RWQCB on the program, water chemistry, hydrologic balance, piezometric groundwater surface elevations, and groundwater modeling. In February 2016, Chino Basin Watermaster announced that hydraulic control had been achieved.

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 2016-17 fiscal year as well as the budget adopted for the 2017-18 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, 2016 to June 30, 2017 Budget	July 1, 2016 to June 30, 2017 Expenses	July 1, 2018 to June 30, 2019 Budget
Support Services	$7,500.00	$15,477.05*	$7,500.00
Reproduction of Annual Report	1,000.00	$677.05*	1,000.00
TOTAL	$8,500.00	$16,154.10*	$8,500.00

* The expenses included $7,577.05 for Fiscal Year 2015 -16, which were paid during Fiscal Year 2016-17.

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 2016-17, 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, 2016 to September 30, 2017

	Total Cost	USGS Share	Parties' Share
USGS PRECIPITATION GAGING STATIONS			
Gilbert Street Gage at San Bernardino	$8,600	$0	$8,600
Middle Fork Lytle Creek Precipitation Gage	$5,150	$5,150	$0
USGS FLOW AND WATER QUALITY GAGING STATIONS			
Santa Ana River at MWD Crossing (Riverside Narrows)			
Surface Water Gage)	$31,050	$10,400	$20,650
Water Quality Monitoring/TDS Sampling	$12,900	$4,300	$8,600
Temescal Creek at Corona Lake	$16,500	$0	$16,500
Temescal Creek above Main St., near Corona	$22,100	$7,400	$14,700
Chino Creek at Schaefer	$22,100	$7,400	$14,700
Cucamonga Creek at Mira Loma	$22,100	$7,400	$14,700
Santa Ana River below Prado Dam			
Surface Water Gage	$24,550	$24,550	$0
Extra Measurements	$15,372	$0	$15,372
Water Quality	$17,750	$5,950	$11,800
TDS Sampling	$11,850	$4,000	$7,850
Water Quality Conductance Program	$2,750	$0	$2,750
Equipment Upgrades	$6,900	$0	$6,900
TOTAL COST AND SHARES	$219,672	$76,550	$143,122
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$28,624
Orange County Water District	40%		$57,249
San Bernardino Valley Municipal Water District	20%		$28,624
Western Municipal Water District	20%		$28,624

CHAPTER II

BASE FLOW AT PRADO

This chapter deals with determinations of 1) the components of flow at Prado, which include Nontributary Flow, 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 2016-17, the flow of the River as measured at the USGS gaging station below Prado Dam amounted to 191,539 acre-feet. There was no water in storage at the beginning of the Water Year, and no water remained in storage at the end of the Water Year. Inflow to the reservoir included 70,010 acre-feet of Base Flow and 121,530 acre-feet of Storm Flow. There were no nontributary flows to Prado. There was no San Jacinto Watershed water that reached Prado. The monthly components of flow of the River at Prado Dam for Water Year 2016-17 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the River below Prado during Water Years 1935-36 through 2016-17 are presented on Plate 5.

Nontributary Flow

Nontributary Flow includes water that originated outside the watershed and other water that the Watermaster has determined should be excluded from Base Flow. During Water Year 2016-17 Nontributary Flow included State Water Project water imported by OCWD and released to San Antonio Creek via OC-59. There were no Nontributary Flows from the San Jacinto Watershed that were determined to have reached Prado. In the past, Nontributary Flows have included, and may include in the future, other water discharged to the River pursuant to water exchange or other such programs.

Releases to San Antonio Creek

Since May 1973, OCWD has from time to time purchased State Water Project water for the replenishment of the groundwater basin in Orange County. The water has been released at two locations: Santa Ana River above Riverside Narrows (1972-72 only) and San Antonio Creek near the City of Upland. During Water Year 2016-17, there was no water discharged to San Antonio Creek for OCWD via OC-59.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
WATER YEAR 2016-17
(acre-feet)

	USGS Measured Outflow	Storage Change (1)	Computed Inflow	San Jacinto Watershed Flow at Prado (2)	San Antonio Creek (3)	Storm Flow	Base Flow
2016							
October	6,147	268	6,415	0	0	2,177	4,238
November	7,975	(258)	7,717	0	0	2,855	4,862
December	15,620	10,241	25,861	0	0	19,009	6,852
2017							
January	75,126	8,036	83,162	0	0	74,617	8,545
February	26,890	(939)	25,951	0	0	18,047	7,904
March	21,384	(11,446)	9,938	0	0	1,530	8,408
April	14,792	(5,901)	8,891	0	0	2,201	6,690
May	5,868	1	5,869	0	0	699	5,170
June	4,392	(2)	4,390	0	0	0	4,390
July	4,105	0	4,105	0	0	0	4,105
August	4,335	0	4,335	0	0	71	4,264
September	4,905	1	4,906	0	0	324	4,582
Total	191,539	1	191,540	0	0	121,530	70,010

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

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, Eastern Municipal Water District (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 2016-17, there was no water discharged to Temescal Wash by EMWD.

Storm Flow

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

During Water Year 2016-17, the maximum volume of water stored in Prado Reservoir reached 36,457 acre-feet on January 23, 2017. The maximum daily mean flow released from Prado Dam to the River during the Water Year was 4,930 cfs on January 23, 2017.

Base Flow

The Base Flow is that portion of the total flow remaining after subtracting Storm Flow, Nontributary Flow and certain other flows determined by the Watermaster. Flows affecting the determination of Base Flow in Water Year 2016-17 did not include discharges from the San Jacinto Watershed. The general procedure used by the Watermaster to separate the Water Year 2016-17 flow components was the same as used for previous years and is fully described in the Fifth (1974-75) and the Twelfth (1981-82) Annual Reports. Table 6 shows the monthly and annual quantities of Base Flow.

Water Quality Adjustments

The flow-weighted average TDS for the total flow passing Prado Dam was found to be 408 mg/L. This determination was based on records from a continuous monitoring device operated by the USGS for EC of the River flow below Prado Dam. This record was supplemented by forty-one (41) grab samples for EC collected by the USGS and analyzed for TDS. Seven other grab samples were analyzed for TDS and not EC.

For Water Year 2016-17 a correlation between TDS and EC yields the following best fit equation:

$$TDS = EC \times 0.6068$$

(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 F. At Prado Dam, the flow-weighted average annual TDS concentration of 408 mg/L represents the quality of the total flow including releases to San Antonio Creek. 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 State Water Project Flow to San Antonio Creek

No State Water Project flows discharged to San Antonio Creek reached Prado Dam.

Adjustment for San Jacinto Watershed Discharge

There was no discharge from the San Jacinto Watershed during Water Year 2016-17 reaching Prado Reservoir. Therefore, no water quality adjustment was necessary.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow X Average TDS
1. Measured Outflow	191,539	408	78,147,912
2. Less Nontributary Flow San Antonio Creek	0	---	---
3. Less San Jacinto Watershed Discharge	0	---	---
4. Measured Outflow less lines 2 and 3	191,539		78,147,912
Average TDS in Total Base and Storm Flow	78,147,912 ÷ 191,539 = 408 mg/L		

As shown above, the flow-weighted average annual TDS of Storm Flow and Base Flow for Water Year 2016-17 is 408 mg/L.

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 408 mg/L is less than 700 mg/L. Therefore, the Base Flow of 70,010 acre-feet must be adjusted by the above equation for TDS less than 700 mg/L. Thus, the Adjusted Base Flow is as follows:

$$(70{,}010 \text{ acre-feet}) + \frac{35}{42{,}000} \times (70{,}010 \text{ acre-feet}) \times (700 - 408) = 87{,}046$$

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 periodic occurrence of San Jacinto Watershed flows at Prado, the Watermaster decided, as in previous years, to credit one-half of any such outflows recharging the groundwater basin in Orange County to IEUA and WMWD.

The findings of the Watermaster concerning flow at Prado for Water Year 2016-17 required under the Judgment are as follows:

1.	Measured Outflow at Prado	191,539 acre-feet
2.	Base Flow at Prado	70,010 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	408 mg/L
4.	Annual Adjusted Base Flow	87,046 acre-feet
5.	Cumulative Adjusted Base Flow	5,522,795 acre-feet
6.	Other Credits (Debits) [1]	0 acre-feet
7.	Cumulative Entitlement of OCWD	1,974,000 acre-feet
8.	Cumulative Credit	3,588,803 acre-feet
9.	One-Third of Cumulative Debit	0 acre-feet
10.	Minimum Required Base Flow in 2016-17	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 cumulative outflow.

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

Water Year	Base Flow	Annual Adjusted Base Flow	Cumulative Adjusted Base Flow	Other Credits (Debits)[1]	Cumulative Entitlement of OCWD	Cumulative Credit[2]
1970-71	38,402	38,402	38,402	0	42,000	-3,598
1971-72	40,416	40,416	78,818	0	84,000	-5,182
1972-73	48,999	51,531	130,349	0	126,000	4,349
1973-74	43,106	45,513	175,862	0	168,000	7,862
1974-75	50,176	51,263	227,125	0	210,000	17,125
1975-76	45,627	48,098	275,223	0	252,000	23,223
1976-77	48,387	50,000	325,223	0	294,000	31,223
1977-78	58,501	73,955	399,178	0	336,000	63,178
1978-79	71,863	79,049	478,227	0	378,000	100,227
1979-80	82,509	106,505	584,732	0	420,000	164,732
1980-81	74,875	74,875	659,607	8,045	462,000	205,652
1981-82	81,548	89,431	749,038	0	504,000	253,083
1982-83	111,692	138,591	887,629	3,362	546,000	353,036
1983-84	109,231	115,876	1,003,505	4,602	588,000	431,514
1984-85	125,023	133,670	1,137,175	0	630,000	523,184
1985-86	127,215	141,315	1,278,490	0	672,000	622,499
1986-87	119,848	127,638	1,406,128	0	714,000	708,137
1987-88	124,104	136,308	1,542,436	0	756,000	802,445
1988-89	119,572	131,230	1,673,666	0	798,000	891,675
1989-90	119,149	127,986	1,801,652	0	840,000	977,661
1990-91	111,515	128,379	1,930,031	0	882,000	1,064,040
1991-92	106,948	124,862	2,054,893	0	924,000	1,146,902
1992-93	128,067	163,499	2,218,392	0	966,000	1,268,401
1993-94	111,186	119,432	2,337,824	0	1,008,000	1,345,833
1994-95	123,468	152,792	2,490,616	1,762	1,050,000	1,458,387
1995-96	131,861	152,299	2,642,915	0	1,092,000	1,568,686
1996-97	136,676	157,861	2,800,776	0	1,134,000	1,684,547
1997-98[3]	155,711	195,677	2,996,453	0	1,176,000	1,838,224
1998-99	158,637	174,369	3,170,822	0	1,218,000	1,970,593
1999-00	148,269	169,644	3,340,466	0	1,260,000	2,098,237
2000-01	153,914	176,360	3,516,826	0	1,302,000	2,232,597
2001-02	145,981	159,728	3,676,554	0	1,344,000	2,350,325
2002-03	146,113	174,970	3,851,524	887	1,386,000	2,484,182
2003-04[4]	143,510	167,190	4,018,714	247	1,428,000	2,609,619
2004-05	154,307	199,570	4,218,284	2,366	1,470,000	2,769,555
2005-06	147,736	170,266	4,388,550	3,562	1,512,000	2,901,383
2006-07	129,830	140,216	4,528,766	5,531	1,554,000	3,005,130
2007-08	116,483	136,382	4,665,148	4,165	1,596,000	3,103,677
2008-09	102,711	117,519	4,782,667	2,189	1,638,000	3,181,385
2009-10	103,099	125,179	4,907,846	1,489	1,680,000	3,266,053
2010-11[4]	102,031	117,166	5,025,012	1,193	1,722,000	3,342,412
2011-12	93,068	101,056	5,126,068	365	1,764,000	3,401,833
2012-13	81,452	86,814	5,212,882	243	1,806,000	3,446,890
2013-14	63,536	69,784	5,282,666	0	1,848,000	3,474,674
2014-15	64,048	73,548	5,356,214	0	1,890,000	3,506,222
2015-16	71,225	79,535	5,435,749	0	1,932,000	3,543,757
2016-17	70,010	87,046	5,522,795	0	1,974,000	3,588,803

TABLE 7 (Continued)

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

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

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

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

CHAPTER III

BASE FLOW AT RIVERSIDE NARROWS

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

Flow at Riverside Narrows

The flow of the River at Riverside Narrows was to 83,601 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 36,090 acre-feet and Storm Flow was 49,705 acre-feet. Included in Base Flow is 2,194 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 2016-17 are listed in Table 8 and shown graphically on Plate 7. The components of flow of the River at Riverside Narrows during the period 1935-36 through 2016-17 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 2016-17, no nontributary flow was delivered to the River upstream of Riverside Narrows and Prado Dam. In the past, nontributary flows have included, and may include in the future, other water discharged to the River pursuant to water exchange or other such programs.

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 2016-17, in the amount of 2,194 acre-feet, has been added to the Base Flow as measured at the gaging station. A summary of Rubidoux discharges is contained in Appendix G.

TABLE 8

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
WATER YEAR 2016-17
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	Rubidoux Waste-water	Base Flow [1]
2016	October	3,084	636	188	2,636
	November	4,068	1,207	183	3,044
	December	14,547	11,238	182	3,491
2017	January	34,796	30,540	187	4,443
	February	9,449	5,613	167	4,003
	March	3,843	246	186	3,783
	April	3,132	0	178	3,310
	May	2,618	51	185	2,752
	June	1,817	0	181	1,998
	July	1,922	0	185	2,107
	August	2,172	57	191	2,306
	September	2,153	117	181	2,218
Total		83,601	49,705	2,194	36,090

(1) Base Flow equals USGS measured flow, minus storm flow, minus transferred water (when applicable), plus Rubidoux Wastewater.

Water Quality Adjustments

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

In October 2013, the City of Riverside changed the TDS and EC location for sampling. The new sampling location was further upstream and was not representative of stream flow at the Riverside Narrows. Beginning October 2016, the City of Riverside changed its sampling location and its TDS and EC data are again representative of stream flow at the Riverside Narrows. The City data are thus used in the water quality adjustments for Water Year 2016-17.

Adjustment for Nontributary Flow

During Water Year 2016-17, there was no nontributary flow. 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 865 mg/L. A monthly summary of discharges and quality is contained in Appendix G.

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 650 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS
1. Base Flow plus Nontributary Flow	33,896	636	21,557,856
2. Less Nontributary Flow	0	---	---
3. Plus Rubidoux Treated Wastewater	2,194	865	1,897,810
4. Base Flow (line 1 less line 2 plus line 3)	36,090		23,455,666
Average TDS of Base Flow		23,445,666 ÷ 36,090= 650 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 2016-17 was 650 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for Water Year 2016-17 is 36,090 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."

Findings of the Watermaster concerning flow at Riverside Narrows for Water Year 2016-17 required under the Judgment are as follows:

1.	Base Flow at Riverside Narrows	36,090 acre-feet
2.	Annual Weighted TDS of Base Flow	650 mg/L
3.	Annual Adjusted Base Flow	36,090 acre-feet
4.	Cumulative Adjusted Base Flow	2,053,513 acre-feet
5.	Cumulative Entitlement of IEUA and WMWD	716,750 acre-feet
6.	Cumulative Credit	1,336,763 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2017-18	12,420 acre-feet

CHAPTER IV

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

History of Litigation

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

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

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

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

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

which was usable by the downstream area. On December 11, 1964, the supplemental information was presented to the defendants' attorneys.

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

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

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

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

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

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

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

Summary of Judgment

Declaration of Rights

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

Physical Solution

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

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

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

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

comprehensive adjudication in Southern California in which the quality of water is taken into consideration in the quantification of water rights.

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

Obligation at Riverside Narrows

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

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

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

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

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

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

Obligation at Prado Dam

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

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

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

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

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

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

Other Provisions

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

History of the Watermaster Committee Membership

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

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

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

TABLE 9
HISTORY OF THE WATERMASTER COMMITTEE MEMBERSHIP

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

TABLE 9 (Continued)
HISTORY OF THE WATERMASTER COMMITTEE MEMBERSHIP

Water Year	SBVMWD	IEUA	WMWD	OCWD	OCWD
2011-12	Samuel H. Fuller, Secretary/Treasurer	Thomas A. Love	John V. Rossi	Michael R. Markus	Roy L. Herndon, Chairman
2012-13 through 2015-16	Douglas D. Headrick, Secretary/Treasurer	P. Joseph Grindstaff	John V. Rossi	Michael R. Markus	Roy L. Herndon, Chairman
2016-17	Douglas D. Headrick, Secretary/Treasurer	Halla Razak	Craig D. Miller	Michael R. Markus	Roy L. Herndon, Chairman

Santa Ana River Watershed

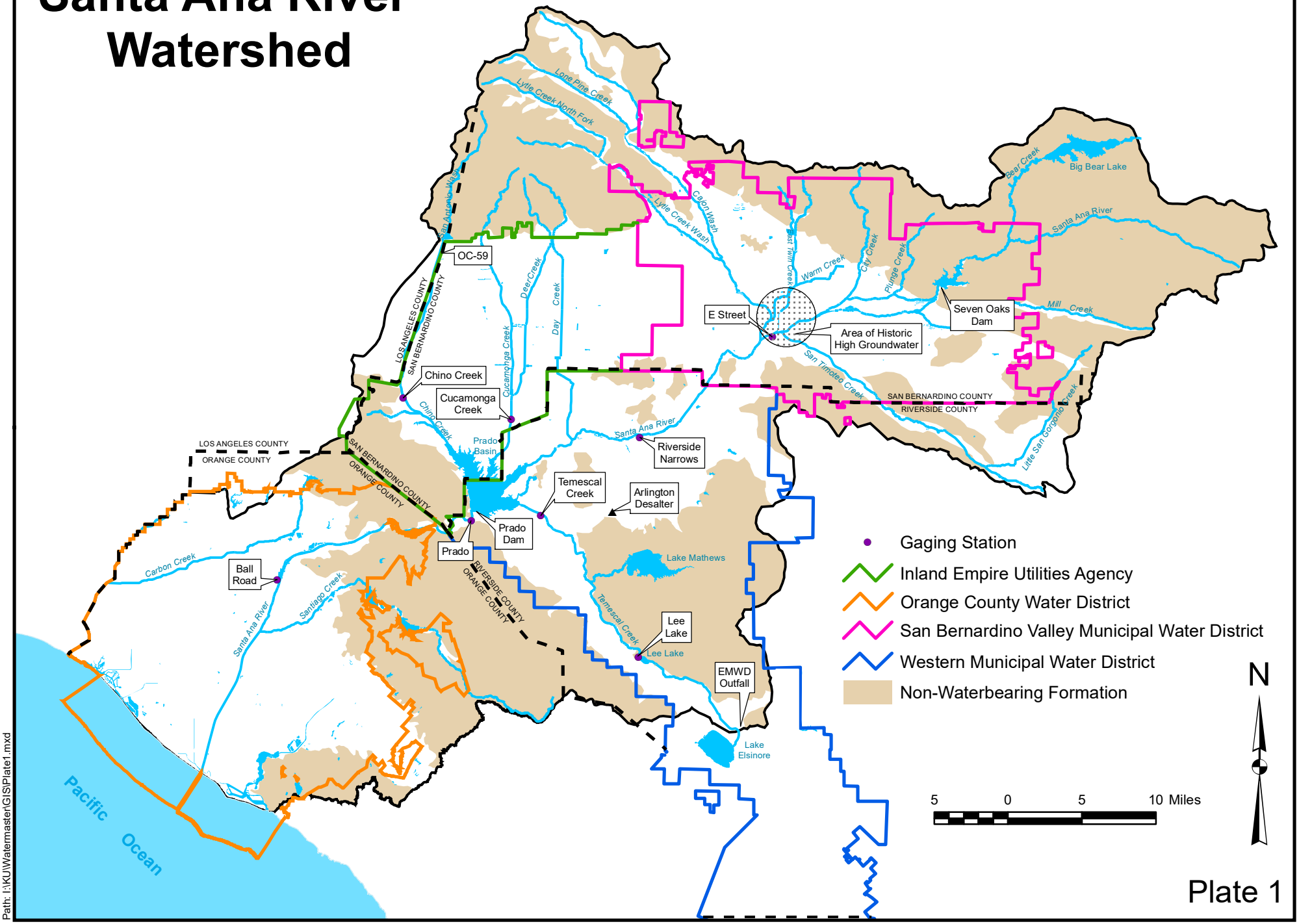

Plate 1

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Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

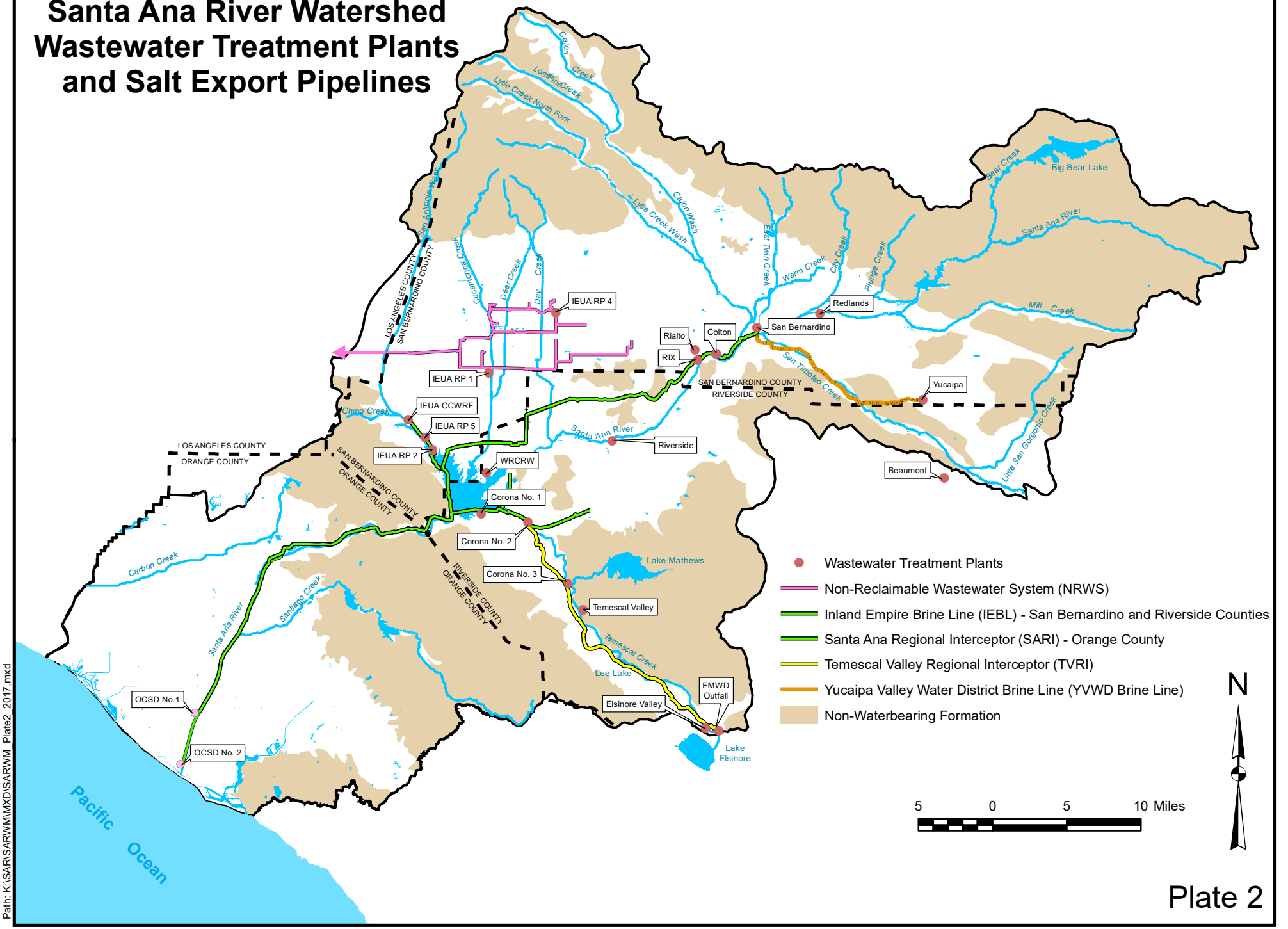

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Plate 2

PRECIPITATION AT SAN BERNARDINO STARTING WITH 1934-35

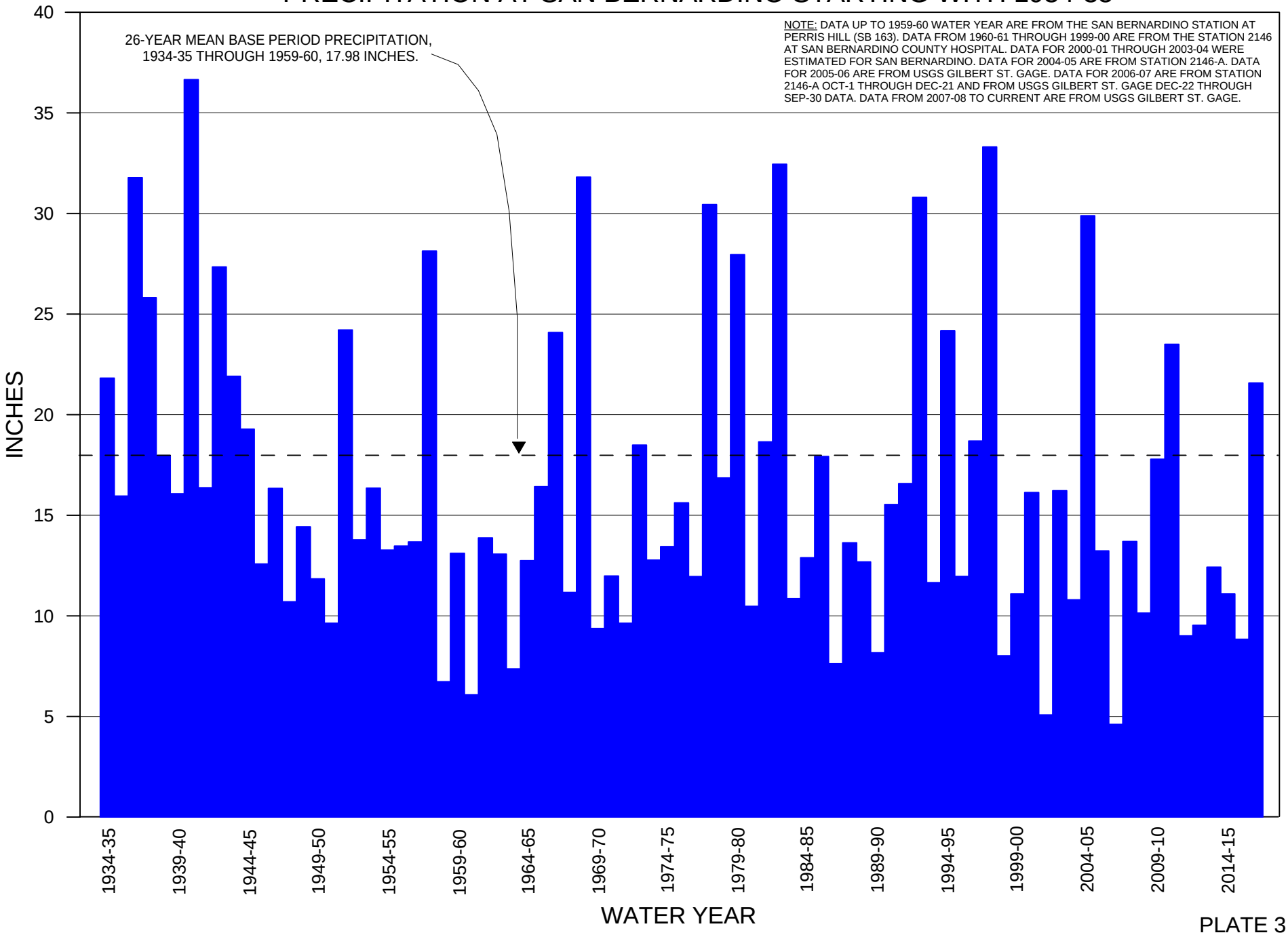


PLATE 3

2016-17 SAN BERNARDINO PRECIPITATION
USGS GILBERT STREET GAGE
TOTAL = 21.57"

INCHES

1.09" 1.18" 5.19" 7.97" 2.93" 0.49" 0.00" 0.38" 0.00" 0.00" 0.44" 0.34"

PERIODS OF WATER STORAGE GREATER THAN 100 ACRE-FEET BEHIND PRADO DAM

CUBIC FEET PER SECOND

STORM FLOW
INFLOW TO PRADO DAM LESS NONTRIBUTARY FLOWS REACHING PRADO
USGS MEASURED OUTFLOW

October November December January February March April May June July August September

DISCHARGE OF THE SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2016-17

Plate 4

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

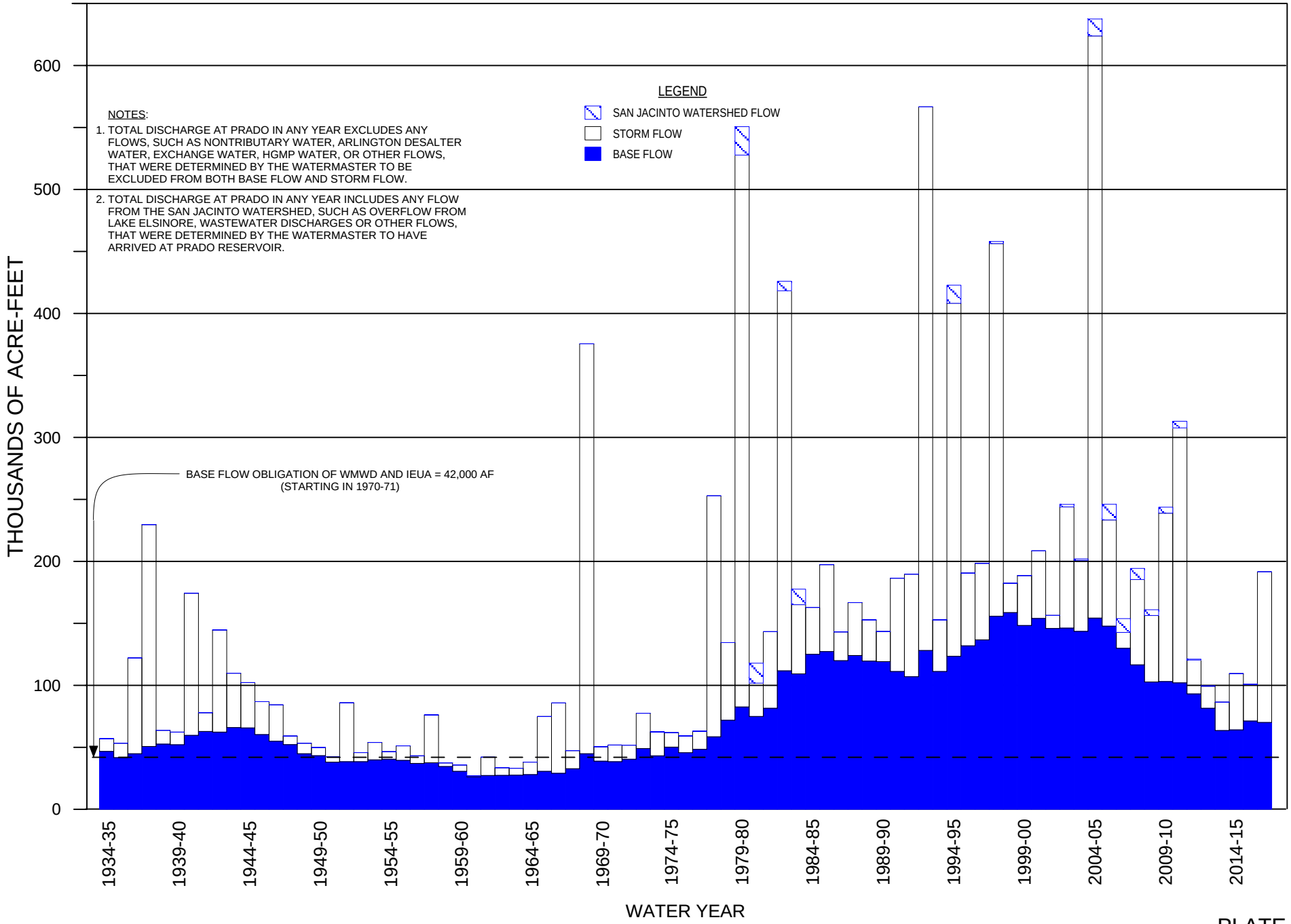
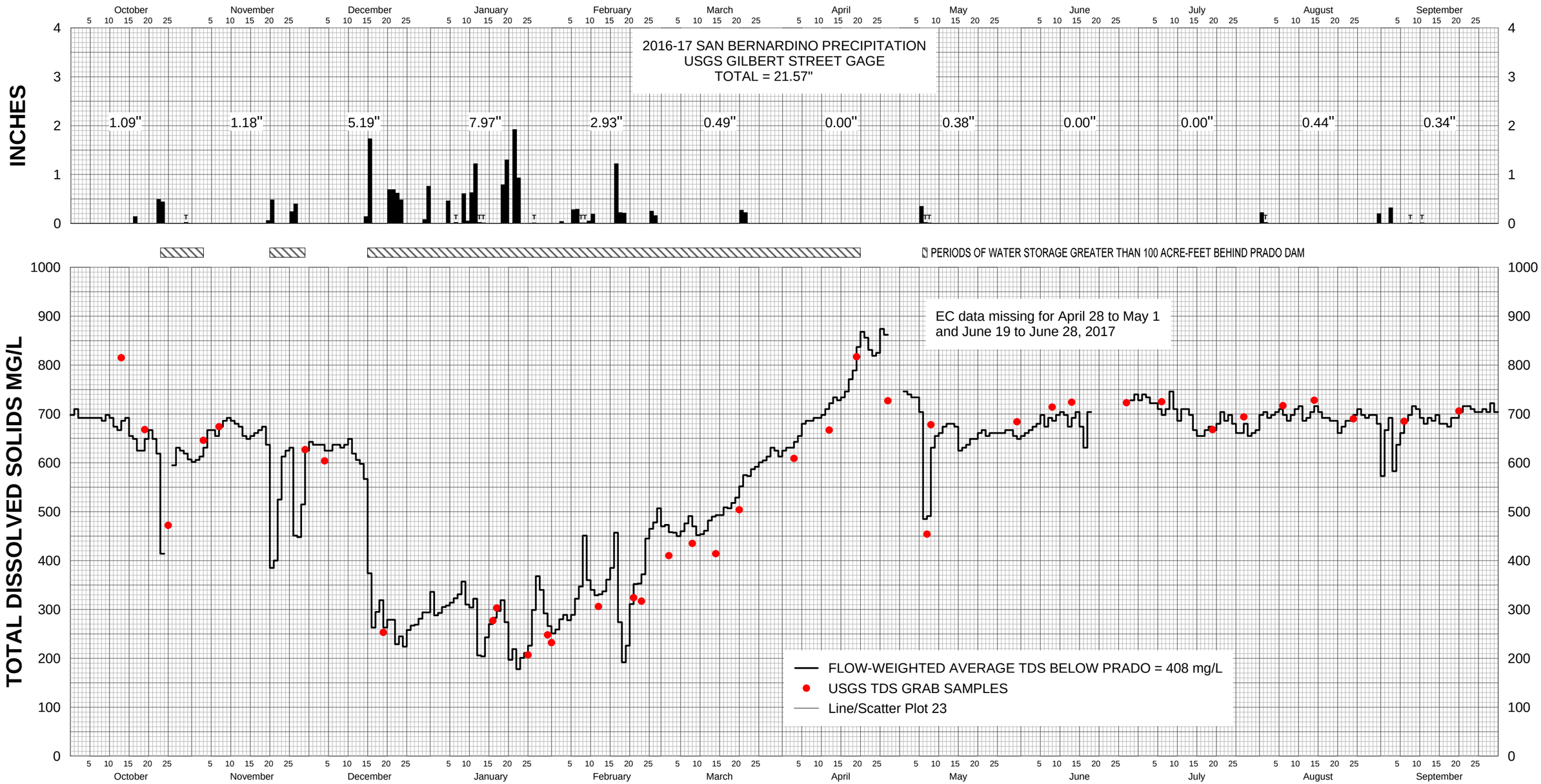


PLATE 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2016-17

Plate 6

2016-17 SAN BERNARDINO PRECIPITATION
USGS GILBERT STEET GAGE
TOTAL = 21.57"

1.09" 1.18" 5.19" 7.97" 2.93" 0.49" 0.00" 0.38" 0.00" 0.00" 0.44" 0.34"

INCHES

CUBIC FEET PER SECOND

STORM FLOW
USGS MEASURED FLOW

OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY March April May June July August September

DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2016-17

Plate 7

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

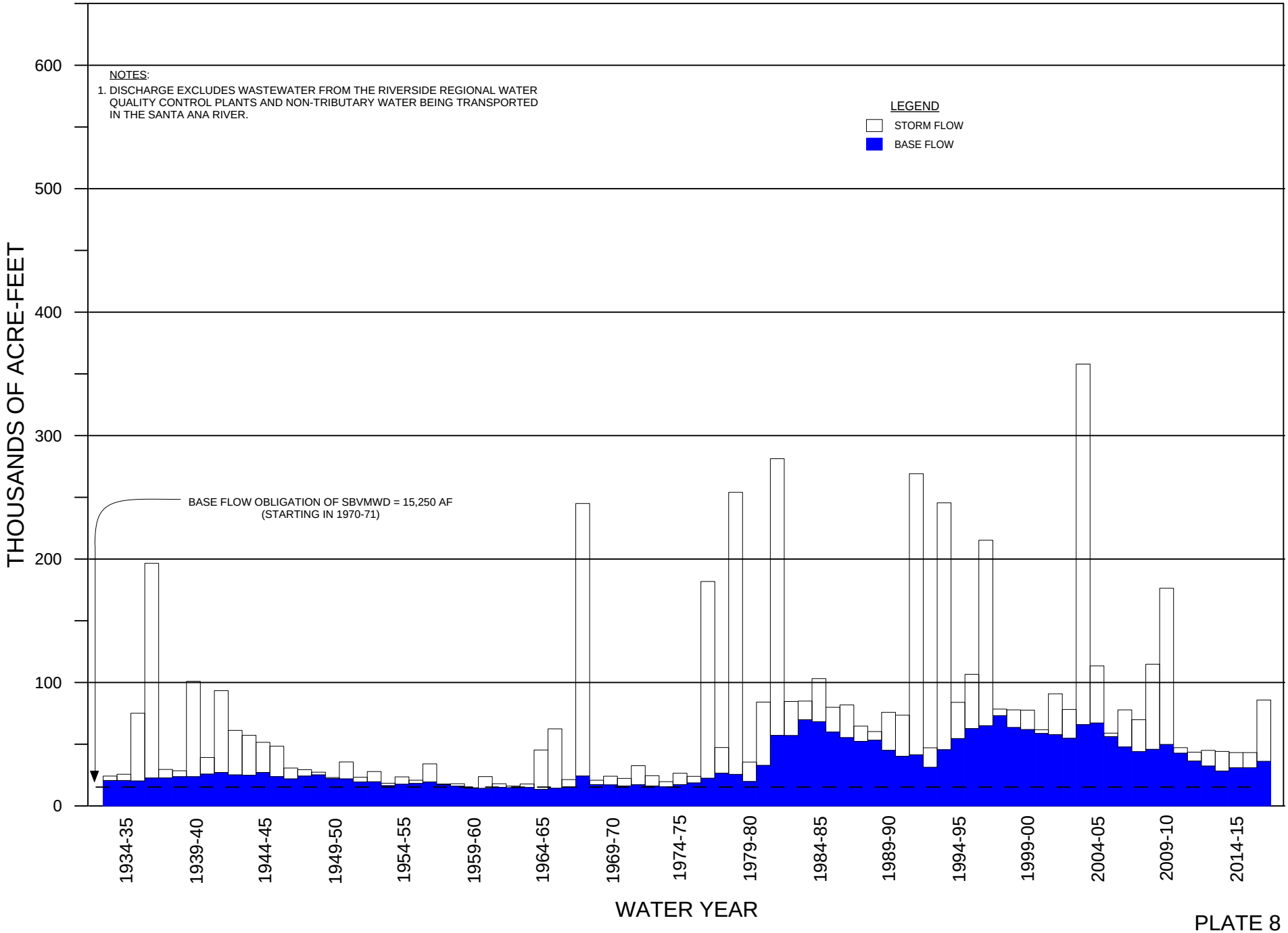


PLATE 8

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- SEVENTH ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2016 - SEPTEMBER 30, 2017

April 30, 2018

APPENDIX A

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

WATER YEAR 2016-17

USGS Water-Year Summary 2017

11074000 Santa Ana River below Prado Dam, CA

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

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

SURFACE-WATER RECORDS

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

REVISED RECORDS - 12/06/2016: Unit and daily value water temperature and specific conductance from April 8, 2016 through Sept. 8, 2016 have been revised superseding those published at http://waterdata.usgs.gov site 11074000.

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 good. 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, 12,780 acre-ft was released. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8183&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11074000&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	59.2	143	148	393	456	314	292	e82.3	92.5	63.4	66.6	121
2	61.0	140	140	392	364	445	284	78.2	85.6	70.2	79.6	77.2
3	69.9	134	137	427	314	388	366	73.4	82.5	65.5	84.5	71.1
4	72.0	123	140	446	311	321	384	68.7	80.8	63.4	65.4	127
5	70.1	102	122	441	311	322	371	63.4	84.8	61.9	63.6	94.2
6	72.2	82.5	154	437	304	324	316	59.8	91.0	65.4	64.1	93.3
7	74.9	97.6	133	429	306	370	297	236	88.0	62.1	66.6	76.0
8	70.9	78.7	125	424	204	413	297	261	85.2	59.7	63.7	60.8
9	70.5	72.9	121	424	138	420	293	114	79.7	63.4	60.8	63.5
10	69.0	71.8	117	430	281	426	288	96.7	77.1	60.7	60.7	72.1
11	68.9	71.6	123	430	324	430	283	93.4	77.2	60.6	62.4	74.3
12	71.7	75.2	131	347	329	434	278	83.2	79.8	59.5	64.9	80.4
13	70.8	79.4	107	293	429	408	272	78.6	76.9	60.4	65.2	75.5
14	72.6	89.5	112	308	557	373	266	78.9	74.9	64.0	68.0	77.2
15	76.7	85.1	107	306	596	364	261	82.6	74.7	66.5	66.8	80.4
16	78.8	78.6	127	303	2,620	393	255	86.3	71.9	68.1	75.7	84.9
17	102	55.6	161	553	1,980	406	386	84.8	70.8	69.0	73.6	88.1
18	122	85.0	161	676	215	406	410	86.8	69.8	70.0	71.6	92.8
19	105	105	361	306	163	404	384	83.4	69.9	76.5	69.1	88.7
20	86.2	102	477	2,590	166	310	337	81.4	67.2	78.9	79.4	84.0
21	77.8	173	338	3,830	287	269	205	81.4	71.1	68.2	88.5	82.3
22	76.0	263	317	4,780	462	269	129	e82.9	68.7	67.3	79.9	85.3
23	86.9	226	372	4,930	477	268	122	e85.0	65.5	63.8	76.1	82.1
24	185	177	331	4,810	417	267	122	e86.9	66.7	69.6	76.2	83.4
25	197	167	476	4,600	418	274	108	e87.9	66.4	78.8	73.2	82.2
26	199	155	472	2,970	417	281	83.4	e90.0	63.8	75.8	71.8	77.5
27	158	191	540	418	419	289	94.4	e91.9	62.0	70.4	74.5	75.1
28	144	271	575	265	292	296	e95.2	e93.2	58.1	68.5	74.6	74.4
29	144	304	466	266		300	e91.4	e94.4	54.5	67.0	68.2	73.5
30	143	221	393	266		300	e87.1	e96.7	57.0	64.8	66.0	74.7
31	144		391	386		297		e95.5		66.0	64.3	
Total	3,099	4,021	7,875	37,880	13,560	10,780	7,457	2,959	2,214	2,069	2,186	2,473
Mean	100.0	134	254	1,222	484	348	249	95.4	73.8	66.8	70.5	82.4
Max	199	304	575	4930	2620	445	410	261	92.5	78.9	88.5	127
Min	59.2	55.6	107	265	138	267	83.4	59.8	54.5	59.5	60.7	60.8
Ac-ft	6,147	7,975	15,620	75,130	26,889	21,380	14,790	5,868	4,392	4,105	4,335	4,905

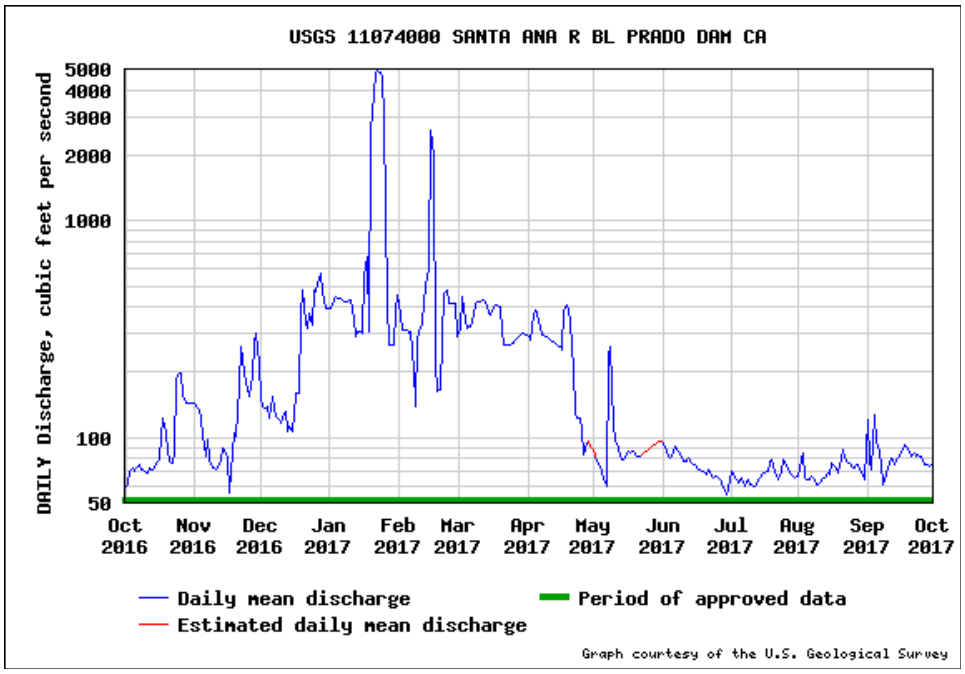
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	129	150	239	396	432	390	258	186	152	125	107	102
Max	910	322	1,300	3,543	2,733	2,556	1,101	915	736	446	403	372
(WY)	(2005)	(1997)	(2011)	(1993)	(1998)	(1980)	(1980)	(1998)	(1983)	(1998)	(2005)	(1997)
Min	22.4	33.5	39.5	49.2	49.8	54.3	43.3	35.2	29.0	17.7	14.8	16.2
(WY)	(1962)	(1963)	(1963)	(1963)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)	(1960)	(1960)

SUMMARY STATISTICS

	Water Year 2017		Water Years 1941 - 2017	
Annual total	96,570			
Annual mean	264.6		221.1	
Highest annual mean			882.0	2005
Lowest annual mean			36.4	1961
Highest daily mean	4,930	Jan 23	11,400	Jan 14, 2005
Lowest daily mean	54.5	Jun 29	2.40	Jul 29, 1978
Annual 7-day minimum	60.7	Jun 25	3.00	Sep 24, 1973
Maximum peak flow			13,200[a]	Jan 15, 2005
Maximum peak stage			8.73	Jan 15, 2005
Annual runoff (cfsm)	0.117		0.098	
Annual runoff (inches)	1.59		1.33	
10 percent exceeds	421.6		382.5	
50 percent exceeds	95.5		137.0	
90 percent exceeds	65.5		43.0	

[a] Discharge affected by Regulation or Diversion



USGS Water-Year Summary 2017

11074000 Santa Ana River below Prado Dam, CA

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

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

WATER-QUALITY RECORDS

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

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

INSTRUMENTATION - Water-quality monitor recording specific conductance and water temperature since October 1969. On October 26th 2016 (QM 3915) Continuous water quality equipment setup (YSI 600R)moved to ~30 ft down stream of the gage house.

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. 1-13, Nov. 17 to Dec. 4, Feb. 3-18 and Sep. 23-28, which are good; Oct. 14-27, Dec. 5-7, Feb. 19-25, which are fair; and Oct. 28 to Nov. 10 which are poor. Temperature records excellent for 2016WY.

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

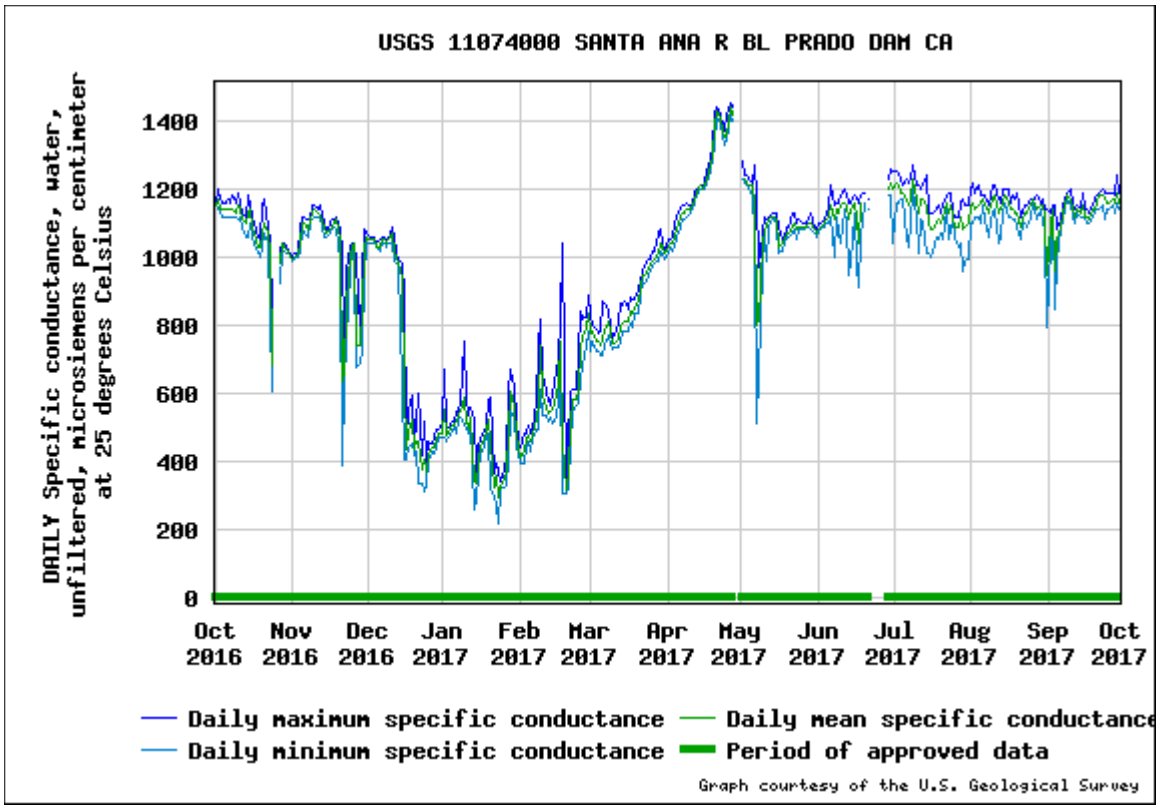
Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8184_8185_8186_8187&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11074000&agency_cd=USGS

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
YEAR 2016-10-01 to 2017-09-30
DAILY VALUES

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	October			November			December			January		
1	1,160	1,150	1,150	1,000	986	992	1,070	1,040	1,060	672	470	554
2	1,200	1,140	1,170	1,010	992	998	1,060	1,040	1,050	498	457	474
3	1,170	1,130	1,140	1,010	999	1,010	1,060	1,040	1,050	499	471	483
4	1,160	1,120	1,140	1,080	1,010	1,040	1,060	1,040	1,050	520	487	503
5	1,160	1,120	1,140	1,120	1,080	1,100	1,040	1,030	1,030	519	500	507
6	1,170	1,120	1,140	1,120	1,070	1,100	1,050	1,020	1,030	547	485	518
7	1,160	1,120	1,140	1,110	1,060	1,080	1,060	1,040	1,050	547	519	533
8	1,180	1,120	1,140	1,110	1,100	1,110	1,060	1,040	1,050	568	529	545
9	1,160	1,120	1,130	1,150	1,110	1,130	1,050	1,030	1,040	754	513	589
10	1,190	1,110	1,150	1,150	1,120	1,140	1,050	1,040	1,050	580	497	511
11	1,160	1,120	1,140	1,140	1,120	1,130	1,090	1,040	1,070	537	482	501
12	1,130	1,080	1,110	1,150	1,110	1,120	1,060	986	1,020	558	512	530
13	1,120	1,060	1,100	1,120	1,090	1,110	1,010	984	998	525	258	339
14	1,180	1,060	1,130	1,110	1,060	1,080	992	978	985	373	285	337
15	1,150	1,100	1,140	1,070	1,060	1,070	983	622	934	437	367	400
16	1,120	1,050	1,080	1,100	1,070	1,080	893	406	617	473	425	445
17	1,100	1,040	1,070	1,110	1,080	1,090	464	403	434	490	443	466
18	1,060	1,010	1,030	1,110	1,090	1,100	552	444	486	503	479	489
19	1,050	1,000	1,030	1,120	1,080	1,110	594	451	526	578	484	526
20	1,150	1,030	1,070	1,080	994	1,050	453	420	433	587	321	451
21	1,170	1,070	1,100	1,010	388	635	513	428	460	363	295	325
22	1,090	1,040	1,070	760	623	660	602	336	459	394	271	361
23	1,040	834	1,020	959	760	865	419	336	377	369	216	293
24	834	608	682	1,030	959	1,010	518	309	403	343	319	331
25	---	---	---	1,040	1,020	1,030	402	331	369	377	322	347
26	---	---	---	1,040	991	1,040	456	402	426	420	331	373
27	1,020	921	981	991	676	743	455	427	440	600	400	492
28	1,040	1,020	1,040	775	688	739	468	425	444	669	547	606
29	1,040	1,020	1,030	941	728	848	495	444	463	615	529	561
30	1,020	1,010	1,020	1,080	941	1,030	497	473	485	529	439	481
31	1,010	998	1,000				509	473	484	452	418	438
Max				1150	1120	1140	1090	1040	1070	754	547	606
Min				760	388	635	402	309	369	343	216	293

Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Day	Max	Min	Mean
February			March			April			May			
439	394	413	831	723	774	1,050	1,010	1,030	**1**	1,280	1,230	---
482	395	427	802	752	780	1,050	1,030	1,040	**2**	1,240	1,220	1,230
480	440	462	791	725	754	1,060	1,020	1,040	**3**	1,240	1,210	1,220
506	461	476	776	721	753	1,100	1,030	1,060	**4**	1,230	1,200	1,210
483	427	458	781	712	742	1,120	1,060	1,080	**5**	1,220	1,180	1,210
494	462	477	873	710	758	1,140	1,090	1,120	**6**	1,270	1,070	1,160
576	492	531	862	740	784	1,150	1,110	1,130	**7**	1,180	509	800
737	497	572	848	770	809	1,150	1,110	1,130	**8**	969	654	809
818	611	744	794	741	775	1,160	1,120	1,140	**9**	1,070	969	1,040
656	538	594	764	732	745	1,150	1,130	1,140	**10**	1,120	1,060	1,080
604	533	561	773	736	749	1,160	1,140	1,150	**11**	1,110	986	1,090
574	519	543	803	738	760	1,190	1,160	1,170	**12**	1,120	1,090	1,110
563	528	546	862	752	795	1,200	1,180	1,190	**13**	1,130	1,110	1,120
602	513	555	857	781	807	1,210	1,200	1,210	**14**	1,130	1,110	1,120
663	530	595	868	784	812	1,210	1,200	1,200	**15**	1,130	1,090	1,110
704	575	634	850	783	813	1,220	1,200	1,210	**16**	1,090	1,010	1,030
813	700	753	882	805	839	1,250	1,220	1,230	**17**	1,050	1,020	1,040
1,040	307	451	878	796	835	1,290	1,250	1,270	**18**	1,060	1,040	1,050
336	306	317	879	836	853	1,330	1,290	1,300	**19**	1,090	1,060	1,070
454	326	373	903	838	871	1,420	1,330	1,380	**20**	1,090	1,060	1,070
599	454	512	932	885	909	1,440	1,420	1,430	**21**	1,130	1,070	1,090
609	544	580	961	928	947	1,420	1,390	1,410	**22**	1,130	1,080	1,100
610	562	581	970	923	945	1,390	1,360	1,370	**23**	1,100	1,050	1,080
718	572	613	996	944	967	1,370	1,330	1,350	**24**	1,110	1,080	1,090
840	643	734	994	966	975	1,420	1,340	1,360	**25**	1,100	1,080	1,090
816	683	766	1,020	970	991	1,450	1,420	1,440	**26**	1,100	1,080	1,090
823	743	788	1,020	981	997	1,440	1,400	1,420	**27**	1,100	1,090	1,090
890	780	836	1,070	988	1,010	---	---	---	**28**	1,110	1,090	1,100
			1,080	1,020	1,040	---	---	---	**29**	1,130	1,080	1,100
			1,040	1,010	1,030	---	---	---	**30**	1,090	1,070	1,080
			1,020	994	1,010				**31**	1,080	1,060	1,070
1040	780	836	1080	1020	1040				**Max**	1280	1230	
336	306	317	764	710	742				**Min**	969	509	

Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
June			July			August			September		
1,100	1,070	1,080	1,250	1,040	1,200	1,200	1,100	1,150	1,140	795	945
1,100	1,080	1,090	1,250	1,160	1,220	1,220	1,100	1,160	1,130	1,040	1,100
1,110	1,090	1,100	1,240	1,160	1,210	1,190	1,120	1,140	1,150	1,130	1,140
1,130	1,100	1,110	1,230	1,170	1,190	1,210	1,120	1,150	1,150	849	960
1,140	1,100	1,120	1,210	1,170	1,190	1,180	1,100	1,160	1,080	990	1,050
1,210	1,120	1,150	1,230	1,050	1,170	1,180	1,150	1,170	1,110	1,080	1,090
1,150	1,000	1,110	1,220	1,030	1,150	1,180	1,110	1,150	1,150	1,110	1,130
1,160	1,120	1,140	1,230	1,100	1,170	1,150	1,060	1,130	1,170	1,140	1,150
1,160	1,070	1,130	1,270	1,200	1,230	1,180	1,110	1,150	1,190	1,170	1,180
1,180	1,040	1,150	1,210	1,120	1,170	1,210	1,130	1,170	1,200	1,150	1,170
1,200	1,140	1,160	1,210	1,010	1,130	1,210	1,140	1,180	1,160	1,120	1,140
1,180	1,100	1,150	1,200	1,110	1,170	1,170	1,040	1,130	1,140	1,100	1,120
1,160	945	1,110	1,210	1,100	1,170	1,160	1,060	1,140	1,150	1,130	1,140
1,160	981	1,140	1,240	1,010	1,150	1,200	1,130	1,160	1,140	1,120	1,130
1,180	1,130	1,160	1,130	1,010	1,100	1,200	1,160	1,180	1,190	1,120	1,150
1,170	970	1,110	1,130	998	1,080	1,200	1,120	1,160	1,140	1,110	1,120
1,160	912	1,040	1,130	1,020	1,080	1,160	1,120	1,140	1,140	1,100	1,120
1,180	1,060	1,160	1,140	1,060	1,100	1,180	1,110	1,140	1,130	1,100	1,110
1,190	1,160	---	1,150	1,050	1,110	1,170	1,110	1,130	1,150	1,120	1,140
---	---	---	1,130	1,070	1,100	1,190	1,090	1,130	1,170	1,130	1,140
1,170	1,140	---	1,150	1,050	1,120	1,120	1,050	1,090	1,180	1,140	1,160
---	---	---	1,180	1,140	1,160	1,130	1,100	1,110	1,190	1,140	1,180
---	---	---	1,190	1,050	1,130	1,150	1,100	1,130	1,200	1,150	1,180
---	---	---	1,190	1,080	1,150	1,150	1,090	1,130	1,190	1,110	1,170
---	---	---	1,130	1,110	1,120	1,170	1,120	1,150	1,190	1,140	1,160
---	---	---	1,120	1,050	1,090	1,170	1,160	1,170	1,190	1,140	1,160
---	---	---	1,120	1,030	1,090	1,170	1,140	1,150	1,190	1,150	1,170
---	---	---	1,160	1,040	1,120	1,180	1,110	1,140	1,180	1,130	1,160
1,230	1,180	1,200	1,170	957	1,080	1,160	1,140	1,150	1,240	1,160	1,190
1,260	1,180	1,220	1,150	986	1,090	1,170	1,100	1,150	1,190	1,140	1,160
			1,150	997	1,100	1,140	1,080	1,120			
			1270	1200	1230	1220	1160	1180	1240	1170	1190
			1120	957	1080	1120	1040	1090	1080	795	945


USGS 11074000 SANTA ANA R BL PRADO DAM CA
DAILY Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius
1400
1200
1000
800
600
400
200
0
Oct 2016
Nov 2016
Dec 2016
Jan 2017
Feb 2017
Mar 2017
Apr 2017
May 2017
Jun 2017
Jul 2017
Aug 2017
Sep 2017
Oct 2017
Daily maximum specific conductance
Daily mean specific conductance
Daily minimum specific conductance
Period of approved data
Graph courtesy of the U.S. Geological Survey

USGS Water-Year Summary 2017

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

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

DRAINAGE AREA - 852 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - March 1970 to current year.

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

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8098&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11066460&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	31.5	50.5	54.3	436	77.4	76.3	52.8	49.4	38.3	26.1	35.8	48.9
2	33.8	48.8	52.4	104	76.1	63.9	52.2	49.8	38.7	27.5	35.6	43.7
3	36.4	47.1	50.7	65.9	77.0	61.8	54.6	46.0	38.9	28.0	34.5	51.1
4	37.7	46.5	49.9	63.7	77.9	62.8	52.8	45.9	35.9	27.6	35.1	51.8
5	37.7	46.0	51.1	156	75.7	62.2	51.6	43.0	36.1	31.3	34.7	43.3
6	38.0	46.9	52.4	78.3	89.5	64.8	51.5	43.6	37.8	30.2	35.2	41.3
7	33.7	48.4	51.9	72.0	105	63.8	49.7	54.6	36.7	29.5	36.0	41.9
8	32.9	47.3	54.5	76.3	99.3	63.1	49.6	51.6	37.3	30.5	33.4	40.2
9	32.8	47.3	51.7	543	85.3	64.0	48.3	45.7	35.8	30.8	34.5	42.2
10	36.0	47.0	50.1	145	85.7	63.1	47.3	45.7	33.7	29.9	36.7	41.2
11	38.0	47.4	50.0	558	106	62.1	47.8	44.3	33.8	30.4	32.4	37.1
12	38.4	48.6	49.9	1,830	102	64.3	48.0	41.4	34.0	30.7	32.5	38.8
13	37.5	47.6	50.3	859	89.5	61.7	51.2	42.0	33.0	32.3	35.0	37.1
14	36.3	45.9	50.7	263	91.9	65.4	61.9	42.2	30.8	29.8	36.1	36.7
15	39.5	47.7	62.2	146	92.2	62.8	60.8	39.9	30.8	29.8	37.4	34.5
16	38.3	42.2	1,170	104	94.9	64.1	50.9	41.5	29.3	29.9	33.6	33.9
17	38.9	46.4	148	81.7	597	60.7	51.8	45.2	28.6	32.2	34.9	33.2
18	37.3	46.4	35.6	78.2	1,710	60.3	53.3	40.4	27.5	34.9	31.4	33.4
19	34.7	47.3	40.0	391	198	58.9	51.4	42.3	27.7	34.1	32.8	31.8
20	32.4	47.8	50.2	2,850	119	58.9	53.7	37.9	27.8	33.5	33.9	31.3
21	32.2	284	141	532	84.6	60.4	53.2	36.7	25.5	33.8	35.5	31.6
22	30.7	53.6	1,320	3,180	76.3	70.9	52.9	38.5	26.3	33.2	34.6	32.3
23	52.1	50.4	70.2	3,820	70.9	64.1	49.1	39.1	24.9	30.1	35.7	32.2
24	325	49.2	2,180	328	70.0	63.5	54.1	39.7	24.5	34.4	34.6	31.2
25	87.5	49.5	262	156	68.7	61.3	53.2	36.9	24.7	32.9	34.6	29.2
26	54.6	85.5	137	136	103	60.5	55.8	38.6	24.3	33.0	33.6	28.2
27	51.5	330	107	134	130	60.4	55.3	40.8	23.4	32.9	32.9	27.4
28	50.0	97.1	76.9	101	111	58.5	56.6	40.1	23.0	33.4	33.7	27.7
29	48.3	55.6	72.8	88.5		59.4	54.0	38.6	23.2	31.3	32.3	26.3
30	50.6	52.7	73.2	85.9		57.4	53.6	38.7	24.0	32.3	31.5	26.2
31	50.4		668	80.6		56.1		39.8		32.5	64.8	
Total	1,555	2,051	7,334	17,540	4,764	1,938	1,579	1,320	916	969	1,095	1,086
Mean	50.2	68.4	237	566	170	62.5	52.6	42.6	30.5	31.3	35.3	36.2
Max	325	330	2180	3820	1710	76.3	61.9	54.6	38.9	34.9	64.8	51.8
Min	30.7	42.2	35.6	63.7	68.7	56.1	47.3	36.7	23.0	26.1	31.4	26.2
Ac-ft	3,084	4,068	14,549	34,800	9,449	3,842	3,132	2,617	1,817	1,922	2,172	2,153

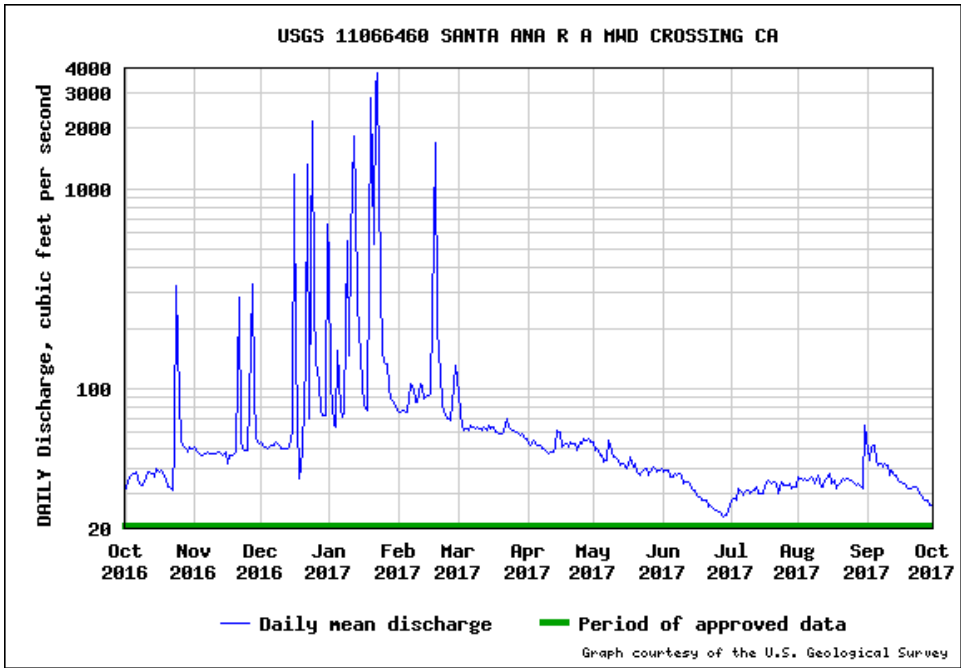
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	92.4	87.3	227	301	206	138	130	85.4	66.7	59.6	64.0	61.5
Max	498	141	1,729	2,350	756	498	501	314	192	137	201	97.6
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2015)
Min	33.8	37.5	42.3	36.9	54.6	32.1	38.1	41.3	30.5	25.7	27.3	29.7
(WY)	(2015)	(2015)	(2016)	(2014)	(2016)	(2015)	(2015)	(2015)	(2017)	(2016)	(2016)	(2016)

SUMMARY STATISTICS

	Water Year 2017		Water Years 2000 - 2017	
Annual total	42,150			
Annual mean	115.5		126.4	
Highest annual mean			491.0	2005
Lowest annual mean			56.5	2016
Highest daily mean	3,820	Jan 23	22,000	Jan 11, 2005
Lowest daily mean	23.0	Jun 28	17.1	Dec 21, 2015
Annual 7-day minimum	23.9	Jun 24	23.3	Aug 22, 2013
Maximum peak flow			49,100[a,b]	Dec 21, 2010
Maximum peak stage			16.83	Dec 21, 2010
Annual runoff (cfsm)	0.136		0.148	
Annual runoff (inches)	1.84		2.01	
10 percent exceeds	106.4		122.0	
50 percent exceeds	47.4		71.0	
90 percent exceeds	30.8		36.7	

[a] Discharge affected to unknown degree by Regulation or Diversion
[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



SAR@MWDXing Water Quality				
	EC (um/cm)	TDS (mg/L)		TDS/EC Ratio
Date			**Source**	
10/14/2016	1020	741	USGS	0.73
10/26/2016	977	595	USGS	0.61
11/4/2016	988	622	USGS	0.63
11/30/2016	969	604	USGS	0.62
12/13/2016	980	633	USGS	0.65
12/20/2016	976	593	USGS	0.61
12/22/2016	220	131	USGS	0.60
1/11/2017	248	147	USGS	0.59
1/17/2017	953	573	USGS	0.60
2/1/2017	885	559	USGS	0.63
2/24/2017	920	573	USGS	0.62
3/3/2017	950	580	USGS	0.61
3/15/2017	991	602	USGS	0.61
4/11/2017	1020	639	USGS	0.63
4/28/2017	998	612	USGS	0.61
5/8/2017	1000	601	USGS	0.60
5/31/2017	1060	658	USGS	0.62
6/9/2017	1040	636	USGS	0.61
6/28/2017	1060	643	USGS	0.61
7/7/2017	1060	654	USGS	0.62
7/28/2017	1040	631	USGS	0.61
8/7/2017	1050	638	USGS	0.61
8/25/2017	1020	637	USGS	0.62
9/7/2017	1030	633	USGS	0.61
9/21/2017	1130	641	USGS	0.57
Average	**908**	**565**		**0.62**

USGS Water-Year Summary 2017

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

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

DRAINAGE AREA - 541 mi².

SURFACE-WATER RECORDS

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

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

REMARKS -

Records are rated poor, except for other periods, as noted: 6/1/2015 to 10/31/2016 are rated fair.

Record downgraded from fair to poor after SBCFCD declared growth in channel semi-permanent citing environmental regulation in 2016. Flow partly regulated by Big Bear Lake (station 11049000) and, since November 1999, by Seven Oaks Flood-Control Reservoir, capacity, 145,600 acre-ft. Natural flow of stream affected by ground-water withdrawals and diversion for domestic use and irrigation upstream from station. Effluent from sewage reclamation plant 1.0 mi upstream caused sustained flow past gage from 1967 to Mar. 21, 1996. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 7, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8056&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11059300&agency_cd=USGS

Water-Data Report 2017

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

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	0.63	e0.15	6.48	139	17.4	21.1	3.77	12.5	e2.27	e0.00	e2.21	e0.00
2	0.04	e0.09	2.72	60.9	14.0	11.8	2.15	9.01	e1.09	e0.00	e0.00	e0.00
3	1.13	e0.18	3.39	21.2	12.9	7.73	1.11	0.33	e1.27	e0.00	e0.00	e16.8
4	0.70	e0.02	5.35	21.2	e12.7	11.3	1.89	0.45	e1.02	e0.00	e0.00	e3.25
5	0.17	0.09	8.91	61.3	e13.2	21.6	1.03	0.26	e1.07	e0.00	e0.00	e0.00
6	0.42	0.13	3.10	32.5	e12.0	17.3	0.68	5.74	e1.80	e0.00	e0.00	e0.00
7	e0.20	0.36	3.87	20.2	29.8	10.5	0.30	41.1	e1.72	e0.00	e0.00	e0.00
8	e0.20	0.17	6.61	23.4	22.4	17.2	0.96	14.8	e0.88	e0.00	e0.00	e0.00
9	e0.18	0.43	6.40	300	5.90	e16.6	1.06	11.4	e1.13	e0.00	e0.00	e0.00
10	e0.15	0.43	7.99	46.1	e4.67	e14.0	1.67	9.27	e0.74	e0.00	e0.00	e0.00
11	e0.17	0.30	7.65	221	e13.0	e22.5	0.32	10.3	e0.48	e0.00	e0.00	e0.00
12	e0.17	0.01	6.14	865	e25.9	e22.5	3.01	e4.12	e1.14	e0.00	e0.00	e0.00
13	e0.25	0.68	5.98	474	e2.98	e15.6	0.87	e3.84	e0.86	e0.00	e0.00	e0.00
14	e0.27	1.16	8.69	113	2.50	e12.1	1.09	e5.00	e1.38	e0.00	e0.00	e0.00
15	e0.27	0.12	12.3	39.5	2.47	e15.0	0.33	e6.16	e0.63	e0.00	e0.00	e0.00
16	e0.27	0.09	347	31.2	3.57	e15.3	2.04	e4.99	e0.48	e0.00	e0.00	e0.00
17	e0.24	0.29	76.0	31.3	e107	e14.2	0.77	e6.87	e0.46	e0.00	e0.00	e0.20
18	e0.24	0.31	15.1	32.3	e118	e13.6	2.76	e6.02	e0.46	e0.00	e0.00	e0.51
19	e0.19	0.29	11.9	235	e55.5	e12.8	0.61	e5.32	e0.53	e0.00	e0.00	e1.12
20	e0.19	1.43	10.9	1,800	e35.8	e13.5	0.63	e6.91	e0.55	e0.00	e0.00	e1.18
21	e0.17	89.3	89.7	591	e30.2	e17.0	1.76	e5.00	e0.55	e0.00	e0.00	e1.14
22	e0.15	0.03	382	1,370	e11.3	e24.7	0.96	e5.36	e0.57	e0.00	e0.00	e1.15
23	e0.55	0.32	102	1,810	7.02	4.90	0.19	e4.94	e1.26	e0.00	e0.00	e1.05
24	e30.0	0.00	1,100	471	6.63	2.47	2.55	e2.65	e1.11	e0.00	e0.00	e1.45
25	e4.20	0.00	95.2	146	7.70	3.35	10.6	e2.69	e0.12	e0.00	e0.00	e1.21
26	e3.00	21.5	26.5	82.3	35.3	2.78	1.56	e4.10	e0.00	e0.00	e0.00	e1.05
27	e3.00	138	19.8	55.5	50.1	3.50	3.86	e2.56	e0.00	e0.00	e0.00	e0.95
28	e2.10	44.5	18.9	41.2	70.9	1.47	7.36	e1.30	e0.00	e0.00	e0.00	e0.91
29	e1.70	9.70	16.9	35.8		0.73	3.29	e1.53	e0.00	e0.00	e0.00	e0.90
30	e1.30	6.14	18.4	31.1		1.45	5.73	e1.41	e0.00	e0.00	e0.00	e0.88
31	e1.00		435	22.5		5.62		e1.42		e0.00	e17.4	
Total	53.3	316	2,861	9,225	731	374	64.9	197	23.6	.000	19.6	33.8
Mean	1.72	10.5	92.3	298	26.1	12.1	2.16	6.37	.79	.000	.63	1.13
Max	30.0	138	1100	1810	118	24.7	10.6	41.1	2.27	0.00	17.4	16.8
Min	0.04	0.00	2.72	20.2	2.47	0.73	0.19	0.26	0.00	0.00	0.00	0.00
Ac-ft	106	627	5,674	18,300	1,450	742	129	391	46.8	.000	38.9	66.9

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2017, BY WATER YEAR (WY)

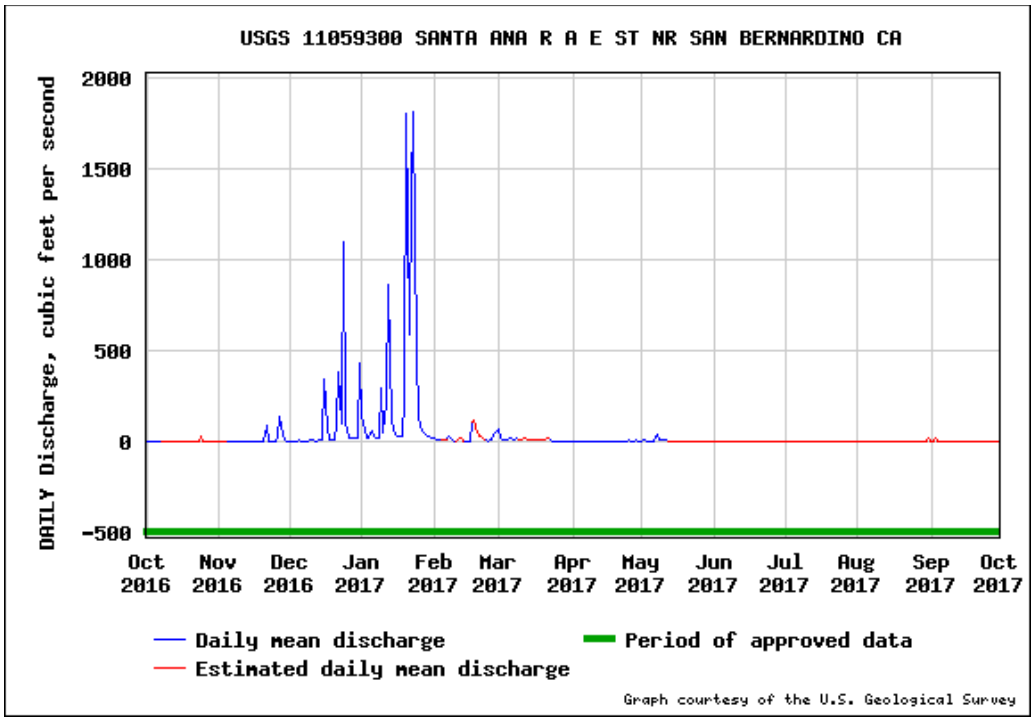
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	15.4	13.2	77.5	117	79.1	55.5	51.3	22.7	6.55	5.76	7.50	4.32
Max	200	47.1	764	1,185	376	398	351	247	112	52.9	102	40.6
(WY)	(2005)	(2014)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	.000	.67	1.16	.000	.82	4.11	.041	.000	.000	.000	.000	.000
(WY)	(2003)	(2001)	(2001)	(2003)	(2002)	(2008)	(2002)	(2002)	(2002)	(2002)	(2002)	(2002)

Water-Data Report 2017
11059300 Santa Ana River at E Street, near San Bernardino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2017		Water Years 2000 - 2017	
Annual total	13,900			
Annual mean	38.1		37.9	
Highest annual mean			264.8	2005
Lowest annual mean			1.70	2002
Highest daily mean	1,810	Jan 23	12,500	Jan 11, 2005
Lowest daily mean	0.0	Nov 24	0.0	May 14, 2000
Annual 7-day minimum	0.0	Jun 26	0.0	Sep 11, 2000
Maximum peak flow			35,700[a,b]	Jan 11, 2005
Maximum peak stage			9.04	Jan 11, 2005
Annual runoff (cfsm)	0.070		0.070	
Annual runoff (inches)	0.955		0.951	
10 percent exceeds	40.1		39.8	
50 percent exceeds	1.41		1.00	
90 percent exceeds	0.0		0.0	

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



USGS Water-Year Summary 2017

11072100 Temescal Creek above Main Street, at Corona, CA

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

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

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

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

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

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 5,290 ft³/s, Dec. 22, 2010, gage height, 7.27 ft, from rating curve extended above 305 ft³/s, on basis of step-backwater analysis; minimum daily, 0.18 ft³/s, Aug. 1, 2017.

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8161&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11072100&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	1.56	0.76	1.06	6.72	9.35	23.3	2.68	1.63	5.36	1.98	13.5	1.19
2	1.77	1.16	1.01	3.54	9.30	25.3	2.27	1.50	5.64	2.12	1.44	1.16
3	2.65	0.71	0.88	3.10	8.71	25.3	2.41	2.00	5.42	2.37	1.17	9.08
4	1.35	0.69	0.99	2.47	5.16	15.2	2.27	1.98	5.74	2.74	1.08	1.17
5	1.90	0.82	1.22	31.2	1.71	21.1	2.38	1.93	4.48	3.13	1.04	1.12
6	1.74	0.75	1.94	3.06	17.2	30.4	1.83	3.01	1.15	3.57	1.08	1.12
7	1.23	1.50	1.76	2.99	6.03	37.4	1.70	3.85	1.03	3.56	1.27	1.20
8	1.36	0.76	1.52	2.36	3.95	34.1	7.64	1.51	0.98	2.86	1.10	1.08
9	1.35	0.73	1.74	114	3.75	30.6	1.33	1.43	1.08	2.57	1.48	1.01
10	1.53	1.80	1.74	7.59	2.39	27.0	1.75	1.74	1.09	2.13	1.81	0.95
11	1.29	1.12	1.71	10.1	12.2	23.1	1.52	1.80	1.04	2.15	1.01	1.91
12	1.49	0.95	1.84	106	4.29	20.2	1.59	1.95	1.06	1.91	0.93	0.97
13	1.99	1.16	2.32	15.3	3.77	21.5	2.11	2.34	1.28	1.84	1.02	1.10
14	1.98	1.22	2.02	3.56	3.99	18.2	1.94	2.08	1.91	1.91	1.11	0.96
15	1.49	0.83	20.4	2.72	4.49	16.4	1.77	2.10	1.28	1.98	0.92	0.92
16	2.03	1.28	158	2.88	16.5	14.5	1.49	2.29	1.54	1.89	1.01	0.93
17	2.33	1.60	1.80	2.82	391	12.4	1.88	2.61	1.38	1.77	1.36	0.92
18	2.10	1.03	1.09	2.65	345	11.1	1.65	2.76	1.38	1.63	1.05	0.79
19	2.40	1.02	1.03	135	144	9.26	1.92	3.44	2.30	1.91	1.10	0.90
20	2.26	2.01	1.13	306	90.3	8.64	1.79	3.07	1.47	2.34	1.12	0.85
21	3.24	50.9	78.2	8.92	70.4	10.3	1.79	3.20	1.60	1.58	1.67	0.86
22	3.02	1.13	201	737	63.6	13.4	1.69	3.28	3.80	1.64	1.01	0.86
23	22.3	0.98	20.3	735	52.0	6.13	1.46	3.45	1.47	0.91	1.31	0.81
24	109	1.27	148	207	36.1	6.16	1.54	4.39	1.64	2.82	1.58	0.86
25	2.67	0.68	2.35	48.3	26.8	5.45	1.52	4.08	1.23	0.66	1.31	0.87
26	3.56	25.2	1.98	17.0	35.4	4.69	1.77	4.36	1.17	0.79	1.03	0.80
27	1.87	6.49	1.70	8.27	79.3	4.47	1.51	4.89	1.26	0.65	1.00	0.77
28	1.48	1.04	2.84	5.89	30.2	3.85	1.45	5.62	1.36	0.64	1.29	0.88
29	0.94	1.00	2.90	6.08		3.85	1.27	4.80	1.64	0.95	1.35	0.96
30	2.79	0.98	10.2	7.55		3.08	1.39	4.57	1.67	0.67	1.45	1.05
31	0.79		76.6	8.11		2.78		5.08		0.70	11.2	
Total	187	112	751	2,553	1,477	489	59.3	92.7	63.5	58.4	59.8	38.0
Mean	6.05	3.72	24.2	82.4	52.7	15.8	1.98	2.99	2.12	1.88	1.93	1.27
Max	109	50.9	201	737	391	37.4	7.64	5.62	5.74	3.57	13.5	9.08
Min	0.79	0.68	0.88	2.36	1.71	2.78	1.27	1.43	0.98	0.64	0.92	0.77
Ac-ft	372	221	1,490	5,064	2,929	970	118	184	126	116	119	75.5

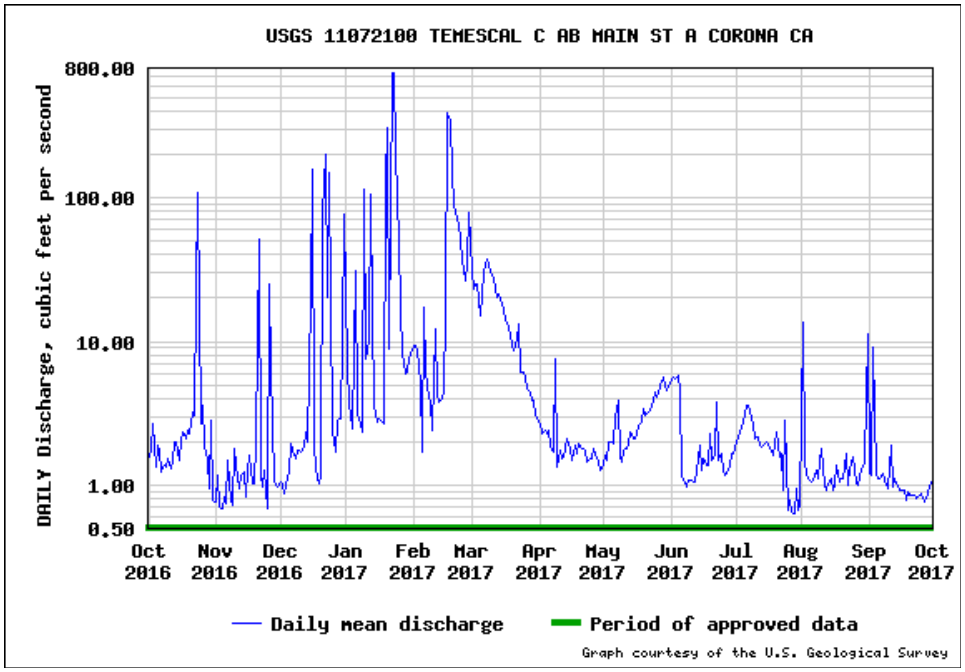
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	12.3	15.0	27.1	53.0	77.8	51.9	30.3	16.8	10.1	9.10	8.51	9.34
Max	52.6	58.3	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	1.95	1.76	3.09	2.51	3.24	1.75	1.72	.79	1.38	1.70	1.58	1.27
(WY)	(2015)	(2016)	(2016)	(2014)	(2016)	(2015)	(2015)	(2016)	(2016)	(2016)	(2015)	(2017)

SUMMARY STATISTICS

	Water Year 2017		Water Years 1991 - 2017	
Annual total	5,941			
Annual mean	16.3		26.5	
Highest annual mean			104.4	2005
Lowest annual mean			4.81	2016
Highest daily mean	737.0	Jan 22	2,870	Dec 22, 2010
Lowest daily mean	0.640	Jul 28	0.340	Jul 03, 1992
Annual 7-day minimum	0.723	Jul 25	0.513	May 08, 2013
Maximum peak flow			5,290[a,b]	Dec 22, 2010
Maximum peak stage			7.27	Dec 22, 2010
Annual runoff (cfsm)	0.073		0.118	
Annual runoff (inches)	0.986		1.61	
10 percent exceeds	24.1		53.9	
50 percent exceeds	1.91		10.2	
90 percent exceeds	0.950		1.84	

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



USGS Water-Year Summary 2017

11071900 Temescal Creek at Corona Lake, near Corona, CA

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

DRAINAGE AREA - 57.9 mi².

SURFACE-WATER RECORDS

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

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

REMARKS - Records fair except for estimated daily discharges which are considered poor. No flow for water year 2014, 2015 and 2016. 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, 302 ft³/s, Jan. 23, 2017, gage height, 38.32 ft; minimum discharge, 0.00 ft³/s, on many days, gage height, 18.28 ft. on Oct. 23, 2016.

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8159&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11071900&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

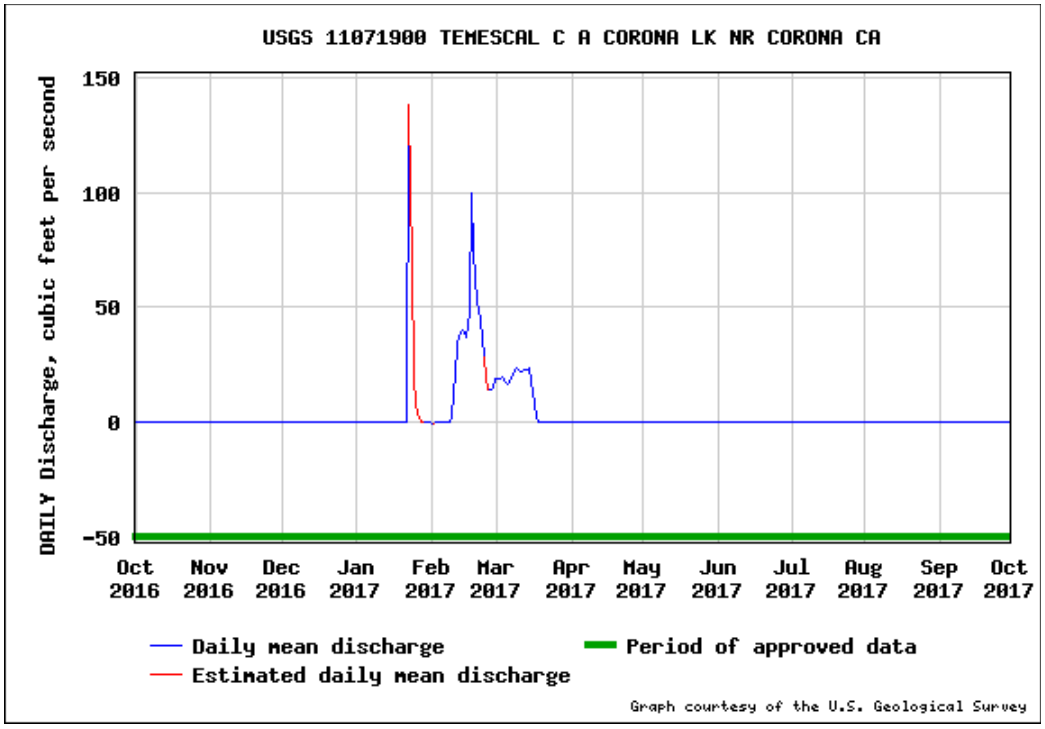
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	0.00	0.00	0.00	0.00	0.00	19.1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	e-0.01	19.5	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	19.8	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	17.9	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	16.7	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	17.6	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	20.7	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	22.9	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	24.2	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	3.02	21.9	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	21.8	22.2	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	32.9	23.4	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	37.6	23.1	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	40.1	23.9	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	38.9	17.9	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	36.8	8.57	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	47.9	2.81	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	99.8	0.01	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	73.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	52.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	48.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	45.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	e138	e28.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	e67.8	e19.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	e20.8	e14.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	e7.28	14.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	e1.81	15.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	e0.07	19.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	e0.01		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	.000	.000	.000	236	691	322	.000	.000	.000	.000	.000	.000
Mean	.000	.000	.000	7.61	24.7	10.4	.000	.000	.000	.000	.000	.000
Max	0.00	0.00	0.00	138	99.8	24.2	0.00	0.00	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ac-ft	.000	.000	.000	468	1,370	639	.000	.000	.000	.000	.000	.000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2013 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	.000	.000	.000	1.90	7.54	2.45	.000	.000	.000	.000	.000	.000
Max	.000	.000	.000	7.61	24.7	10.4	.000	.000	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2017)	(2017)	(2017)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2014)	(2014)	(2014)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)

SUMMARY STATISTICS

	Water Year 2017		Water Years 2013 - 2017	
Annual total	1,249			
Annual mean	3.42		0.858	
Highest annual mean			3.43	2017
Lowest annual mean			0.0	2014
Highest daily mean	138.0	Jan 23	138.0	Jan 23, 2017
Lowest daily mean	-0.010	Feb 02	-0.010	Feb 02, 2017
Annual 7-day minimum	-0.001	Jan 30	-0.001	Jan 30, 2017
Maximum peak flow			35	Feb 23, 2013
Maximum peak stage			37.35	Feb 23, 2013
Annual runoff (cfsm)	0.059		0.017	
Annual runoff (inches)	0.802		0.227	
10 percent exceeds	11.0		0.0	
50 percent exceeds	0.0		0.0	
90 percent exceeds	0.0		0.0	



USGS Water-Year Summary 2017

11073495 Cucamonga Creek near Mira Loma, CA

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

DRAINAGE AREA - 75.8 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 7, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8174&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11073495&agency_cd=USGS

Water-Data Report 2017
11073495 Cucamonga Creek near Mira Loma, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	7.04	13.8	7.20	15.1	76.5	24.2	8.77	18.3	5.07	1.47	1.94	11.3
2	10.1	8.83	10.6	22.7	84.6	21.7	9.84	18.3	4.54	2.39	0.27	5.84
3	7.39	3.85	8.46	19.0	106	19.5	13.2	28.4	5.11	1.93	2.20	8.58
4	7.65	3.46	17.2	18.8	71.9	19.6	6.69	17.5	5.24	1.35	0.60	10.5
5	10.7	4.88	39.8	60.9	92.5	19.4	4.52	24.7	3.48	0.35	0.08	15.5
6	6.05	8.30	46.2	26.9	182	12.4	9.44	8.91	15.6	0.51	1.14	8.76
7	11.3	5.90	19.0	29.5	171	18.3	12.7	34.9	6.10	0.15	0.51	3.88
8	11.1	4.17	17.3	29.2	149	15.6	14.9	6.94	3.66	1.40	0.14	2.72
9	19.0	1.77	9.95	240	117	16.6	8.05	8.88	2.35	2.48	0.69	8.64
10	14.5	2.84	12.6	25.5	126	12.8	14.2	7.47	3.01	0.46	7.63	10.5
11	17.4	3.19	20.6	440	146	8.93	1.02	5.40	5.28	0.35	5.02	10.4
12	12.0	4.37	26.0	868	129	12.0	3.61	2.13	1.63	0.33	5.64	5.39
13	21.4	6.88	49.8	52.4	117	7.10	4.31	1.67	1.01	2.04	9.01	1.42
14	30.0	17.2	33.3	25.3	96.4	8.28	2.24	4.66	1.51	4.31	3.92	6.05
15	41.3	10.4	58.0	21.3	102	5.09	2.94	13.6	1.17	4.23	6.61	9.20
16	40.6	4.29	564	27.8	151	5.39	8.98	5.16	1.54	5.80	8.34	9.15
17	34.5	4.25	21.6	31.5	825	4.71	4.37	2.49	1.30	4.64	6.75	9.01
18	26.8	4.25	16.6	47.9	278	5.76	3.54	2.38	1.08	4.90	3.42	5.12
19	22.2	11.3	20.8	269	69.3	7.64	3.75	2.29	0.71	7.33	9.66	2.04
20	17.3	33.2	18.3	1,190	72.3	9.25	5.44	2.78	0.92	3.73	18.2	1.96
21	12.9	139	47.1	111	62.0	32.1	7.79	6.32	0.61	0.28	9.93	2.56
22	21.3	9.08	175	1,380	53.4	20.4	10.1	4.87	0.97	0.17	5.34	1.89
23	51.7	7.59	213	637	41.4	14.4	7.06	5.28	0.64	2.23	6.09	3.26
24	48.5	11.2	660	84.7	36.2	9.32	6.15	4.25	0.68	5.61	4.99	2.65
25	15.8	6.59	15.3	73.9	31.1	5.07	5.50	3.66	0.65	4.51	2.55	1.37
26	11.4	25.3	13.1	70.6	61.6	7.33	18.7	3.16	0.48	4.01	6.06	1.63
27	14.2	17.0	12.7	70.4	86.5	7.87	13.2	2.92	0.40	0.42	8.85	1.81
28	16.5	6.82	17.6	64.6	35.1	5.38	9.97	7.60	0.38	0.03	7.34	4.33
29	12.5	5.95	16.7	51.8		4.75	26.8	4.36	0.50	0.40	4.61	1.63
30	16.4	4.85	24.6	64.5		6.53	17.2	2.52	0.64	0.80	7.07	1.75
31	18.5		52.3	69.2		8.01		5.73		0.66	11.8	
Total	608	391	2,265	6,139	3,570	375	265	268	76.3	69.3	166	169
Mean	19.6	13.0	73.1	198	127	12.1	8.83	8.63	2.54	2.23	5.37	5.63
Max	51.7	139	660	1380	825	32.1	26.8	34.9	15.6	7.33	18.2	15.5
Min	6.05	1.77	7.20	15.1	31.1	4.71	1.02	1.67	0.38	0.03	0.08	1.37
Ac-ft	1,206	775	4,492	12,180	7,080	745	526	531	151	137	330	335

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2017, BY WATER YEAR (WY)

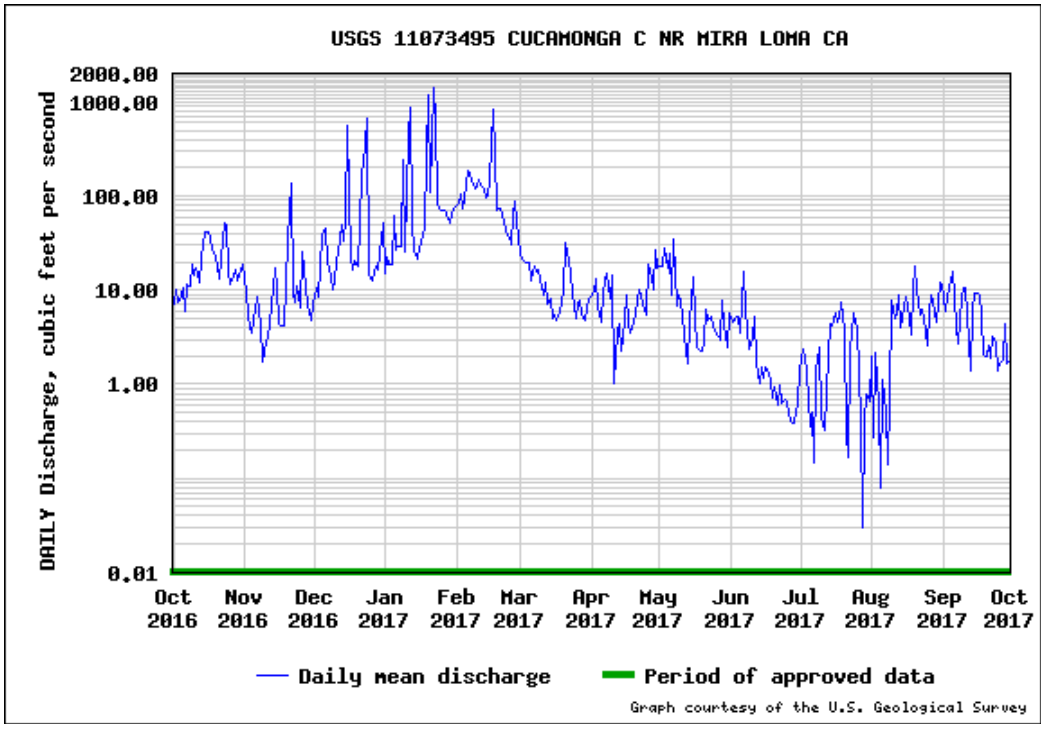
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	41.1	40.8	64.4	87.9	98.7	60.9	42.7	33.5	29.3	27.7	27.4	31.2
Max	223	102	328	442	350	198	114	69.4	57.1	53.4	51.8	52.0
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(1995)	(2006)	(2003)	(1992)	(2004)	(1992)	(1986)
Min	10.9	12.5	16.7	15.6	14.5	12.1	6.27	6.60	2.54	2.23	2.67	3.86
(WY)	(2015)	(2013)	(2014)	(2014)	(2016)	(2017)	(2013)	(2014)	(2017)	(2017)	(2015)	(2016)

Water-Data Report 2017
11073495 Cucamonga Creek near Mira Loma, CA -- Continued

SUMMARY STATISTICS

	Water Year 2017		Water Years 1986 - 2017	
Annual total	14,360			
Annual mean	39.3		48.6	
Highest annual mean			137.4	2005
Lowest annual mean			15.8	2013
Highest daily mean	1,380	Jan 22	5,200	Jan 09, 2005
Lowest daily mean	0.030	Jul 28	0.030	Jul 28, 2017
Annual 7-day minimum	0.533	Jun 23	0.533	Jun 23, 2017
Maximum peak flow			17,300[a]	Oct 20, 2004
Maximum peak stage			6.58	Oct 20, 2004
Annual runoff (cfsm)	0.519		0.641	
Annual runoff (inches)	7.05		8.70	
10 percent exceeds	70.5		60.0	
50 percent exceeds	8.64		33.8	
90 percent exceeds	1.25		10.4	

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



USGS Water-Year Summary 2017

11073360 Chino Creek at Schaefer Avenue, near Chino, CA

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

DRAINAGE AREA - 48.9 mi².

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

SURFACE-WATER RECORDS

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

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, except when estimated is considered fair. 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 water year, the California Water Project reported releases of 21,699 acre-ft. were made into the basin. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 7, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8167&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11073360&agency_cd=USGS

Water-Data Report 2017
11073360 Chino Creek at Schaefer Avenue, near Chino, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	0.20	2.94	0.14	0.98	0.70	0.61	0.44	0.42	0.27	0.19	0.53	0.26
2	0.18	4.14	0.15	0.64	0.63	0.66	0.42	0.44	0.28	0.21	0.36	0.25
3	0.31	4.02	0.14	0.60	0.62	0.58	0.44	0.44	0.26	0.22	0.50	1.50
4	0.57	0.87	0.12	0.59	0.62	0.57	0.44	0.42	0.23	0.22	0.58	0.32
5	0.20	0.55	0.18	45.1	0.58	0.61	0.44	0.40	0.27	0.24	0.28	0.30
6	0.19	1.47	0.30	0.88	29.2	0.60	0.47	0.85	0.25	0.24	0.28	0.29
7	0.24	3.45	0.34	1.55	13.6	0.54	0.44	13.5	0.28	0.25	0.30	0.28
8	0.20	0.91	0.15	0.71	3.59	0.56	0.87	0.38	0.25	0.22	0.32	0.27
9	0.15	1.00	0.17	112	0.70	0.55	0.40	0.37	0.26	0.21	0.36	0.26
10	0.22	2.42	0.20	1.49	12.0	0.56	0.41	0.42	0.26	0.23	0.33	0.32
11	0.18	1.09	0.42	87.4	11.8	0.56	0.42	0.41	0.28	0.26	0.31	0.39
12	0.15	1.07	0.23	190	0.77	0.53	0.42	0.40	0.20	0.26	0.26	0.27
13	0.19	1.27	0.21	4.17	0.66	0.55	0.46	0.38	0.23	0.25	0.24	0.27
14	0.18	1.07	0.23	1.54	0.63	0.56	0.45	0.31	0.24	0.29	0.25	0.25
15	0.27	0.36	15.6	1.09	0.63	0.53	0.44	1.07	0.24	0.29	0.25	0.34
16	0.14	0.46	319	0.89	0.61	0.66	0.46	0.31	0.23	0.21	0.25	0.44
17	1.52	0.24	1.00	0.70	299	0.46	0.44	0.32	0.22	0.21	0.25	0.43
18	0.80	0.13	0.39	0.58	26.6	0.42	0.47	0.34	0.19	0.22	0.25	0.39
19	0.91	0.14	0.36	149	1.49	0.41	0.46	0.34	0.23	0.23	0.44	0.24
20	0.64	2.77	0.34	466	1.03	0.47	0.46	0.33	0.23	0.22	0.90	0.27
21	3.78	40.9	49.1	4.58	0.86	4.02	0.48	0.31	0.23	0.23	0.58	0.27
22	3.42	1.28	73.8	682	0.79	1.26	0.46	0.36	0.23	0.20	0.25	0.23
23	10.4	0.19	82.5	133	1.01	0.46	0.43	0.38	0.23	0.21	0.26	0.21
24	16.9	0.14	188	4.88	0.68	0.44	0.44	0.30	0.20	0.36	0.23	0.22
25	0.82	0.15	0.86	1.88	0.64	0.45	0.44	0.30	0.21	0.21	0.24	0.22
26	0.61	7.61	0.71	1.45	6.20	0.44	0.44	0.34	0.25	0.23	0.24	0.23
27	0.57	2.75	0.55	1.16	5.74	0.44	0.46	0.25	0.20	0.23	0.23	0.27
28	1.07	0.23	0.54	0.95	0.68	0.46	0.44	0.25	0.19	0.23	0.28	0.25
29	4.26	0.15	0.51	0.83		0.46	0.39	0.27	0.19	0.24	0.27	0.26
30	2.93	0.14	3.07	0.82		0.46	0.38	0.27	0.20	0.20	0.28	0.24
31	5.86		34.3	0.74		0.43		0.26		0.21	0.27	
Total	58.1	83.9	774	1,898	422	20.3	13.6	25.1	7.03	7.22	10.4	9.74
Mean	1.87	2.80	25.0	61.2	15.1	.66	.45	.81	.23	.23	.33	.32
Max	16.9	40.9	319	682	299	4.02	0.87	13.5	0.28	0.36	0.90	1.50
Min	0.14	0.13	0.12	0.58	0.58	0.41	0.38	0.25	0.19	0.19	0.23	0.21
Ac-ft	115	166	1,534	3,765	837	40.3	27.0	49.9	13.9	14.3	20.6	19.3

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2017, BY WATER YEAR (WY)

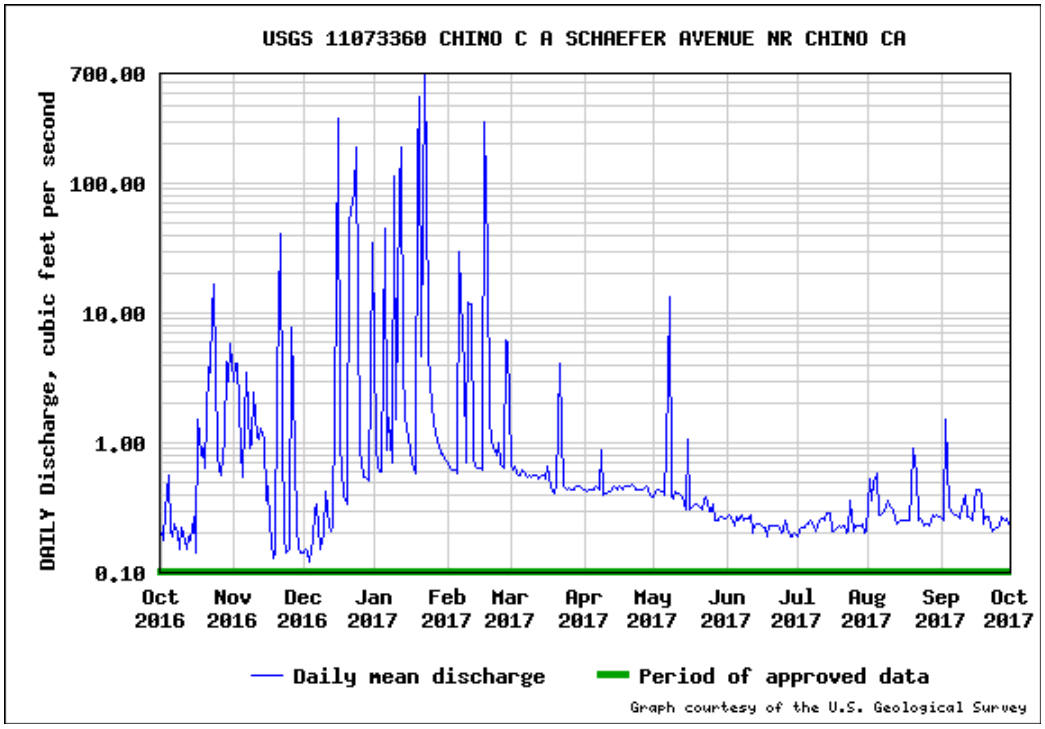
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	14.6	14.0	24.0	32.6	34.6	23.0	8.46	10.3	15.1	17.0	14.9	12.0
Max	126	113	189	221	193	257	68.6	104	184	176	191	198
(WY)	(1979)	(1976)	(1976)	(2005)	(1980)	(1978)	(1974)	(1997)	(1976)	(1974)	(1974)	(1997)
Min	.061	.23	.53	.48	.33	.30	.14	.22	.062	.069	.12	.13
(WY)	(1978)	(1978)	(1970)	(2014)	(1972)	(1972)	(1977)	(1973)	(1977)	(1977)	(2015)	(1977)

Water-Data Report 2017
11073360 Chino Creek at Schaefer Avenue, near Chino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2017		Water Years 1970 - 2017	
Annual total	3,329			
Annual mean	9.12		18.3	
Highest annual mean			92.4	1974
Lowest annual mean			2.26	2014
Highest daily mean	682.0	Jan 22	2,060	Mar 01, 1978
Lowest daily mean	0.120	Dec 04	0.0	May 21, 1977
Annual 7-day minimum	0.146	Nov 29	0.024	Oct 28, 1977
Maximum peak flow			13,100[a,b]	Feb 27, 1983
Maximum peak stage			10.32	Feb 27, 1983
Annual runoff (cfsm)	0.187		0.375	
Annual runoff (inches)	2.53		5.09	
10 percent exceeds	3.88		59.0	
50 percent exceeds	0.420		1.20	
90 percent exceeds	0.206		0.310	

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



USGS Water-Year Summary 2017

11065000 Lytle Creek at Colton, CA

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

DRAINAGE AREA - 186 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8090&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11065000&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.44	0.30	0.36	0.86	0.49	2.39	0.21	0.30	0.13	e0.26	2.82	0.10
2	0.43	0.34	0.39	0.37	0.51	2.03	0.10	0.28	0.12	e0.21	0.78	0.20
3	0.49	0.39	0.42	0.34	0.48	2.79	0.07	0.18	0.27	e0.39	0.88	e7.50
4	0.34	0.39	0.39	0.31	0.51	2.90	0.04	0.13	0.16	e0.38	e2.57	0.08
5	0.42	0.40	0.34	7.66	0.39	2.10	0.06	0.16	0.03	0.14	e1.27	0.04
6	0.70	0.33	0.37	0.29	4.16	2.23	0.13	0.17	0.05	0.00	e1.92	0.06
7	1.59	0.24	0.41	0.33	4.96	2.11	0.17	0.59	0.03	0.01	e0.99	0.13
8	1.24	0.31	0.72	0.33	3.85	1.52	0.22	0.80	0.07	0.02	e0.67	0.18
9	0.75	0.35	0.30	24.6	4.09	1.29	0.26	0.53	0.11	0.03	0.93	0.19
10	0.75	0.61	0.33	0.21	4.15	1.32	0.15	0.46	0.16	0.04	e0.74	0.15
11	0.46	0.35	0.34	76.7	6.32	1.01	0.17	0.33	0.26	0.03	0.98	0.51
12	0.54	0.39	0.33	227	4.11	1.13	0.23	0.36	0.58	0.02	e1.53	0.15
13	0.37	0.40	0.28	e8.38	4.80	1.45	0.31	0.37	0.53	0.07	e1.29	0.16
14	0.27	0.40	0.25	0.33	4.42	1.44	0.23	0.40	0.50	0.18	e2.68	0.21
15	0.22	0.42	1.08	0.31	2.92	1.47	0.32	0.38	0.70	0.51	e3.55	0.17
16	0.21	0.45	137	0.30	2.34	1.16	0.38	0.25	0.98	e0.30	e3.30	e0.15
17	0.56	0.41	1.18	0.28	435	0.87	0.14	0.14	1.29	e0.01	2.72	0.08
18	0.34	0.36	0.30	0.27	113	1.34	0.16	0.10	0.85	0.00	e2.00	0.08
19	0.31	0.38	0.32	e21.8	1.57	1.39	0.09	0.26	0.19	0.01	1.37	0.08
20	0.35	0.47	0.35	262	1.45	0.83	0.11	0.11	0.37	0.02	e1.70	0.11
21	0.42	18.5	19.9	2.71	1.11	0.93	0.14	0.10	0.26	0.05	e1.59	0.07
22	0.47	0.33	48.1	719	1.24	0.98	0.15	0.06	0.01	0.03	1.54	0.03
23	10.6	0.33	12.7	258	1.13	0.70	0.14	0.15	e0.36	0.05	1.26	0.07
24	4.57	0.36	192	e1.42	1.01	0.80	0.15	0.19	e0.08	0.08	1.07	0.08
25	0.32	0.34	0.33	0.61	1.01	0.74	0.15	0.26	e0.06	0.08	0.71	0.14
26	0.27	3.23	0.35	0.66	1.96	0.69	0.17	0.38	1.08	0.09	0.25	0.15
27	0.28	6.12	0.31	0.80	5.21	0.65	0.13	0.13	0.40	0.11	0.17	0.13
28	0.31	0.38	0.33	0.58	1.62	0.44	0.15	0.19	e0.27	0.14	0.13	0.12
29	0.28	0.40	0.37	0.75		0.22	0.16	0.16	e0.16	0.12	0.11	0.21
30	0.35	0.35	0.40	0.58		0.15	0.24	0.17	e0.23	0.14	0.08	0.13
31	0.35		49.0	0.53		0.20		0.14		0.30	e6.44	
Total	29.0	38.0	469	1,618	614	39.3	5.13	8.23	10.3	3.82	48.0	11.5
Mean	.94	1.27	15.1	52.2	21.9	1.27	.17	.27	.34	.12	1.55	.38
Max	10.6	18.5	192	719	435	2.90	0.38	0.80	1.29	0.51	6.44	7.50
Min	0.21	0.24	0.25	0.21	0.39	0.15	0.04	0.06	0.01	0.00	0.08	0.03
Ac-ft	57.5	75.4	931	3,210	1,217	77.9	10.2	16.3	20.4	7.58	95.3	22.7

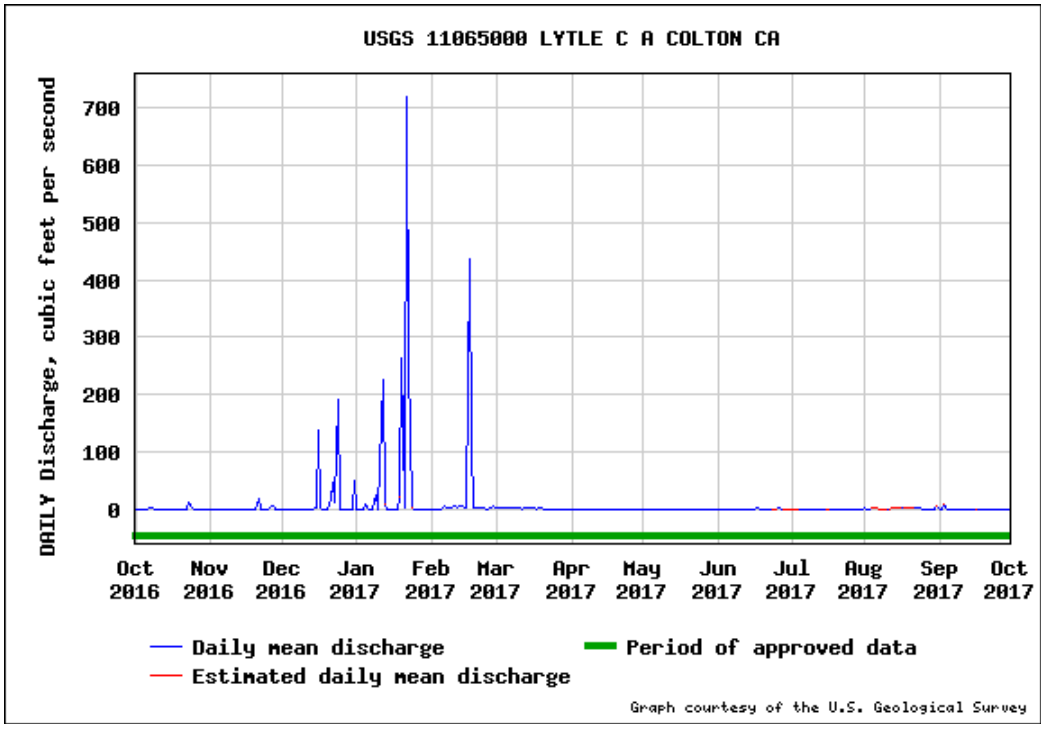
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.07	3.64	9.64	19.1	26.6	14.9	3.89	3.35	1.90	1.21	.82	.65
Max	83.2	79.1	142	318	363	326	57.3	87.6	61.3	35.4	17.1	9.58
(WY)	(2005)	(1966)	(2011)	(1969)	(1980)	(1978)	(1969)	(1969)	(1978)	(1978)	(1969)	(1980)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(1958)	(1958)	(1959)	(1963)	(1961)	(1959)	(1961)	(1959)	(1958)	(1958)	(1958)	(1958)

SUMMARY STATISTICS

	Water Year 2017		Water Years 1958 - 2017	
Annual total	2,895			
Annual mean	7.93		7.25	
Highest annual mean			65.4	1969
Lowest annual mean			0.008	1977
Highest daily mean	719.0	Jan 22	5,040	Jan 25, 1969
Lowest daily mean	0.0	Jul 06	0.0	Oct 01, 1957
Annual 7-day minimum	0.021	Jul 06	0.0	Oct 01, 1957
Maximum peak flow			17,500[a,b]	Mar 04, 1978
Maximum peak stage			14.80	Mar 04, 1978
Annual runoff (cfsm)	0.043		0.039	
Annual runoff (inches)	0.579		0.527	
10 percent exceeds	3.04		3.00	
50 percent exceeds	0.350		0.0	
90 percent exceeds	0.080		0.0	

[a] Discharge affected to unknown degree by Regulation or Diversion
[b] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other



USGS Water-Year Summary 2017

11060400 Warm Creek near San Bernardino, CA

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

DRAINAGE AREA - 11 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 7, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8060&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11060400&agency_cd=USGS

Water-Data Report 2017
11060400 Warm Creek near San Bernardino, CA -- Continued

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.49	2.77	0.38	0.25	0.00	0.78	0.00	0.27	6.43	0.41
2	0.00	0.00	0.15	0.53	0.32	0.24	0.00	1.55	0.00	0.31	0.13	0.16
3	0.00	0.12	0.00	0.24	0.39	0.00	0.00	1.29	0.00	0.37	0.01	23.4
4	0.00	0.13	0.00	0.03	0.26	0.00	0.11	1.29	0.00	0.48	0.00	0.25
5	0.00	0.00	0.00	27.5	0.23	0.00	0.00	1.29	0.09	0.43	0.00	0.21
6	0.00	0.00	0.00	1.20	7.06	0.19	0.00	2.96	0.00	0.01	0.00	0.63
7	0.00	0.00	0.00	0.15	5.30	0.00	0.01	1.64	0.00	0.00	0.00	0.13
8	0.00	0.10	0.36	0.00	5.08	0.00	0.00	0.17	0.00	0.00	0.00	0.00
9	0.00	0.66	0.00	46.8	0.30	0.00	0.00	0.10	0.00	0.00	0.00	0.06
10	0.00	1.13	0.00	1.04	0.32	0.00	0.00	0.08	0.00	0.00	0.00	0.08
11	0.00	0.16	0.00	45.3	7.07	0.00	0.04	0.00	0.00	0.03	0.09	1.60
12	0.00	0.00	0.00	132	0.13	0.00	0.02	0.00	0.00	0.01	0.00	0.06
13	0.00	0.42	0.00	2.86	0.03	0.00	0.10	0.00	0.03	0.00	0.00	0.04
14	0.00	0.71	0.00	0.69	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.17
15	0.00	0.44	2.09	0.38	0.03	0.00	0.00	0.00	0.04	0.00	0.00	0.15
16	0.00	0.57	147	0.42	0.24	0.40	0.00	0.00	0.00	0.00	0.03	0.18
17	1.77	1.13	1.81	0.25	79.8	0.00	0.02	0.00	0.03	0.00	0.00	0.17
18	0.00	0.87	0.00	0.16	26.9	0.00	0.11	0.00	0.00	0.00	0.00	0.33
19	0.00	1.44	7.41	54.2	2.03	0.00	0.37	0.00	0.02	0.00	0.00	0.24
20	0.10	1.74	1.32	151	1.39	0.06	0.00	0.00	0.01	0.00	0.00	0.17
21	0.00	39.9	49.2	2.97	0.02	1.84	0.23	0.00	0.00	0.00	0.00	0.16
22	0.00	0.01	64.5	247	0.00	5.09	0.00	0.65	0.00	0.02	0.01	0.17
23	22.2	0.00	19.0	76.1	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.15
24	27.4	0.00	67.3	1.24	0.00	0.00	0.23	0.00	0.00	0.01	0.01	0.15
25	0.19	0.01	0.00	0.77	0.00	0.00	0.36	0.00	0.00	0.03	0.03	0.15
26	0.00	12.3	0.00	0.65	2.39	0.00	0.01	0.00	0.00	0.05	0.04	0.13
27	0.02	31.0	0.02	0.59	6.39	0.17	0.22	0.00	0.05	0.39	0.03	0.04
28	0.00	0.10	0.03	0.44	0.61	0.50	0.00	0.00	0.00	0.00	0.05	0.07
29	0.00	0.28	0.00	0.40		0.00	0.24	0.01	0.00	0.00	0.05	0.12
30	0.19	0.59	0.66	0.39		0.00	0.67	0.00	0.09	0.00	0.02	0.07
31	0.00		88.4	0.41		0.00		0.11		0.00	8.37	
Total	51.9	93.8	450	798	147	8.87	2.76	11.9	.36	2.41	15.3	29.6
Mean	1.67	3.13	14.5	25.8	5.24	.29	.092	.38	.012	.078	.49	.99
Max	27.4	39.9	147	247	79.8	5.09	0.67	2.96	0.09	0.48	8.37	23.4
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ac-ft	103	186	892	1,584	291	17.6	5.47	23.6	.71	4.78	30.3	58.8

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2017, BY WATER YEAR (WY)

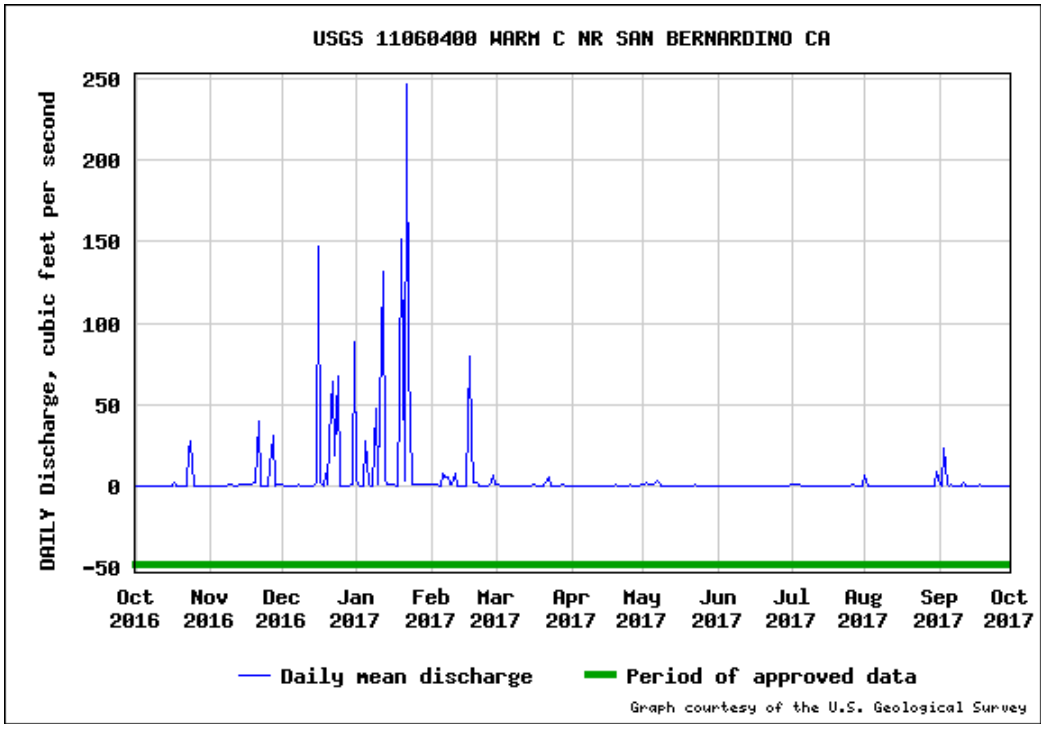
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	5.60	7.07	10.4	14.1	27.1	22.9	10.7	8.30	6.07	5.33	5.16	4.98
Max	32.4	33.1	48.3	41.2	418	376	44.2	86.7	43.6	34.5	50.6	30.3
(WY)	(1984)	(1986)	(2011)	(1993)	(1978)	(1978)	(1986)	(1980)	(1980)	(1980)	(1983)	(1983)
Min	.011	.087	.40	.066	.72	.12	.092	.076	.008	.011	.002	.022
(WY)	(2015)	(1996)	(1980)	(2003)	(2002)	(2015)	(2017)	(2016)	(2015)	(2016)	(2016)	(2016)

Water-Data Report 2017
11060400 Warm Creek near San Bernardino, CA -- Continued

SUMMARY STATISTICS

	Water Year 2017		Water Years 1975 - 2017	
Annual total	1,612			
Annual mean	4.42		10.6	
Highest annual mean			70.5	1978
Lowest annual mean			1.23	2002
Highest daily mean	247.0	Jan 22	3,400	Mar 01, 1978
Lowest daily mean	0.0	Oct 01	0.0	Nov 29, 1974
Annual 7-day minimum	0.0	Oct 01	0.0	Dec 07, 1974
Maximum peak flow			8,500[a]	Mar 04, 1978
Maximum peak stage			4.88	Mar 04, 1978
Annual runoff (cfsm)	0.401		0.959	
Annual runoff (inches)	5.45		13.0	
10 percent exceeds	2.21		24.0	
50 percent exceeds	0.020		1.84	
90 percent exceeds	0.0		0.060	

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



USGS Water-Year Summary 2017

11057500 San Timoteo Creek near Loma Linda, CA

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

DRAINAGE AREA - 125 mi^2.

SURFACE-WATER RECORDS

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

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

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

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 15,000 ft^3/s, Feb. 25, 1969, gage height, 8.2 ft, from floodmark, from rating curve extended above 2,100 ft^3/s, on basis of slope-conveyance study of peak flow, at site and datum then in use; no flow for many days most years.

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

Suggested citation: U.S. Geological Survey, 2018, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [February 16, 2018], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8045&adr_begin_date=2016-10-01&adr_end_date=2017-09-30&site_no=11057500&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2016-10-01 to 2017-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
1	2.45	4.74	7.72	119	33.7	22.1	6.81	5.48	4.37	0.71	6.84	0.64
2	1.79	4.76	4.88	79.3	31.0	14.0	5.84	4.59	2.86	0.41	0.77	1.06
3	2.49	3.32	5.13	37.9	29.0	13.1	4.70	2.47	1.61	0.79	0.96	0.65
4	3.21	1.68	5.80	37.9	32.1	12.0	4.12	2.24	0.96	0.34	0.88	0.42
5	2.88	1.86	7.34	48.4	25.7	9.06	4.51	2.23	2.78	0.21	0.61	0.45
6	2.00	1.67	3.79	44.2	28.2	17.9	3.78	4.77	3.23	0.39	0.92	0.54
7	0.70	2.22	5.10	31.5	26.7	10.9	3.42	13.9	3.94	0.51	1.06	0.47
8	0.82	1.73	5.76	32.2	27.7	11.0	7.70	10.2	1.68	0.36	0.72	0.61
9	1.00	1.24	6.70	74.0	18.2	7.82	8.50	10.6	1.81	0.37	0.44	0.34
10	0.74	1.80	7.60	59.9	17.6	8.62	8.34	13.2	1.67	0.29	0.55	0.44
11	0.73	2.48	7.55	61.7	23.2	9.68	4.56	9.33	3.20	0.45	0.36	0.65
12	1.00	2.67	6.97	110	22.5	8.55	11.6	7.42	2.15	0.35	0.74	0.57
13	1.77	3.01	8.37	193	16.1	10.3	10.4	10.5	1.54	0.42	0.90	0.71
14	1.76	3.95	9.86	113	11.1	8.56	11.7	6.27	4.05	0.27	0.85	0.82
15	1.08	4.66	14.2	61.8	8.25	7.65	9.45	6.73	1.11	0.53	0.76	0.92
16	0.94	2.83	41.6	43.3	7.32	5.76	11.9	8.12	1.29	0.40	0.55	0.99
17	1.48	3.73	58.6	41.9	39.3	5.13	13.5	10.7	0.41	0.15	0.43	e1.54
18	2.19	3.79	11.2	40.5	83.4	9.64	10.8	9.63	0.50	0.17	0.44	e1.89
19	1.30	4.47	8.94	74.2	44.1	10.8	9.92	11.7	0.29	0.28	0.41	e5.84
20	1.21	5.62	7.73	251	21.6	11.2	11.3	11.7	0.99	0.38	0.45	e4.58
21	0.88	28.0	31.1	143	13.1	10.8	9.85	7.61	0.59	0.64	0.64	e6.23
22	0.83	7.50	124	221	9.07	9.29	4.28	9.02	0.52	0.58	0.60	e6.35
23	5.28	4.65	104	302	5.08	8.68	5.50	5.35	1.81	0.22	0.45	4.92
24	23.5	3.83	228	147	5.89	6.16	7.35	2.34	1.17	0.25	0.60	6.55
25	3.26	3.43	124	87.4	6.79	6.43	10.3	4.51	0.12	0.15	0.63	2.13
26	2.70	16.3	45.1	67.6	23.9	5.33	4.82	2.72	0.23	0.18	0.65	1.44
27	3.13	e25.2	35.2	65.2	23.4	5.54	6.13	3.45	0.33	0.33	0.78	1.20
28	3.41	e9.54	35.0	51.1	58.5	2.73	4.47	0.73	0.19	0.18	0.64	1.26
29	3.32	e10.8	33.1	40.4		1.90	2.12	1.63	0.46	0.36	0.78	1.01
30	2.86	7.87	34.3	38.2		3.21	3.71	1.88	0.22	0.29	e0.43	1.18
31	3.01		67.5	35.4		5.95		2.59		0.35	1.42	
Total	83.7	179	1,096	2,753	693	280	221	204	46.1	11.3	27.3	56.4
Mean	2.70	5.98	35.4	88.8	24.7	9.03	7.38	6.57	1.54	.36	.88	1.88
Max	23.5	28.0	228	302	83.4	22.1	13.5	13.9	4.37	0.79	6.84	6.55
Min	0.70	1.24	3.79	31.5	5.08	1.90	2.12	0.73	0.12	0.15	0.36	0.34
Ac-ft	166	356	2,174	5,460	1,374	555	439	404	91.4	22.4	54.1	112

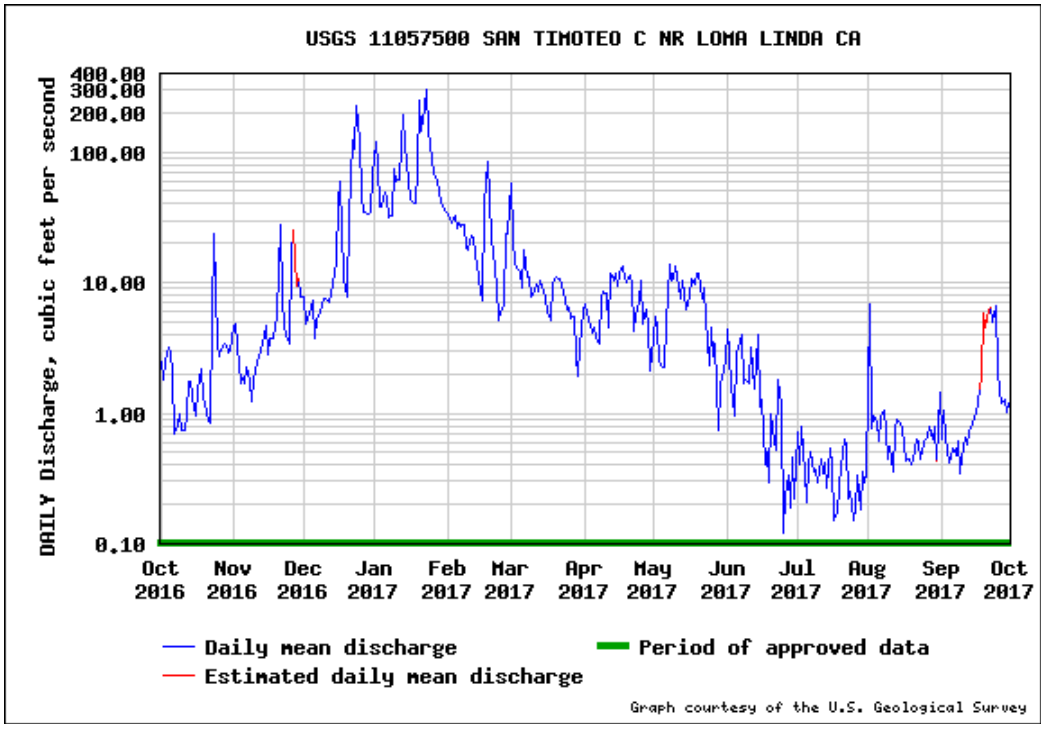
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2017, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.06	2.82	6.80	14.2	14.0	7.84	3.39	1.88	1.22	.83	.77	.94
Max	39.8	16.5	76.2	124	186	53.7	23.1	12.7	7.37	6.82	3.06	4.95
(WY)	(2005)	(2014)	(2011)	(2005)	(1969)	(1991)	(2006)	(2016)	(2013)	(2015)	(2014)	(2015)
Min	.000	.000	.16	.079	.17	.000	.000	.000	.000	.000	.000	.000
(WY)	(1996)	(1996)	(1996)	(1972)	(1968)	(1997)	(1979)	(1996)	(1996)	(1995)	(1995)	(1995)

SUMMARY STATISTICS

	Water Year 2017		Water Years 1955 - 2017	
Annual total	5,651			
Annual mean	15.5		4.86	
Highest annual mean			25.3	2005
Lowest annual mean			0.447	2002
Highest daily mean	302.0	Jan 23	3,500	Feb 25, 1969
Lowest daily mean	0.120	Jun 25	0.0	Feb 04, 1968
Annual 7-day minimum	0.239	Jul 23	0.0	Apr 15, 1969
Maximum peak flow			15,000	Feb 25, 1969
Maximum peak stage			8.50[a]	Feb 16, 1980
Annual runoff (cfsm)	0.124		0.037	
Annual runoff (inches)	1.68		0.506	
10 percent exceeds	39.7		6.23	
50 percent exceeds	4.47		0.710	
90 percent exceeds	0.430		0.0	

[a] Gage datum changed during this year



APPENDIX B

DAILY PRECIPITATION DATA
FOR SAN BERNARDINO

WATER YEAR 2016-17

TABLE B-1

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

	2016			2017								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
3	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.34
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.30	0.00	0.00	0.38	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.02	0.31	0.00	0.00	0.02	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01
9	0.00	0.00	0.00	0.66	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.68	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.01
12	0.00	0.00	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.14	0.00	0.00	0.00	1.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.85	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.06	0.00	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.52	0.75	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.75	2.07	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00
23	0.53	0.00	0.67	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.48	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.26	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.43	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.02	0.00	0.09	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.82	0.00		0.00		0.00		0.00	0.21	
Total	1.17	1.27	5.62	8.59	3.16	0.53	0.00	0.41	0.00	0.00	0.46	0.36

Total Rainfall = 21.57 Inches

APPENDIX C

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

WATER YEAR 2016-17

SINCE 1933

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

March 05, 2018

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

Subject: Review of Fiscal Year 2016-17 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, 2017. 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 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, 2017

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

JUNE 30, 2017

ASSETS

Cash in Bank Account	$ 11,885

LIABILITIES AND NET ASSETS

Total Net Assets	$ 11,885

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUE AND EXPENSES ARISING FROM CASH TRANSACTIONS

FOR THE PERIOD JULY 1, 2016 - JUNE 30, 2017

	Actual	Budget	Variance - Favorable (Unfavorable)	
REVENUE COLLECTED:				
Water District Contributions				
Orange County Water District	$ -	$ -	-	
Inland Empire Utilities Agency	-	-	-	
Western Municipal Water District	-	-	-	
San Bernardino Valley Municipal Water District	-	-	-	
TOTAL REVENUE COLLECTED	$ -	$ -	$ -	(A)
EXPENSES PAID:				
Professional Engineering Services - OCWD	$ 14,800	$ 7,500	(7,300)	(B)
Administrative Expenses:				
Auditing Services				
Reproduction of Annual Report	1,354	-	(1,354)	(C)
Bank service charges				
	$ 16,154	$ 7,500	$ (8,654)	
CHANGE IN NET ASSETS	$ (16,154)			
NET ASSETS - BEGINNING OF THE YEAR	$ 28,039			
NET ASSETS - END OF THE YEAR	$ 11,885			

(A) No revenue was budgeted or collected for the fiscal year 2016-17

(B) The anticipated payment of $7,500 to IEUA was not billed as of the year end. The payment of $14,800 were for the WY 2014-15 and the WY 2015-16.

(C) For the administrative expense of the WY 2014-15, the payment was made in July 2016 to OCWD. And for the administrative expense of the WY 2015-16, the payment was made in June 2017 to OCWD.

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 2017

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%

But for WY 2016-17, no contributions were budgeted or collected as the Secretary/Treasurer believed that the account had sufficient balance to cover the anticipated cost of $7,500, which had actually not been billed yet as of the year end by Inland Empire Utilities Agency.

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, 2017 consisted of the following:

Bank of America:	$11,885

All cash is fully insured by the FDIC.

APPENDIX D

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

WATER YEAR 2016-17

There was no discharge of OC-59 water to Santa Ana River during the 2016-2017 water year.

APPENDIX E

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2016-17

There was no discharge of the San Jacinto Watershed to the Santa Ana River during the 2016-17 water year.

APPENDIX F

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

WATER YEAR 2016-17

TABLE F-1

WATER QUALITY SAMPLES BELOW PRADO DAM
WATER YEAR 2016-17

Date	TDS (mg/L)	EC (um/cm)	TDS/EC Ratio	Source
10/14/2016	815	1160	1.42331	USGS
10/20/2016	668	1110	1.66168	USGS
10/26/2016	472	784	1.66102	USGS
11/4/2016	646	1090	1.68731	USGS
11/8/2016	674	1120	1.66172	USGS
11/30/2016	627	1030	1.64274	USGS
12/5/2016	649	1070	1.64869	USGS
12/13/2016	604	1080	1.78808	USGS
12/20/2016	253	430	1.69960	USGS
1/17/2017	277	472	1.70397	USGS
1/18/2017	303	522	1.72277	USGS
1/26/2017	207	350	1.69082	USGS
1/31/2017	248	434	1.75000	USGS
2/1/2017	232	404	1.74138	USGS
2/13/2017	306	533	1.74183	USGS
2/22/2017	324	558	1.72222	USGS
2/24/2017	317	535	1.68770	USGS
3/3/2017	410	677	1.65122	USGS
3/9/2017	435	770	1.77011	USGS
3/15/2017	414	741	1.78986	USGS
3/21/2017	504	857	1.70040	USGS
4/4/2017	609	1020	1.67488	USGS
4/13/2017	667	1120	1.67916	USGS
4/20/2017	817	1350	1.65239	USGS
4/28/2017	727	1190	1.63686	USGS
5/8/2017	454	770	1.69604	USGS
5/9/2017	678	1130	1.66667	USGS
5/31/2017	684	1160	1.69591	USGS
5/31/2017	724	1170	1.61602	USGS
6/9/2017	714	1180	1.65266	USGS
6/14/2017	724	1210	1.67127	USGS
6/28/2017	723	1110	1.53527	USGS
6/28/2017	736	1210	1.64402	USGS
7/7/2017	725	1220	1.68276	USGS
7/20/2017	668	1080	1.61677	USGS
7/28/2017	694	1140	1.64265	USGS
8/7/2017	717	1130	1.57601	USGS
8/15/2017	728	1190	1.63462	USGS
8/25/2017	690	1100	1.59420	USGS
9/7/2017	685	1110	1.62044	USGS
9/7/2017	679	1120	1.64948	USGS

TABLE F-2

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

October 2016

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	59	1,150	698	41,322
2	61	1,170	710	43,310
3	70	1,140	692	48,371
4	72	1,140	692	49,824
5	70	1,140	692	48,509
6	72	1,140	692	49,962
7	75	1,140	692	51,831
8	71	1,140	692	49,063
9	71	1,130	686	48,363
10	69	1,150	698	48,162
11	69	1,140	692	47,679
12	72	1,110	674	48,326
13	71	1,100	667	47,224
14	73	1,130	686	49,804
15	77	1,140	692	53,076
16	79	1,080	655	51,614
17	102	1,070	649	66,198
18	122	1,030	625	76,250
19	105	1,030	625	65,625
20	86	1,070	649	55,944
21	78	1,100	667	51,893
22	76	1,070	649	49,324
23	87	1,020	619	53,791
24	185	682	414	76,590
25	197	--- [2]	---	---
26	199	--- [2]	---	---
27	158	981	595	94,010
28	144	1,040	631	90,864
29	144	1,030	625	90,000
30	143	1,020	619	88,517
31	144	1,000	607	87,408
	3,099			1,722,852
		Monthly Flow-weighted TDS [2] =	637	mg/L
Total	2,703 [3]			

(1) TDS = EC x 0.6068

(2) Equipment malfunction - EC data missing for 10/25/2016 and 10/26/2016. Flow data period of missing EC are excluded in the monthly flow-weighted TDS calculation.

(3) Total outflow less days where data is missing.

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

November 2016

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	143	992	602	86,086
2	140	998	606	84,840
3	134	1,010	613	82,142
4	123	1,040	631	77,613
5	102	1,100	667	68,034
6	83	1,100	667	55,028
7	98	1,080	655	63,928
8	79	1,110	674	53,044
9	73	1,130	686	50,009
10	72	1,140	692	49,686
11	72	1,130	686	49,118
12	75	1,120	680	51,136
13	79	1,110	674	53,516
14	90	1,080	655	58,623
15	85	1,070	649	55,230
16	79	1,080	655	51,483
17	56	1,090	661	36,752
18	85	1,100	667	56,695
19	105	1,110	674	70,770
20	102	1,050	637	64,974
21	173	635	385	66,605
22	263	660	400	105,200
23	226	865	525	118,650
24	177	1,010	613	108,501
25	167	1,030	625	104,375
26	155	1,040	631	97,805
27	191	743	451	86,141
28	271	739	448	121,408
29	304	848	515	156,560
30	221	1,030	625	138,125
Total	4,021			2,322,075

Monthly Flow-weighted TDS = 578 mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

December 2016

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	148	1,060	643	95,164
2	140	1,050	637	89,180
3	137	1,050	637	87,269
4	140	1,050	637	89,180
5	122	1,030	625	76,250
6	154	1,030	625	96,250
7	133	1,050	637	84,721
8	125	1,050	637	79,625
9	121	1,040	631	76,351
10	117	1,050	637	74,529
11	123	1,070	649	79,827
12	131	1,020	619	81,089
13	107	998	606	64,842
14	112	985	598	66,976
15	107	934	567	60,669
16	127	617	374	47,498
17	161	434	263	42,343
18	161	486	295	47,495
19	361	526	319	115,159
20	477	433	263	125,451
21	338	460	279	94,302
22	317	459	279	88,443
23	372	377	229	85,188
24	331	403	245	81,095
25	476	369	224	106,624
26	472	426	258	121,776
27	540	440	267	144,180
28	575	444	269	154,675
29	466	463	281	130,946
30	393	485	294	115,542
31	391	484	294	114,954
Total	7,875			2,817,593
		Monthly Flow-weighted TDS =	358	mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

January 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	393	554	336	132,048
2	392	474	288	112,896
3	427	483	293	125,111
4	446	503	305	136,030
5	441	507	308	135,828
6	437	518	314	137,218
7	429	533	323	138,567
8	424	545	331	140,344
9	424	589	357	151,368
10	430	511	310	133,300
11	430	501	304	130,720
12	347	530	322	111,734
13	293	339	206	60,358
14	308	337	204	62,832
15	306	400	243	74,358
16	303	445	270	81,810
17	553	466	283	156,499
18	676	489	297	200,772
19	306	526	319	97,614
20	2,590	451	274	709,660
21	3,830	325	197	754,510
22	4,780	361	219	1,046,820
23	4,930	293	178	877,540
24	4,810	331	201	966,810
25	4,600	347	211	970,600
26	2,970	373	226	671,220
27	418	492	299	124,982
28	265	606	368	97,520
29	266	561	340	90,440
30	266	481	292	77,672
31	386	438	266	102,676
Total	37,876			8,809,857

Monthly Flow-weighted TDS = 233 mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

February 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	456	413	251	114,456
2	364	427	259	94,276
3	314	462	280	87,920
4	311	476	289	89,879
5	311	458	278	86,458
6	304	477	289	87,856
7	306	531	322	98,532
8	204	572	347	70,788
9	138	744	451	62,238
10	281	594	360	101,160
11	324	561	340	110,160
12	329	543	329	108,241
13	429	546	331	141,999
14	557	555	337	187,709
15	596	595	361	215,156
16	2,620	634	385	1,008,700
17	1,980	753	457	904,860
18	215	451	274	58,910
19	163	317	192	31,296
20	166	373	226	37,516
21	287	512	311	89,257
22	462	580	352	162,624
23	477	581	353	168,381
24	417	613	372	155,124
25	418	734	445	186,010
26	417	766	465	193,905
27	419	788	478	200,282
28	292	836	507	148,044
Total	13,557			5,001,737
		Monthly Flow-weighted TDS =	369	mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

March 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	314	774	470	147,580
2	445	780	473	210,485
3	388	754	458	177,704
4	321	753	457	146,697
5	322	742	450	144,900
6	324	758	460	149,040
7	370	784	476	176,120
8	413	809	491	202,783
9	420	775	470	197,400
10	426	745	452	192,552
11	430	749	454	195,220
12	434	760	461	200,074
13	408	795	482	196,656
14	373	807	490	182,770
15	364	812	493	179,452
16	393	813	493	193,749
17	406	839	509	206,654
18	406	835	507	205,842
19	404	853	518	209,272
20	310	871	529	163,990
21	269	909	552	148,488
22	269	947	575	154,675
23	268	945	573	153,564
24	267	967	587	156,729
25	274	975	592	162,208
26	281	991	601	168,881
27	289	997	605	174,845
28	296	1,010	613	181,448
29	300	1,040	631	189,300
30	300	1,030	625	187,500
31	297	1,010	613	182,061
Total	10,781			5,538,639
		Monthly Flow-weighted TDS =	514	mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

April 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	292	1,030	625	182,500
2	284	1,040	631	179,204
3	366	1,040	631	230,946
4	384	1,060	643	246,912
5	371	1,080	655	243,005
6	316	1,120	680	214,880
7	297	1,130	686	203,742
8	297	1,130	686	203,742
9	293	1,140	692	202,756
10	288	1,140	692	199,296
11	283	1,150	698	197,534
12	278	1,170	710	197,380
13	272	1,190	722	196,384
14	266	1,210	734	195,244
15	261	1,200	728	190,008
16	255	1,210	734	187,170
17	386	1,230	746	287,956
18	410	1,270	771	316,110
19	384	1,300	789	302,976
20	337	1,380	837	282,069
21	205	1,430	868	177,940
22	129	1,410	856	110,424
23	122	1,370	831	101,382
24	122	1,350	819	99,918
25	108	1,360	825	89,100
26	83	1,440	874	72,892
27	94	1,420	862	81,373
28	95	--- [2]	---	---
29	91	--- [2]	---	---
30	87	--- [2]	---	---
	7,458			5,192,842

Monthly Flow-weighted TDS [2] = 723 mg/L

Total 7,184 [3]

(1) TDS = EC x 0.6068

(2) Equipment Malfunction - EC data missing 6/19/2017 - 6/28/2017. Flow data for period of missing EC are excluded in the Monthly Flow-weighted TDS calculation.

(3) Total outflow less days where data is missing.

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

May 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	82	--- [2]	---	---
2	78	1,230	746	58,337
3	73	1,220	740	54,316
4	69	1,210	734	50,426
5	63	1,210	734	46,536
6	60	1,160	704	42,099
7	236	800	485	114,460
8	261	809	491	128,151
9	114	1,040	631	71,934
10	97	1,080	655	63,339
11	93	1,090	661	61,737
12	83	1,110	674	56,077
13	79	1,120	680	53,448
14	79	1,120	680	53,652
15	83	1,110	674	55,672
16	86	1,030	625	53,938
17	85	1,040	631	53,509
18	87	1,050	637	55,292
19	83	1,070	649	54,127
20	81	1,070	649	52,829
21	81	1,090	661	53,805
22	83	1,100	667	55,294
23	85	1,080	655	55,675
24	87	1,090	661	57,441
25	88	1,090	661	58,102
26	90	1,090	661	59,490
27	92	1,090	661	60,746
28	93	1,100	667	62,164
29	94	1,100	667	62,965
30	97	1,080	655	63,339
31	96	1,070	649	61,980
	2,959			1,830,878
		Monthly Flow-weighted TDS [2] =	637	mg/L
Total	2,876 [3]			

(1) TDS = EC x 0.6068

(2) Equipment Malfunction - EC data missing 6/19/2017 - 6/28/2017. Flow data for period of missing EC are excluded in the Monthly Flow-weighted TDS calculation.

(3) Total outflow less days where data is missing.

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

June 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	93	1,080	655	60,588
2	86	1,090	661	56,582
3	83	1,100	667	55,028
4	81	1,110	674	54,459
5	85	1,120	680	57,664
6	91	1,150	698	63,518
7	88	1,110	674	59,312
8	85	1,140	692	58,958
9	80	1,130	686	54,674
10	77	1,150	698	53,816
11	77	1,160	704	54,349
12	80	1,150	698	55,700
13	77	1,110	674	51,831
14	75	1,140	692	51,831
15	75	1,160	704	52,589
16	72	1,110	674	48,461
17	71	1,040	631	44,675
18	70	1,160	704	49,139
19	70	--- [2]	---	---
20	67	--- [2]	---	---
21	71	--- [2]	---	---
22	69	--- [2]	---	---
23	66	--- [2]	---	---
24	67	--- [2]	---	---
25	66	--- [2]	---	---
26	64	--- [2]	---	---
27	62	--- [2]	---	---
28	58	--- [2]	---	---
29	55	1,200	728	39,676
30	57	1,220	740	42,180
Total Outflow	2,214			1,065,028
		Monthly Flow-weighted TDS [2] =	685	mg/L
Total Used	1,555 [3]			

(1) TDS = EC x 0.6068

(2) Equipment Malfunction - EC data missing 6/19/2017 - 6/28/2017. Flow data for period of missing EC are excluded in the Monthly Flow-weighted TDS calculation.

(3) Total outflow less days where data is missing.

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

July 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	63	1,120	680	43,112
2	70	1,160	704	49,421
3	66	1,130	686	44,933
4	63	1,150	698	44,253
5	62	1,120	680	42,092
6	65	1,090	661	43,229
7	62	1,090	661	41,048
8	60	1,120	680	40,596
9	63	1,080	655	41,527
10	61	1,090	661	40,123
11	61	1,100	667	40,420
12	60	1,150	698	41,531
13	60	1,160	704	42,522
14	64	1,140	692	44,288
15	67	1,150	698	46,417
16	68	1,160	704	47,942
17	69	1,170	710	48,990
18	70	1,150	698	48,860
19	77	1,130	686	52,479
20	79	1,150	698	55,072
21	68	1,170	710	48,422
22	67	1,180	716	48,187
23	64	1,130	686	43,767
24	70	1,140	692	48,163
25	79	1,160	704	55,475
26	76	1,180	716	54,273
27	70	1,160	704	49,562
28	69	1,140	692	47,402
29	67	1,080	655	43,885
30	65	1,090	661	42,833
31	66	1,100	667	44,022
Total	2,069			1,424,846
		Monthly Flow-weighted TDS =	689	mg/L

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

August 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	67	1,150	698	46,487
2	80	1,160	704	56,038
3	85	1,140	692	58,474
4	65	1,150	698	45,649
5	64	1,160	704	44,774
6	64	1,170	710	45,511
7	67	1,150	698	46,487
8	64	1,130	686	43,698
9	61	1,150	698	42,438
10	61	1,170	710	43,097
11	62	1,180	716	44,678
12	65	1,130	686	44,521
13	65	1,140	692	45,118
14	68	1,160	704	47,872
15	67	1,180	716	47,829
16	76	1,160	704	53,293
17	74	1,140	692	50,931
18	72	1,140	692	49,547
19	69	1,130	686	47,403
20	79	1,130	686	54,468
21	89	1,090	661	58,499
22	80	1,110	674	53,853
23	76	1,130	686	52,205
24	76	1,130	686	52,273
25	73	1,150	698	51,094
26	72	1,170	710	50,978
27	75	1,150	698	52,001
28	75	1,140	692	51,623
29	68	1,150	698	47,604
30	66	1,150	698	46,068
31	64	1,120	680	43,724
Total	2,186			1,518,236
		Monthly Flow-weighted TDS =	695 mg/L	

(1) TDS = EC x 0.6068

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2016-17

September 2017

Day	Prado Outflow (cfs)	Daily Median EC (microsiemens/cm)	Computed TDS (1)	Outflow X TDS
1	121	945	573	69,333
2	77	1,100	667	51,492
3	71	1,140	692	49,201
4	127	960	583	74,041
5	94	1,050	637	60,005
6	93	1,090	661	61,671
7	76	1,130	686	52,136
8	61	1,150	698	42,438
9	64	1,180	716	45,466
10	72	1,170	710	51,191
11	74	1,140	692	51,416
12	80	1,120	680	54,672
13	76	1,140	692	52,246
14	77	1,130	686	52,959
15	80	1,150	698	56,119
16	85	1,120	680	57,732
17	88	1,120	680	59,908
18	93	1,110	674	62,547
19	89	1,140	692	61,380
20	84	1,140	692	58,128
21	82	1,160	704	57,939
22	85	1,180	716	61,075
23	82	1,180	716	58,784
24	83	1,170	710	59,214
25	82	1,160	704	57,869
26	78	1,160	704	54,560
27	75	1,170	710	53,321
28	74	1,160	704	52,378
29	74	1,190	722	53,067
30	75	1,160	704	52,589
Total	2,473			1,684,878
		Monthly Flow-weighted TDS =	681 mg/L	

(1) TDS = EC x 0.6068

TABLE F-3

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM

WATER YEAR 2016-17

Month	Monthly Flow [1] (cfs-days)	Monthly Flow-weighted TDS[1] (mg/L)	Monthly Flow x TDS
2016			
October	2,703	637	1,722,852
November	4,021	578	2,322,075
December	7,875	358	2,817,593
2017			
January	37,876	233	8,809,857
February	13,557	369	5,002,533
March	10,781	514	5,538,639
April	7,458	723	5,192,842
May	2,876	637	1,830,878
June	1,555	685	1,065,028
July	2,069	689	1,424,846
August	2,186	695	1,518,236
September	2,473	681	1,684,878
Total	95,429 [1]		38,930,257
	Yearly Flow-weighted TDS[1] =	408	

(1) Prado Outflow and Flow Weighted TDS values exclude days when EC data are missing

APPENDIX G

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

WATER YEAR 2016-17

TABLE G-1

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

WATER YEAR 2016-17

MONTH	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2016			
October	188	818	153,817
November	183	760	138,729
December	182	864	157,045
2017			
January	187	798	148,856
February	167	797	133,065
March	186	896	166,559
April	178	901	160,222
May	185	920	169,925
June	181	926	167,760
July	185	900	166,149
August	191	936	178,950
September	181	861	156,214
Total	2,193		1,897,292

Flow-weighted TDS = $\frac{1,897,292}{2,193}$ = 865 mg/L

APPENDIX H

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

WATER YEAR 2016-17

TABLE H-1

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2016-17

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Monthly Average TDS
2016	10/05/2016	1022	596	C of R		0.58	
	10/12/2016	1024	656	C of R		0.64	
	10/14/2016	1020	741	USGS		0.73	
	10/19/2016	1016	713	C of R		0.70	
	10/26/2016	965	638	C of R		0.66	
	10/26/2016	977	595	USGS		0.61	***656.5***
	11/02/2016	972	652	C of R		0.67	
	11/04/2016	988	622	USGS		0.63	
	11/09/2016	942	598	C of R		0.63	
	11/16/2016	986	552	C of R		0.56	
	11/23/2016	970	592	C of R		0.61	
	11/30/2016	988	646	C of R		0.65	
	11/30/2016	969	604	USGS		0.62	***609.4***
	12/07/2016	1015	676	C of R		0.67	
	12/13/2016	980	633	USGS		0.65	
	12/14/2016	986	632	C of R		0.64	
	12/20/2016	976	593	USGS		0.61	
	12/21/2016	210	168	C of R	*	0.80	
	12/22/2016	220	131	USGS	*	0.60	
	12/28/2016	984	676	C of R		0.69	***642***
2017	01/04/2017	975	602	C of R		0.62	
	01/11/2017	267	178	C of R	*	0.67	
	01/11/2017	248	147	USGS	*	0.59	
	01/17/2017	953	573	USGS		0.60	
	01/18/2017	969	626	C of R		0.65	
	01/25/2017	639	424	C of R		0.66	***556***

*	TDS data not used in determining monthly averages
USGS	U.S. Geological Survey
C of R	City of Riverside
NR	Not Recorded

TABLE H-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2016-17

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Average
2017	02/01/2017	885	559	USGS	0.63	
	02/01/2017	994	624	C of R	0.63	
	02/08/2017	817	542	C of R	0.66	
	02/15/2017	1016	630	C of R	0.62	
	02/22/2017	988	654	C of R	0.66	
	02/24/2017	920	573	USGS	0.62	***597***
	03/01/2017	916	594	C of R	0.65	
	03/03/2017	950	580	USGS	0.61	
	03/08/2017	1005	660	C of R	0.66	
	03/15/2017	1051	646	C of R	0.61	
	03/15/2017	991	602	USGS	0.61	
	03/22/2017	991	598	C of R	0.60	
	03/29/2017	1052	690	C of R	0.66	***624***
	04/05/2017	1059	644	C of R	0.61	
	04/06/2017	1059	644	C of R	0.61	
	04/11/2017	1020	639	USGS	0.63	
	04/12/2017	1080	638	C of R	0.59	
	04/19/2017	1099	674	C of R	0.61	
	04/26/2017	1085	654	C of R	0.60	
	04/28/2017	998	612	USGS	0.61	***644***
	05/03/2017	1091	690	C of R	0.63	
	05/08/2017	1000	601	USGS	0.60	
	05/10/2017	1088	718	C of R	0.66	
	05/17/2017	1099	700	C of R	0.64	
	05/25/2017	1117	714	C of R	0.64	
	05/31/2017	1116	722	C of R	0.65	
	05/31/2017	1060	658	USGS	0.62	***686***

*	TDS data not used in determining monthly averages
USGS	U.S. Geological Survey
C of R	City of Riverside
NR	Not Recorded

TABLE H-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2016-17

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Average
2017	06/07/2017	1087	716	C of R	0.66	
	06/09/2017	1040	636	USGS	0.61	
	06/14/2017	1111	698	C of R	0.63	
	06/21/2017	1096	718	C of R	0.66	
	06/28/2017	1115	684	C of R	0.61	
	06/28/2017	1060	643	USGS	0.61	***683***
	07/05/2017	1096	674	C of R	0.61	
	07/07/2017	1060	654	USGS	0.62	
	07/12/2017	1099	690	C of R	0.63	
	07/19/2017	1089	701	C of R	0.64	
	07/26/2017	1100	788	C of R	0.72	
	07/28/2017	1040	631	USGS	0.61	*690*
	08/02/2017	1078	726	C of R	0.67	
	08/07/2017	1050	638	USGS	0.61	
	08/09/2017	1075	710	C of R	0.66	
	08/16/2017	1069	676	C of R	0.63	
	08/23/2017	1071	712	C of R	0.66	
	08/25/2017	1020	637	USGS	0.62	
	08/30/2017	1086	716	C of R	0.66	***688***
	09/06/2017	1084	714	C of R	0.66	
	09/07/2017	1030	633	USGS	0.61	
	09/13/2017	1079	684	C of R	0.63	
	09/20/2017	1068	670	C of R	0.63	
	09/21/2017	1130	641	USGS	0.57	
	09/28/2017	1066	692	C of R	0.65	*672*
	Max	1130	788		0.80	*690*
	Min	210	131		0.56	*556*

*	TDS data not used in determining monthly averages
USGS	U.S. Geological Survey
C of R	City of Riverside
NR	Not Recorded

TABLE H-2

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS AT RIVERSIDE NARROWS
WATER YEAR 2016-17

	Month	Stream Flow [1] (acre-feet)	Monthly Average TDS [2] (mg/L)	Monthly Flow x TDS
2016	October	2,448	657	1,608,336
	November	2,861	609	1,742,349
	December	3,309	642	2,124,378
2017	January	4,256	556	2,366,336
	February	3,836	597	2,290,092
	March	3,597	624	2,244,528
	April	3,132	644	2,017,008
	May	2,567	686	1,760,962
	June	1,817	683	1,241,011
	July	1,922	690	1,326,180
	August	2,115	688	1,455,120
	September	2,036	672	1,368,192
	Total Stream Flow	33,896		21,544,492

$$\text{Flow-weighted TDS} = \frac{21{,}544{,}492}{33{,}896} = 636 \text{ mg/L}$$

(1) USGS measured flow minus storm flow.

(2) TDS based on water quality data from Table H-1.