SANTA ANA RIVER WATERMASTER

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

WATERMASTER
Samuel H. Fuller
Roy L. Herndon
Thomas A. Love
Michael R. Markus
John V. Rossi

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

April 30, 2011

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

Re: Watermaster Report for Water Year October 1, 2009 - September 30, 2010

Ladies and Gentlemen:

We have the honor of submitting herewith the Fortieth 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 2009-10 are as follows:

At Prado

1	Measured Outflow at Prado	243,776	acre-feet
2	Base Flow at Prado	103,099	acre-feet
3	Annual Weighted TDS in Base and Storm Flows	443	mg/L
4	Annual Adjusted Base Flow	125,179	acre-feet
5	Cumulative Adjusted Base Flow	4,905,004	acre-feet
6	Other Credits (Debits)	1,489	acre-feet
7	Cumulative Entitlement of OCWD	1,680,000	acre-feet
8	Cumulative Credit	3,263,211	acre-feet
9	One-Third of Cumulative Debit	0	acre-feet
10	Minimum Required Base Flow in 2010-11	34,000	acre-feet

At Riverside Narrows

1	Base Flow at Riverside Narrows	45,887	acre-feet
2	Annual Weighted TDS in Base Flow	643	mg/L
3	Annual Adjusted Base Flow	45,887	acre-feet
4	Cumulative Adjusted Base Flow	1,797,130	acre-feet
5	Cumulative Entitlement of IEUA and WMWD	610,000	acre-feet
6	Cumulative Credit	1,187,130	acre-feet
7	One-Third of Cumulative Debit	0	acre-feet
8	Minimum Required Base Flow in 2010-11	12,420	acre-feet

Based on these findings, the Watermaster concludes that there was full compliance with the provisions of the Stipulated Judgment in 2009-10.

At the end of the 2009-10 water year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit of 3,263,211 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 1,187,130 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: Samuel H. Fuller

Michael R. Markus

Roy L. Herndon

John V. Rossi

Thomas A. Love

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO, et al.

CASE NO. 117628 - COUNTY OF ORANGE

FORTIETH

ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2009 - SEPTEMBER 30, 2010

APRIL 30, 2011

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF PLATES

(Located at back of report)

TABLE OF CONTENTS (Continued)

APPENDICES

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

CHAPTER I

WATERMASTER ACTIVITIES AND WATER CONDITIONS

Introduction

This Fortieth Annual Report of the Santa Ana River Watermaster covers Water Year 2009-10. The annual report is required by the Stipulated Judgment (Judgment) in the case of Orange County Water District v. City of Chino, et al., entered by the court on April 17, 1969 (Case No. 117628-County of Orange). 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 Watermaster's duty is 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 is April 30, seven months after the end of the water year.

At the beginning of Water Year 2009-10 the Watermaster consisted of Richard W. Atwater, Samuel H. Fuller, Craig D. Miller, John V. Rossi, and Robert C. Wagner. IEUA nominated Thomas A. Love to replace Mr. Atwater. OCWD nominated Michael R. Markus to replace Mr. Wagner. Mr. Miller was elected Chairman and Mr. Fuller was elected Secretary/ Treasurer at the December 13, 2010 meeting. At the February 4, 2011 meeting, Mr. Miller notified the Watermaster he would be resigning his appointment. OCWD nominated Roy L. Herndon to replace Mr. Miller. Mr. Rossi was elected Chairman at the March 7, 2011 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 Watermaster's determinations.

For Water Year 2009-10 the United States Geological Survey (USGS) provided discharge and water quality data for the River at two gaging stations, "Santa Ana River Below Prado" (Prado) and "Santa Ana River at Metropolitan Water District (MWD) Crossing" (Riverside Narrows). The discharge data at both stations consist of computed daily mean discharges, expressed in cubic feet per second (cfs), based on continuous recordings. The water quality data at Prado consist of daily maximum and minimum and mean values for electrical conductivity (EC), measured as specific conductance and expressed in microsiemens per centimeter (μs/cm) based on a continuous recording, and twice-monthly measured values for total dissolved solids (TDS), expressed in milligrams per liter (mg/L). The water quality data at Riverside Narrows consist of twice-monthly values for both EC and TDS. The USGS also provided discharge data for other gaging stations for streams tributary to Prado, including, among others, the Santa Ana River at E Street in San Bernardino, Chino Creek at Schaefer Avenue, Cucamonga Creek near Mira Loma, and Temescal Creek in the City of Corona (see Appendix A). At times the USGS must estimate daily mean discharges due to damaged or malfunctioning recording equipment.

The Water Year 2009-10 daily mean discharge record at Prado is considered by the USGS to be "good". 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, 4,790 cfs on January 23, 2010 and 79 cfs on July 23, 2010 . The maximum and minimum daily flow-weighted mean EC values reported by the USGS at Prado were, respectively, 1,210 μs/cm on June 17, 18, and 19, 2010 and 302 μs/cm on January 21, 2010. The corresponding calculated TDS concentrations were 731 and 183 mg/L. EC records were rated "good" by the USGS.

The Water Year 2009-10 daily mean discharge record at Riverside Narrows was rated by the USGS to be "fair" except for discharges above 100 cfs and estimated daily discharges, which are rated "poor". The maximum and minimum daily mean discharge values during the year were 7,320 cfs on January 22, 2010 and 42 cfs on May 31, 2010, respectively. The maximum and minimum EC values reported by the USGS were 1,020 μs/cm on May 28, 2010 and 690 μs/cm on December 14, 2009, respectively. The corresponding measured TDS concentrations were 629 mg/L and 413 mg/L.

To assist in making its determinations each year the Watermaster refers to the records of many precipitation stations located in or near the Santa Ana River Watershed. The record for San Bernardino County Department of Public Works (SBCDPW) Station 2146, located at the San Bernardino County Hospital, was used to define the hydrologic base period for

the physical solution in the Judgment, and until Water Year 2000-01 the annual reports of the Watermaster presented the daily and total annual precipitation record at Station 2146 in order to provide a comparison with historical conditions.

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

The USGS established a precipitation gage network during the 2003-04 Water Year 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.

For Water Year 2009-10, the total precipitation recorded at the Gilbert Street gage was 17.79 inches, or 99% 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 reported by the Watermaster from 1934-35 through 2009-10.

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 2009-10, the United States Army Corps of Engineers (USACE) stored the flows of the Santa Ana River at Seven Oaks Dam. The storage in Seven Oaks Dam Reservoir reached about 17,260 acre-feet by July 12, 2010. During July 13 through 15, 2010, the USACE exercised the outlet gates each day to test the outlet gates and appurtenant structures of the Seven Oaks Dam. On July 13 the maximum discharge from Seven Oaks Dam was 2,850 cfs, on July 14 the maximum flow was 2,630 cfs, and on July 15 the maximum flow was 3,230 cfs as determined by the USGS at the gage, Santa Ana River near Mentone. After the outlet gate testing was completed, the USACE cooperated with the local water agencies, particularly SBVMWD, San Bernardino Valley Water Conservation District, and WMWD, by restricting releases from Seven Oaks Dam to about 300 cfs. SBVMWD and WMWD were thus able to divert 15,691 acre-feet of the flows from the Seven Oaks Dam into recharge basins and recharged additional portions of the flow in the River channel into the San Bernardino Basin Area. The high flow rates on July 12 through 15 resulted in the flows reaching Riverside Narrows in the Santa Ana River. The Watermaster determined that approximately 1,087 acre-feet passed Riverside Narrows. The Watermaster determined that approximately 594 acre-feet of water flowed into Prado Reservoir. The Watermaster will review the determination of the character of the flow that passed Riverside Narrows and the flow that reached Prado.

During Water Year 2009-10 there were no sources of non-storm flow in the river at Riverside Narrows. There was one source of non-storm flow in the river at Prado, that the Watermaster has included in neither Base Flow nor in the calculation of Cumulative Credits: Arlington Desalter water at Prado. A second source, treated municipal wastewater discharged to Temescal Creek from the San Jacinto River Watershed, was also excluded from Base Flow but was partially added to the Cumulative Credit at Prado.

- At its Arlington Desalter in Riverside, WMWD produced and delivered 86 acre-feet of water having an average TDS of 314 mg/L to a channel tributary to the River between Riverside Narrows and Prado.
- Eastern Municipal Water District (EMWD) reported that it discharged 4,961 acre-feet of treated wastewater to Temescal Creek, with a flow-weighted average TDS of 789 mg/L, that originated in the San Jacinto River Watershed. Discharges from the San Jacinto Watershed were not taken into account in the settlement discussions and calculations that led to the flow obligations in the Judgment. In the past the Watermaster decided that fifty percent of any portion of such discharges that reach Prado Reservoir and that are subsequently captured by OCWD should be added to the Cumulative Credit at Prado (after the usual water quality adjustment). OCWD Hydrogeologist Gwen Sharp estimated that 4,814 acre-feet of the EMWD treated wastewater, with an average TDS

concentration of 813 mg/L, reached Prado Reservoir and that 2,977 acre-feet of it was captured by OCWD, and recommended that the Cumulative Credit at Prado be increased accordingly using the previously established fifty percent rule. The Watermaster accepted the estimate and the recommendation.

The Watermaster's determinations for Water Year 2009-10 are explained in detail for Prado in Chapter II and for Riverside Narrows in Chapter III. A summary of annual determinations by the Watermaster for both locations for the period 1970-71 through 2009-10 is presented in Table 1. Note that the Base Flow obligations set forth in the Judgment at both Prado and Riverside Narrows have been met and cumulative credits have accrued to the Upper Area.

TABLE 1

SUMMARY OF FINDINGS AT PRADO

Water Year	Rainfall (in)[1]	USGS Measured Flow (ac-ft)	Total Flow (ac-ft)[2]	Base Flow (ac-ft)[3]	Weighted TDS (mg/L)[4]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)[5]
1970-71	11.97	51,864	51,864	38,402	727	38,402	-3,598
1971-72	9.62	51,743	51,743	40,416	707	40,416	-5,182
1972-73	18.46	76,848	77,484	48,999	638	51,531	4,349
1973-74	12.72	128,436	62,511	43,106	633	45,513	7,862
1974-75	13.49	93,397	61,855	50,176	694	51,263	17,125
1975-76	15.86	120,590	59,209	45,627	635	48,098	23,223
1976-77	11.95	72,278	62,953	48,387	660	50,000	31,223
1977-78	30.47	255,043	252,850	58,501	383	73,955	63,178
1978-79	17.51	145,198	134,506	71,863	580	79,049	100,227
1979-80	30.93	536,174	527,760	82,509	351	106,505	164,732
1980-81	10.45	118,300	117,888	74,875	728	74,875	205,652
1981-82	18.34	143,702	143,367	81,548	584	89,431	253,083
1982-83	32.36	426,273	426,750	111,692	411	138,591	353,036
1983-84	10.81	178,730	177,606	109,231	627	115,876	431,514
1984-85	12.86	163,247	162,912	125,023	617	133,670	523,184
1985-86	17.86	196,900	197,373	127,215	567	141,315	622,499
1986-87	8.08	140,872	143,191	119,848	622	127,638	708,137
1987-88	13.78	176,292	166,818	124,104	582	136,308	802,445
1988-89	12.64	159,659	152,743	119,572	583	131,230	891,675
1989-90	8.53	144,817	143,463	119,149	611	127,986	977,661
1990-91	15.48	195,186	186,426	111,151	514	128,379	1,064,040
1991-92	16.54	198,280	189,677	106,948	499	124,862	1,146,902
1992-93	30.92	571,138	566,630	128,067	368	163,499	1,268,401
1993-94	11.62	159,560	152,808	111,186	611	119,432	1,345,833
1994-95	25.14	429,270	422,816	123,468	415	152,792	1,458,387
1995-96	11.92	217,160	190,553	131,861	514	152,299	1,568,686
1996-97	18.64	249,685	198,459	136,676	514	157,861	1,684,547
1997-98	33.41	462,646	456,316	154,021	392	193,553	1,836,100
1998-99	8.02	184,998	182,310	158,637	581	174,369	1,968,469
1999-00	11.09	207,850	188,538	148,269	527	169,644	2,096,113
2000-01	16.13	222,559	208,535	153,914	525	176,360	2,230,473
2001-02	5.08	174,968	156,596	145,981	587	159,728	2,348,201
2002-03	16.22	256,157	245,947	146,113	463	174,970	2,482,058
2003-04	10.80	214,102	201,967	143,510	508	166,472	2,606,777
2004-05	29.89	638,513	637,568	154,307	348	199,570	2,766,713
2005-06	13.23	247,593	246,101	147,736	517	170,266	2,898,541
2006-07	4.61	156,147	153,823	129,830	604	140,216	3,002,288
2007-08	13.70	199,690	194,309	116,483	495	136,382	3,100,835
2008-09	10.14	162,698	161,026	102,711	527	117,519	3,178,543
2009-10	17.79	243,776	243,690	103,099	443	125,179	3,263,211

TABLE 1 (Continued)

SUMMARY OF FINDINGS AT RIVERSIDE NARROWS

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

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 for Water Year 2007-08, 2008-09, and 2009-10.

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

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

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

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

(6) The Base Flow amount for 2007-08 at Riverside Narrows was published as 47,760 acre-feet in the 2007-08 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 Watermaster's determinations, do have significant potential to affect River flow or quality. The following are brief descriptions of five such items.

Upper Area Treated Wastewater Discharges

Data on treated wastewater discharged in the Upper Area are compiled annually because it 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) 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 first went into service in 1985-86. The NRWS has been in service since prior to 1970, but records of flow data prior to 1981-82 are missing.

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

Arundo donax Eradication

Arundo donax is a non-native species of reed that has invaded many waterways in California. It displaces native vegetation, resulting in undesirable habitat for animals. *Arundo* also consumes water at the rate of about 5.6 acre-feet per acre per year compared to only about 1.9 for native plants, a net water loss of about 3.7 acre-feet per year per acre of *Arundo*. By the early 1990s there were about 10,000 acres of *Arundo* in the Santa Ana River Watershed. In 1997 a consortium of local, state and federal agencies launched a long term eradication program in the watershed for reasons of both habitat restoration and water savings. *Arundo* spreads quickly downstream as roots and rhizomes break off during high streamflows. Therefore the eradication program began at the farthest upstream locations and is working toward the River mouth. Each location requires multiyear retreatment. During Water Year 2009-10 the consortium eradicated 200 acres of *Arundo,* bringing the total eradicated to date to 4,100 acres.

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

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

1. RIX = Rapid Infiltration and Extraction Facility for San Bernadino and Colton, including over-extraction of groundwater
2. Beginning in 1997-98, includes IEUA Plant #4 flows.
3. CCWRF = Carbon Canyon Water Reclamation Facility
4. WRCR = Western Riverside County Regional Wastewater Treatment Plant

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

TABLE 3

HIGH SALINITY WATER EXPORTED
FROM THE SANTA ANA RIVER WATERSHED

Water Year	Inland Empire Utility Agency Non-Reclaimable Wastewater North System (acre-feet)	Santa Ana Watershed Project Authority Santa Ana Regional Interceptor (SARI)[1] 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

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 ("HCP") 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.

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

Water Right Permits for Appropriation of Water from the Santa Ana River

On October 3, 1991, SBVMWD submitted an application to appropriate un-appropriated water from the Santa Ana River to the State Water Resources Control Board (SWRCB) Division of Water Rights. This application was followed on May 31, 1995 by a joint application submitted by SBVMWD and WMWD which was accompanied by a petition for reconsideration of Order WR 89-25 which previously designated the Santa Ana River Watershed as a fully appropriated stream system. SBVMWD and WMWD requested authorization to direct divert and divert to underground storage and surface storage, water from the Santa Ana River at numerous points including the soon to be completed Seven Oaks Dam. The USACE was constructing the Seven Oaks Dam as a portion of the Santa Ana River Mainstem Project in conjunction with the local sponsors for the project, Orange County Flood Control District, Riverside County Flood Control and Water Conservation District, and San Bernardino County Flood Control (and Water Conservation) District.

On September 2, 1999, OCWD submitted an application and petition to the SWRCB Division of Water Rights. OCWD requested authorization to divert water from the Santa Ana River to underground storage and surface storage.

On November 16, 1999, the Parties, IEUA, OCWD, SBVMWD and WMWD, entered into a Memorandum of Understanding to Affirm and Preserve Existing Rights in the Santa Ana River Watershed. This agreement Affirmed the Declared Rights under the Judgment and established the intent of the Parties to cooperate with one another as may be necessary, appropriate or convenient to implement their respective projects and the Judgment.

In 2000, the SWRCB conducted a hearing and found in Order WR 2000-12 that the Fully Appropriated Stream status on the Santa Ana River could be removed to allow consideration of the application from SBVMWD and WMWD and the application from OCWD. In November 2002, additional applications and petitions were submitted by Chino Basin Watermaster, SBVMWD and WMWD, San Bernardino Valley Water Conservation District (San Bernardino Valley Water Conservation District later withdrew its application) and City of Riverside. Based on evidence in the record, the SWRCB found that the Declaration as adopted in Order WR 98-08 should be revised to allow processing of these water right applications. On May 2, 3, 4 and 8, 2007 the SWRCB conducted a hearing for all applications submitted to appropriate water from the Santa Ana River.

During 2008 the SWRCB began to issue separate water right permits to several agencies within the Santa Ana River Watershed:

City of Riverside Application 31372: City of Riverside withdrew its application 31372 and requested a Wastewater Change Petition. On May 30, 2008, the SWRCB approved Wastewater Change Petition WW-0045 of the City of Riverside. Wastewater Change Petition WW-0045 requires the City of Riverside to discharge a minimum of 25,000 acre-feet per year of treated effluent to the Santa Ana River and allows the City of Riverside to recycle water from the wastewater treatment plant in amounts greater than the 25,000 acre-feet per year discharge requirement.

Chino Basin Watermaster Application 31369: On October 9, 2008, the SWRCB issued Permit Number 21225 to the Chino Basin Watermaster. Permit Number 21225 authorizes the Chino Basin Watermaster to divert up to 68,500 acre-feet of water per year to underground storage at a maximum rate of flow of 115,570 cfs from January 1 to December 31 of each year from 29 points of diversion on numerous streams that are tributary to the Santa Ana River.

OCWD Application Number 31174: On June 30, 2009, the SWRCB issued Permit Number 21243 to OCWD. Permit Number 21243 authorizes OCWD to divert up to 362,000 acre-feet of water per year to underground storage and/or surface storage from numerous points of diversion at a maximum flow rate of 1,670 cfs from January 1 to December 31 of each year from the Santa Ana River.

SBVMWD and WMWD Application Numbers 31165 and 31370: On October 20, 2009, the SWRCB issued Decision 1649 in the matter of applications 31165 and 31370. On June 29, 2010 the SWRCB issued permit number 21264 pursuant to application 31165 and permit number 21265 pursuant to application 31370, respectively, to SBVMWD and WMWD. These two permits authorize SBVMWD and WMWD to divert up to 198,317 acre-feet of water per year from numerous points of diversion on the Santa Ana River and its tributaries to direct diversion uses, diversion to underground storage, and diversion to

onstream and offstream surface storage at a maximum flow rate of 1,250 cfs from October 1 of each year to September 30 of the following year. During Water Year 2009-10 SBVMWD and WMWD were able to divert 15,691 acre-feet to recharge basins for underground storage in the San Bernardino Basin Area from the stored water remaining in Seven Oaks Dam after the flow test releases were completed by the USACE from July 12 through July 16, 2010.

On May 20, 2010, the SWRCB advertised a Notice of Wastewater Change Petition number WW0059 submitted by the City of San Bernardino Municipal Water Department. The City of San Bernardino Municipal Water Department requested authorization to reclaim the tertiary treated water that is presently discharged to the Santa Ana River for irrigation and groundwater recharge uses in the San Bernardino Basin Area and other areas. The SWRCB advertised the wastewater change petition. SBVMWD and WMWD requested that the SWRCB extend the protest period and defer any hearing on the matter for 6 months to allow SBVMWD and WMWD to discuss the matter with the City of San Bernardino Municipal Water Department. SBVMWD and WMWD are reported to be nearing agreement on the conditions of the change petition.

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 2009-10 fiscal year as well as the budget adopted for the 2010-11 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, 2009 to June 30, 2010 Budget	July 1, 2009 to June 30, 2010 Expenses	July 1, 2010 to June 30, 2011 Budget
Support Services	$12,500.00	$9,277.00	$12,500.00
Reproduction of Annual Report	1,500.00	1,015.22	1,500.00
TOTAL	$14,000.00	$10,292.22	$14,000.00

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 2009-10, 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, 2009 to September 30, 2010

	Total Cost	USGS Share	Parties' Share
USGS PRECIPITATION GAGING STATIONS			
Gilbert Street Gage at San Bernardino	$7,750	$0	$7,750
"E" Street Gage	7,750	0	7,750
Middle Fork Lytle Creek Gage	7,750	0	7,750
Ridge Top Gage near Devore	7,750	0	7,750
USGS FLOW AND WATER QUALITY GAGING STATIONS			
Santa Ana River at MWD Crossing (Riverside Narrows)			
Surface Water Gage	31,200	12,500	18,700
Water Quality Monitoring/TDS Sampling	12,950	5,200	7,750
Santa Ana River below Prado Dam			
Surface Water Gage	22,200	8,900	13,300
Continuous Temperature and Conductance	29,650	11,850	17,800
Water Quality Conductance Program	2,500	0	2,500
Extra Measurements	2,800	0	2,800
Temescal Creek above Main St., near Corona	22,200	8,900	13,300
Chino Creek at Schaefer	22,200	8,900	13,300
Cucamonga Creek at Mira Loma	22,200	8,900	13,300
TOTAL COST AND SHARES	$198,900	$65,150	$133,750
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$26,750
Orange County Water District	40%		$53,500
San Bernardino Valley Municipal Water District	20%		$26,750
Western Municipal Water District	20%		$26,750

CHAPTER II

BASE FLOW AT PRADO

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

Flow at Prado

During Water Year 2009-10, the flow of the River as measured at the USGS gaging station below Prado Dam amounted to 243,776 acre-feet. Three acre-feet of water were in storage at the beginning of the Water Year, and one acre-foot of water remained in storage at the end of the Water Year. Inflow to the reservoir included 103,099 acre-feet of Base Flow and 135,775 acre-feet of Storm Flow. Nontributary flows consisted of Arlington Desalter discharges. Water discharged from the San Jacinto Watershed was also excluded from Base Flow but was partially credited to the Cumulative Credit at Prado. Of the flow due to the Arlington Desalter discharge, 86 acre-feet reached Prado Reservoir during Water Year 2009-10. Discharge from the San Jacinto Watershed calculated to have reached Prado Reservoir was 4,814 acre-feet. The monthly components of flow of the River at Prado Dam for Water Year 2009-10 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the Santa Ana River below Prado during the period Water Years 1934-35 through 2009-10 are presented on Plate 5.

During July 13 through 15, 2010, the USACE tested the outlet works at Seven Oaks Dam. The high flow rate releases from Seven Oaks Dam flowed downstream to Prado. Plate 4 illustrates that a portion of the flow from the high rate flow test reached Prado reservoir on July 14, 2010. The Watermaster will review the determination of the character of this water.

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 2009-10 it included Arlington Desalter discharge. Some flows from the San Jacinto Watershed were also determined to have reached Prado Reservoir. In the past nontributary flows have included, and in the future may include, other water discharged to the river pursuant to the water exchanges or other such programs.

High Groundwater Mitigation Project

No High Groundwater Mitigation Project water was discharged to the River during Water˚Year 2009-10.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
WATER YEAR 2009-10
(acre-feet)

	USGS Measured Outflow	Storage Change (1)	Computed Inflow	San Jacinto Watershed Flow at Prado (2)	WMWD Transfer Water (3)	San Antonio Creek (4)	Arlington Desalter	Storm Flow	Base Flow
2009									
October	7,702	3	7,705	0	0	0	24	449	7,232
November	8,345	(3)	8,342	0	0	0	48	445	7,849
December	23,772	9	23,781	0	0	0	14	13,809	9,958
2010									
January	74,162	7,939	82,101	777	0	0	0	69,701	11,623
February	48,668	5,719	54,387	2,789	0	0	0	40,642	10,956
March	26,934	(7,856)	19,078	1,248	0	0	0	6,453	11,377
April	15,308	(1,338)	13,970	0	0	0	0	3,625	10,345
May	10,961	(2,677)	8,284	0	0	0	0	57	8,227
June	8,969	(1,796)	7,173	0	0	0	0	0	7,173
July	6,783	(2)	6,781	0	0	0	0	594	6,187
August	5,736	0	5,736	0	0	0	0	0	5,736
September	6,436	0	6,436	0	0	0	0	0	6,436
Total	243,776	(2)	243,774	4,814	0	0	86	135,775	103,099

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

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

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

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

Releases to San Antonio Creek

During Water Year 2009-10, no State Water Project water was released into San Antonio Creek from the Foothill Feeder at turnout OC-59 near Upland for OCWD that would have arrived at Prado reservoir.

Arlington Desalter Discharge

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

The Watermaster determined that the flow and TDS of the water delivered to OCWD via the River from this facility would be excluded from the computation of Base Flow and Adjusted Base at Prado. During Water Year 2009-10, 86 acre-feet of Arlington Desalter flows were discharged to the Arlington drain. WMWD provided daily discharge rates and electrical conductance of water discharged. A summary of Arlington Desalter discharges is contained in Appendix F.

WMWD-OCWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Colton and Riverside Basins via the Riverside Canal and the River. No WMWD-OCWD Transfer Program water deliveries were made to the River upstream of Riverside Narrows and Prado Dam during Water Year 2009-10.

San Jacinto Watershed Discharge

Prior to the 1997-98 Water Year, discharges from the San Jacinto Watershed reaching Prado Reservoir were due to discharges from Lake Elsinore, and had been accounted for as “Lake Elsinore Discharge.” In 1998 EMWD completed its Reach 4 discharge pipeline to Wasson Canyon, which is tributary to Temescal Wash. The pipeline discharges tertiary-treated wastewater to Temescal Wash above Lee Lake when flows exceed EMWD’s storage facility capacity. The collective discharges from Lake Elsinore and EMWD to Temescal Wash are referred to herein as San Jacinto Watershed discharges.

During Water Year 2009-10, EMWD discharged 4,961 acre-feet of treated wastewater to Temescal Wash, and 4,814 acre-feet of that discharge was estimated to have reached Prado Reservoir. The Watermaster previously determined that to the extent such discharges occur and are captured by OCWD, fifty percent of such captured water will be added as Cumulative Credit at Prado. OCWD captured 2,977 acre-feet of the San Jacinto

Watershed discharge and 1,837 acre-feet flowed past OCWD's groundwater recharge facilities and was considered as lost to the ocean. Summaries of the EMWD Discharges, San Jacinto Watershed Discharge Calculations, and San Jacinto Watershed Discharges are contained in Appendix G. Page G-7 contains hydrographs of Discharge of Temescal Creek at Main Street in Corona, EMWD Discharge, and Elsinore Precipitation and illustrates the known and estimated components of flow of Temescal Creek.

Storm Flow

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

During Water Year 2009-10, the maximum volume of water stored in Prado Reservoir reached 30,443 acre-feet on January 22, 2010. The maximum daily mean flow released from Prado Dam to the Santa Ana River was 4,790 cfs on January 23, 2010.

Base Flow

The Base Flow is that portion of the total flow remaining after subtracting Storm Flow, Nontributary Flow, Exchange Water, and certain other flows determined by the Watermaster. Flows affecting the determination of Base Flow in Water Year 2009-10 included Arlington Desalter discharge and discharges from the San Jacinto Watershed. The general procedure used by the Watermaster to separate the Water Year 2009-10 flow components was the same as used for previous years and is fully described in the Fifth (1974-75) and the Twelfth (1981-82) Annual Reports. Table 6 shows the monthly and annual quantities of Base Flow.

Water Quality Adjustments

The flow-weighted average TDS for the total flow passing Prado Dam, including Arlington Desalter discharge and San Jacinto Watershed discharge, was found to be 450 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 24 grab samples for EC collected by the USGS and analyzed for TDS.

A correlation between TDS and EC yields the following best fit equation:

$$TDS = EC \times 0.60405$$

(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 daily average TDS concentration of the River flow passing Prado Dam. A summary of daily TDS and EC of the River below Prado Dam is contained in Appendix H. At Prado Dam, the flow-weighted average annual TDS concentration of 450 mg/L represents the quality of the total flow including Arlington Desalter discharge and discharges from the San Jacinto Watershed. The Judgment requires that Base Flow shall be subject to adjustment based on the TDS of Base Flow and Storm Flow only. Hence, a determination of the TDS of Base Flow plus Storm Flow only, is detailed in the following paragraphs.

Adjustment for High Groundwater Mitigation Project Discharge

During Water Year 2009-10, SBVMWD did not discharge High Groundwater Mitigation Project water. Therefore, no water quality adjustment was necessary.

Adjustment for Flow to San Antonio Creek

During Water Year 2009-10, no water was released from OC-59 to San Antonio Creek. Therefore, no water quality adjustment was necessary.

Adjustment for Arlington Desalter Discharge

During Water Year 2009-10, 86 acre-feet of water were discharged from the Arlington Desalter. A flow-weighted average TDS of 314 mg/L was calculated for Arlington Desalter water reaching Prado Dam. A summary of the Arlington Desalter discharge, daily mean EC, and computed TDS is contained in Appendix F.

Adjustment for WMWD-OCWD Transfer Program Discharge

During Water Year 2009-10, no WMWD-OCWD Transfer Program water was delivered. Therefore, no water quality adjustment was necessary.

Adjustment for San Jacinto Watershed Discharge

Discharge from the San Jacinto Watershed during Water Year 2009-10 reaching Prado Reservoir was estimated to be 4,814 acre-feet. Using EMWD discharge data, the TDS data for the discharge, and monthly volume of the discharge estimated to have reached Prado reservoir, a flow-weighted average TDS of 813 mg/L was calculated. A summary of these calculations is contained in Appendix G.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow X Average TDS
1. Measured Outflow	243,776	450	109,699,200
2. Less High Groundwater Mitigation Project	0	---	---
3. Less Nontributary Flow San Antonio Creek	0	---	---
4. Less Arlington Desalter	(86)	314	(27,004)
5. Less WMWD Transfer Program	0	---	---
6. Less San Jacinto Watershed Discharge	(4,814)	813	(3,913,782)
7. Measured Outflow less lines 2 through 6	238,876		105,758,414
Average TDS in Total Base and Storm Flow	105,758,414 ÷ 238,876 = 443 mg/L		

After adjusting for Arlington Desalter discharges and San Jacinto Watershed discharge, the flow-weighted average annual TDS of Storm Flow and Base Flow for Water Year 2009-10 is 443 mg/L, as shown above.

Adjusted Base Flow at Prado

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

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

Where: Q = Base Flow actually received.

The flow-weighted average annual TDS of 443 mg/L is less than 700 mg/L. Therefore, the Base Flow must be adjusted by the above equation for TDS less than 700 mg/L. Thus the Adjusted Base Flow is as follows:

$$(103{,}099 \text{ acre-feet}) + \frac{35}{42{,}000} (103{,}099 \text{ acre-feet}) (700 - 443) = 125{,}179 \text{ acre-feet}$$

Entitlement and Credit or Debit

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

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

Of the 4,814 acre-feet of San Jacinto Watershed outflows reaching Prado Reservoir in Water Year 2009-10, 1,837 acre-feet flowed past OCWD's groundwater recharge facilities and was considered as lost to the ocean. Therefore, a net of 2,977 acre-feet of San Jacinto Watershed outflow recharged the Orange County groundwater basin in Water Year 2009-10. One-half of that amount has been considered a credit against the Upper

Area Base Flow obligation at Prado Dam. Thus, an additional 1,489 acre-feet was added to the Cumulative Credit at Prado Dam.

While compiling the 2002-03 Watermaster Report, it came to the attention of the Watermaster that in previous reports one-half the San Jacinto Watershed discharge reaching Prado and recharging Orange County groundwater basin had been included in the Cumulative Adjusted Base Flow as well as in the Cumulative Credit. The Watermaster determined that the San Jacinto Watershed discharge should be included only in the Cumulative Credit and not in the Cumulative Adjusted Base Flow. Therefore, the Watermaster revised the Cumulative Adjusted Base Flow and has included Table 7 summarizing the historical Watermaster findings concerning flow at Prado that reflect the revision in the report following the Watermaster's findings.

The Watermaster's findings concerning flow at Prado for Water Year 2009-10 required under the Judgment are as follows:

1.	Measured Outflow at Prado	243,776 acre-feet
2.	Base Flow at Prado	103,099 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	443 mg/L
4.	Annual Adjusted Base Flow	125,179 acre-feet
5.	Cumulative Adjusted Base Flow	4,905,004 acre-feet
6.	Other Credits (Debits) [1]	1,489 acre-feet
7.	Cumulative Entitlement of OCWD	1,680,000 acre-feet
8.	Cumulative Credit [2]	3,263,211 acre-feet
9.	One-Third of Cumulative Debit	0 acre-feet
10.	Minimum Required Base Flow in 2010-11	34,000 acre-feet

1. Other Credits (Debits) are comprised of San Jacinto Watershed outflow.
2. Cumulative Credit includes 38,207 acre-feet of San Jacinto Watershed outflow.

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

Water Year	Base Flow	Annual Adjusted Base Flow	Cumulative Adjusted Base Flow	Other Credits (Debits)[1]	Cumulative Entitlement of OCWD	Cumulative Credit[2]
1970-71	38,402	38,402	38,402	0	42,000	(3,598)
1971-72	40,416	40,416	78,818	0	84,000	(5,182)
1972-73	48,999	51,531	130,349	0	126,000	4,349
1973-74	43,106	45,513	175,862	0	168,000	7,862
1974-75	50,176	51,263	227,125	0	210,000	17,125
1975-76	45,627	48,098	275,223	0	252,000	23,223
1976-77	48,387	50,000	325,223	0	294,000	31,223
1977-78	58,501	73,955	399,178	0	336,000	63,178
1978-79	71,863	79,049	478,227	0	378,000	100,227
1979-80	82,509	106,505	584,732	0	420,000	164,732
1980-81	74,875	74,875	659,607	8,045	462,000	205,652
1981-82	81,548	89,431	749,038	0	504,000	253,083
1982-83	111,692	138,591	887,629	3,362	546,000	353,036
1983-84	109,231	115,876	1,003,505	4,602	588,000	431,514
1984-85	125,023	133,670	1,137,175	0	630,000	523,184
1985-86	127,215	141,315	1,278,490	0	672,000	622,499
1986-87	119,848	127,638	1,406,128	0	714,000	708,137
1987-88	124,104	136,308	1,542,436	0	756,000	802,445
1988-89	119,572	131,230	1,673,666	0	798,000	891,675
1989-90	119,149	127,986	1,801,652	0	840,000	977,661
1990-91	111,515	128,379	1,930,031	0	882,000	1,064,040
1991-92	106,948	124,862	2,054,893	0	924,000	1,146,902
1992-93	128,067	163,499	2,218,392	0	966,000	1,268,401
1993-94	111,186	119,432	2,337,824	0	1,008,000	1,345,833
1994-95	123,468	152,792	2,490,616	1,762	1,050,000	1,458,387
1995-96	131,861	152,299	2,642,915	0	1,092,000	1,568,686
1996-97	136,676	157,861	2,800,776	0	1,134,000	1,684,547
1997-98	154,021	193,553	2,994,329	0	1,176,000	1,836,100
1998-99	158,637	174,369	3,168,698	0	1,218,000	1,968,469
1999-00	148,269	169,644	3,338,342	0	1,260,000	2,096,113
2000-01	153,914	176,360	3,514,702	0	1,302,000	2,230,473
2001-02	145,981	159,728	3,674,430	0	1,344,000	2,348,201
2002-03	146,113	174,970	3,849,400	887	1,386,000	2,482,058
2003-04	143,510	166,472	4,015,872	247	1,428,000	2,606,777
2004-05	154,307	199,570	4,215,442	2,366	1,470,000	2,766,713
2005-06	147,736	170,266	4,385,708	3,562	1,512,000	2,898,541
2006-07	129,830	140,216	4,525,924	5,531	1,554,000	3,002,288
2007-08	116,483	136,382	4,662,306	4,165	1,596,000	3,100,835
2008-09	102,711	117,519	4,779,825	2,189	1,638,000	3,178,543
2009-10	103,099	125,179	4,905,004	1,489	1,680,000	3,263,211

1. Other Credits (Debits) are comprised of San Jacinto Watershed outflow.
2. Cumulative Credit includes 38,207 acre-feet of San Jacinto Watershed outflow.

CHAPTER III

BASE FLOW AT RIVERSIDE NARROWS

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

Flow at Riverside Narrows

The flow of the River at Riverside Narrows amounted to 112,631 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 45,887 acre-feet and Storm Flow was 68,960 acre-feet. Included in Base Flow are 2,216 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 2009-10 are listed in Table 8 and shown graphically on Plate 7. The components of flow of the River at Riverside Narrows during the period 1934-35 through 2009-10 are presented on Plate 8.

During July 13 through 15, 2010, the USACE tested the outlet works at Seven Oaks Dam. The high flow rate releases from Seven Oaks Dam flowed downstream to Prado. Plate 4 illustrates that a portion of the flow from the high rate flow test reached Riverside Narrows on July 13, 2010. The Watermaster will review the determination of the character of this water.

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 2009-10 no nontributary flow was delivered to the River upstream of Riverside Narrows and Prado Dam.

High Groundwater Mitigation Project

No High Groundwater Mitigation Project water was discharged to the River during Water Year 2009-10.

WMWD-OCWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Colton and Riverside Basins to OCWD via the Riverside Canal and the River. During Water Year 2009-10, no WMWD-OCWD Transfer Program water was delivered to the River.

TABLE 8

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
WATER YEAR 2009-10
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	SBVMWD HGMP Water[1]	WMWD Transfer Program[2]	Rubidoux Waste-water	Base Flow[3]
2009	October	3,136	0	0	0	187	3,323
	November	3,062	153	0	0	181	3,090
	December	13,343	9,236	0	0	188	4,295
2010	January	46,905	42,458	0	0	190	4,637
	February	17,187	13,166	0	0	171	4,192
	March	6,111	1,624	0	0	188	4,675
	April	5,415	1,236	0	0	180	4,359
	May	3,447	0	0	0	186	3,633
	June	3,156	0	0	0	184	3,340
	July	4,459	1,087	0	0	188	3,560
	August	3,219	0	0	0	190	3,409
	September	3,191	0	0	0	183	3,374
Total		112,631	68,960	0	0	2,216	45,887

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

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

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

Base Flow

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

In April 1980, Rubidoux Community Services District made the first delivery of treated wastewater to the regional treatment plant at Riverside. Prior to that time, Rubidoux had discharged to the river upstream of the Riverside Narrows gaging station. Treated wastewater from Rubidoux during Water Year 2009-10, in the amount of 2,216 acre-feet, has been added to the Base Flow as measured at the gaging station. A summary of Rubidoux discharges is contained in Appendix I.

Water Quality Adjustments

The determination of water quality at the Riverside Narrows Gaging Station was made using periodic grab samples taken and analyzed for TDS by the USGS and the City of Riverside. Water quality data based on samples taken during storm flow periods were not used in the calculations. A summary of TDS and EC data of the River at Riverside Narrows is contained in Appendix J.

Adjustment for High Groundwater Mitigation Project Discharge

During Water Year 2009-10, there was no discharge of High Groundwater Mitigation Project water. Therefore, no water quality adjustment was required.

Adjustment for WMWD-OCWD Transfer Program Flows

During Water Year 2009-10, no WMWD-OCWD Transfer Program water was delivered to the River. Therefore, no water quality adjustment was required.

Adjustment for Treated Wastewater Discharges from the Rubidoux Community Services District

The flow-weighted quality of treated wastewater from Rubidoux was 734 mg/L. A monthly summary of discharges and quality is contained in Appendix I.

The Base Flow quality adjustments resulting from exclusion of the Nontributary Flow and inclusion of the Rubidoux treated wastewater are shown in the following table, and resulted in a Base Flow TDS of 643 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS
1. Base Flow plus Nontributary Flow	43,671	638	27,862,098
2. Less Nontributary Flow HGMP Pumped Water	0	---	---
3. Less WMWD Transfer Flow	0	---	---
4. Plus Rubidoux Treated Wastewater	2,216	734	1,626,544
5. Base Flow (line 1 less lines 2 and 3 plus line 4)	45,887		29,488,642
Average TDS of Base Flow	29,488,642 ÷ 45,887 = 643 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 2009-10 was 643 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for Water Year 2009-10 is 45,887 acre-feet.

Entitlement and Credit or Debit

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

The Watermaster's findings concerning flow at Riverside Narrows for Water Year 2009-10 required under the Judgment are as follows:

1.	Base Flow at Riverside Narrows	45,887 acre-feet
2.	Annual Weighted TDS of Base Flow	643 mg/L
3.	Annual Adjusted Base Flow	45,887 acre-feet
4.	Cumulative Adjusted Base Flow	1,797,130 acre-feet
5.	Cumulative Entitlement of IEUA and WMWD	610,000 acre-feet
6.	Cumulative Credit	1,187,130 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2010-11	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

Santa Ana River Watershed

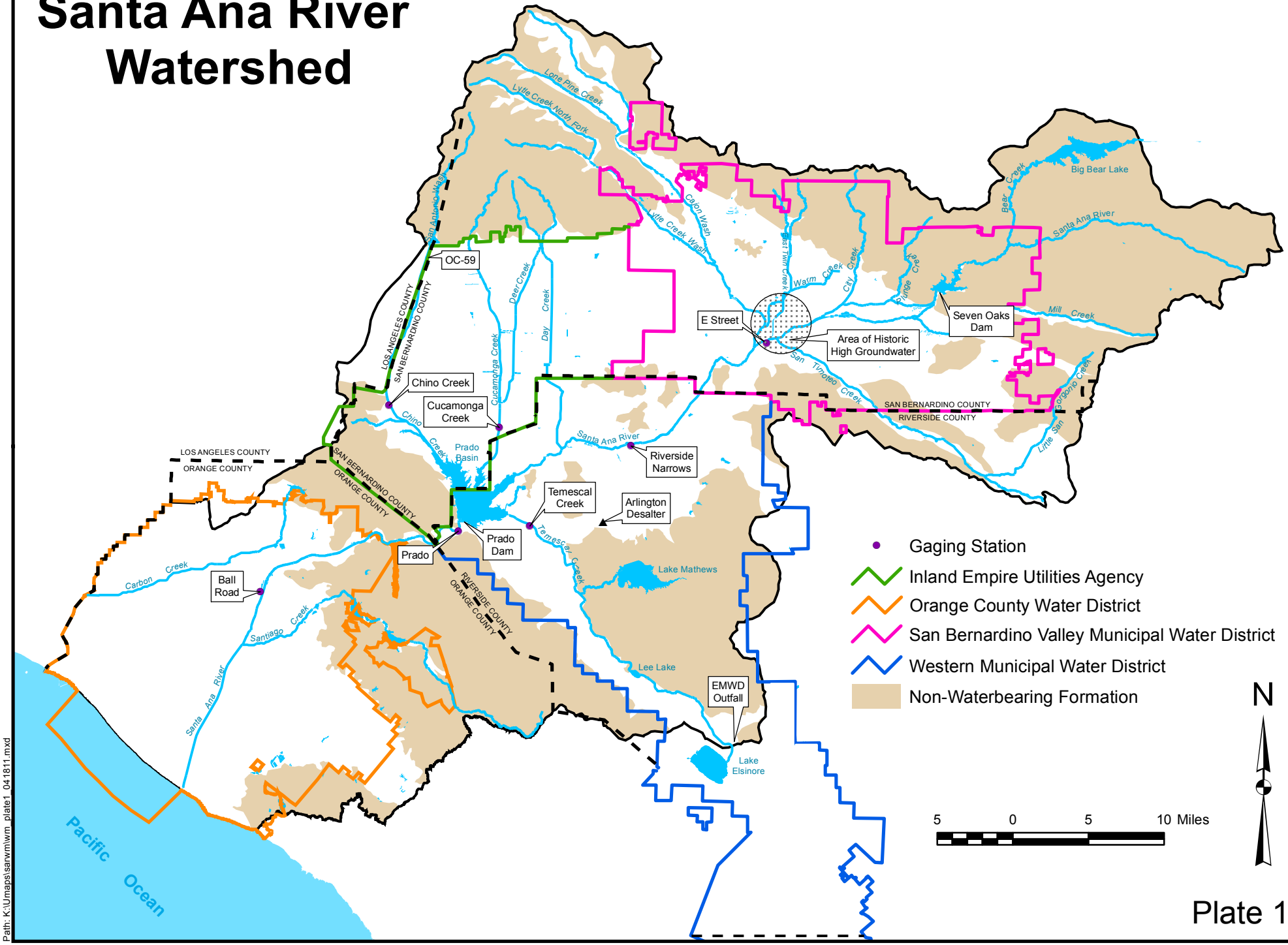


Plate 1

Path: K:\Umaps\sarw\wm_plate1_041811.mxd

Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

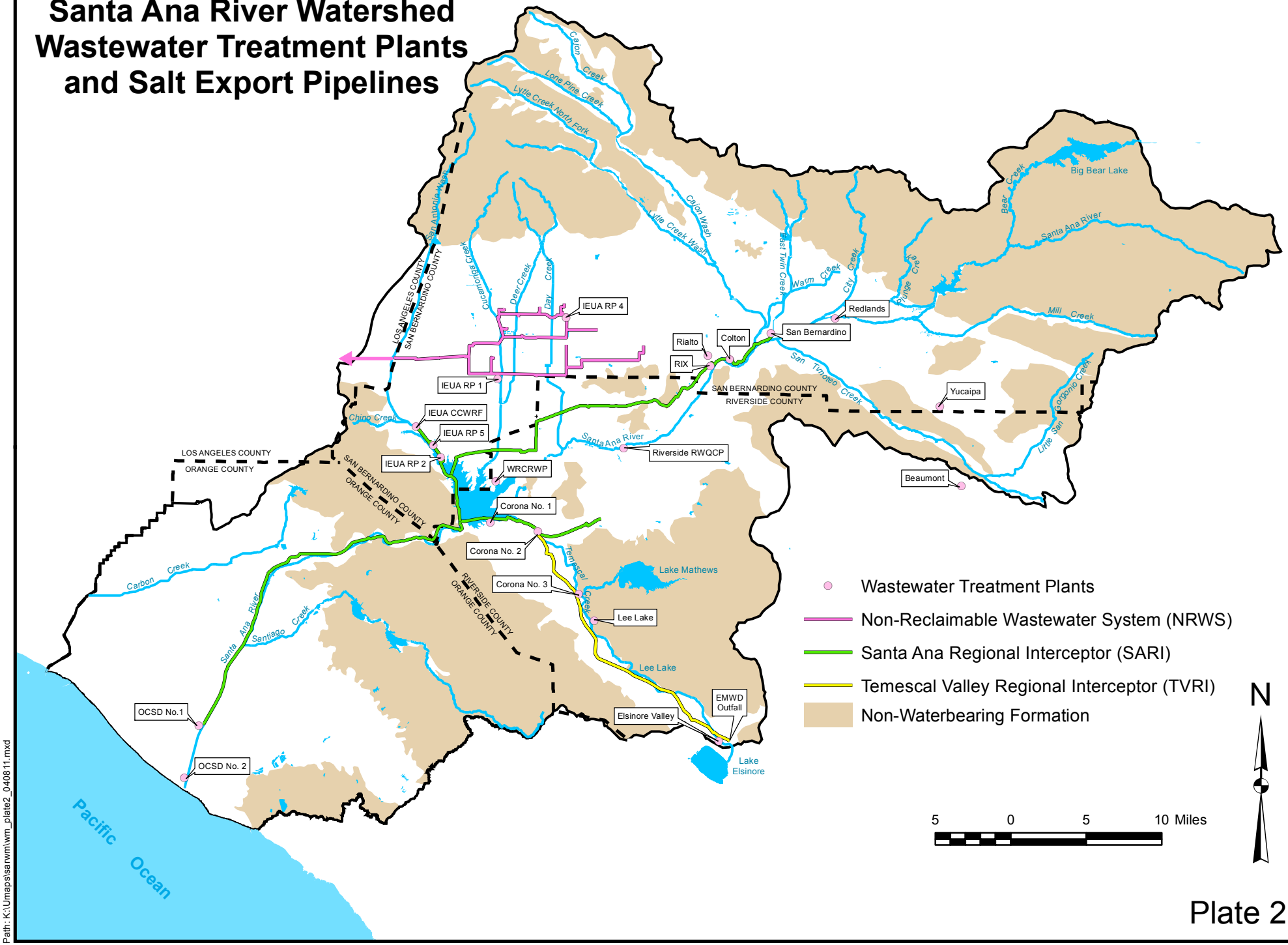


Plate 2

Path: K:\Umaps\sarwm\wm_plate2_040811.mxd

PRECIPITATION AT SAN BERNARDINO STARTING WITH 1934-35

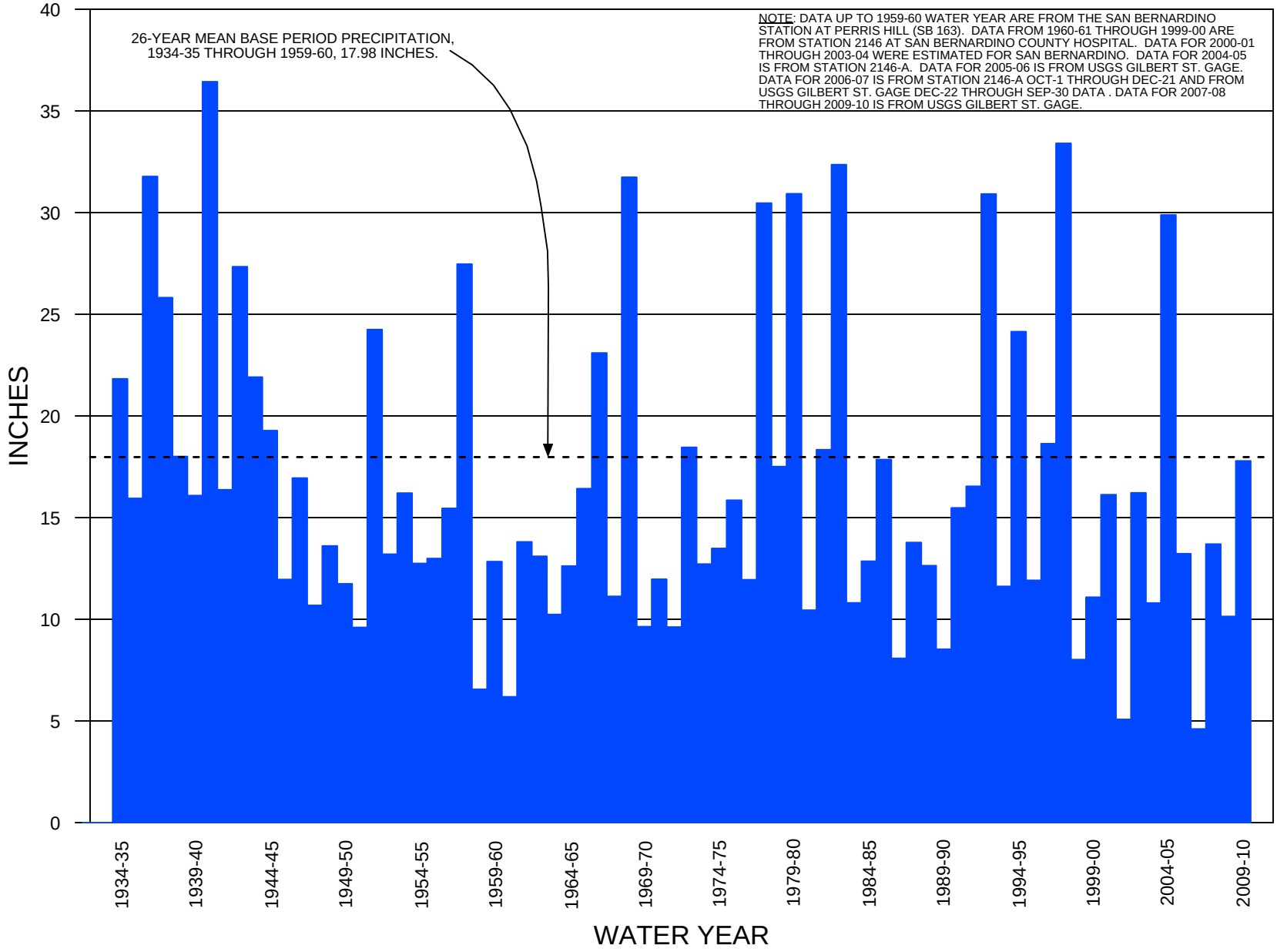
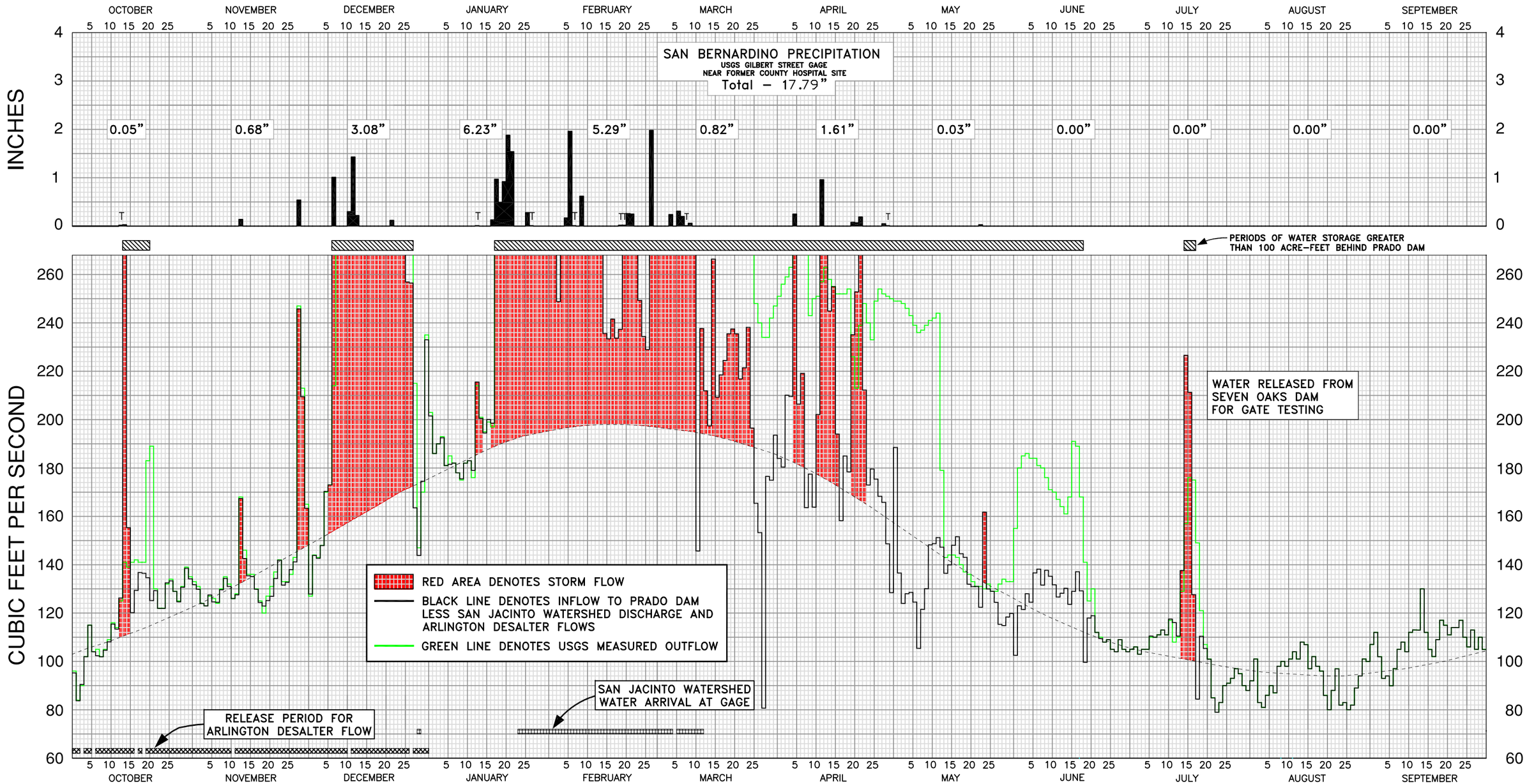


PLATE 3



DISCHARGE OF SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2009-10

Plate 4

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

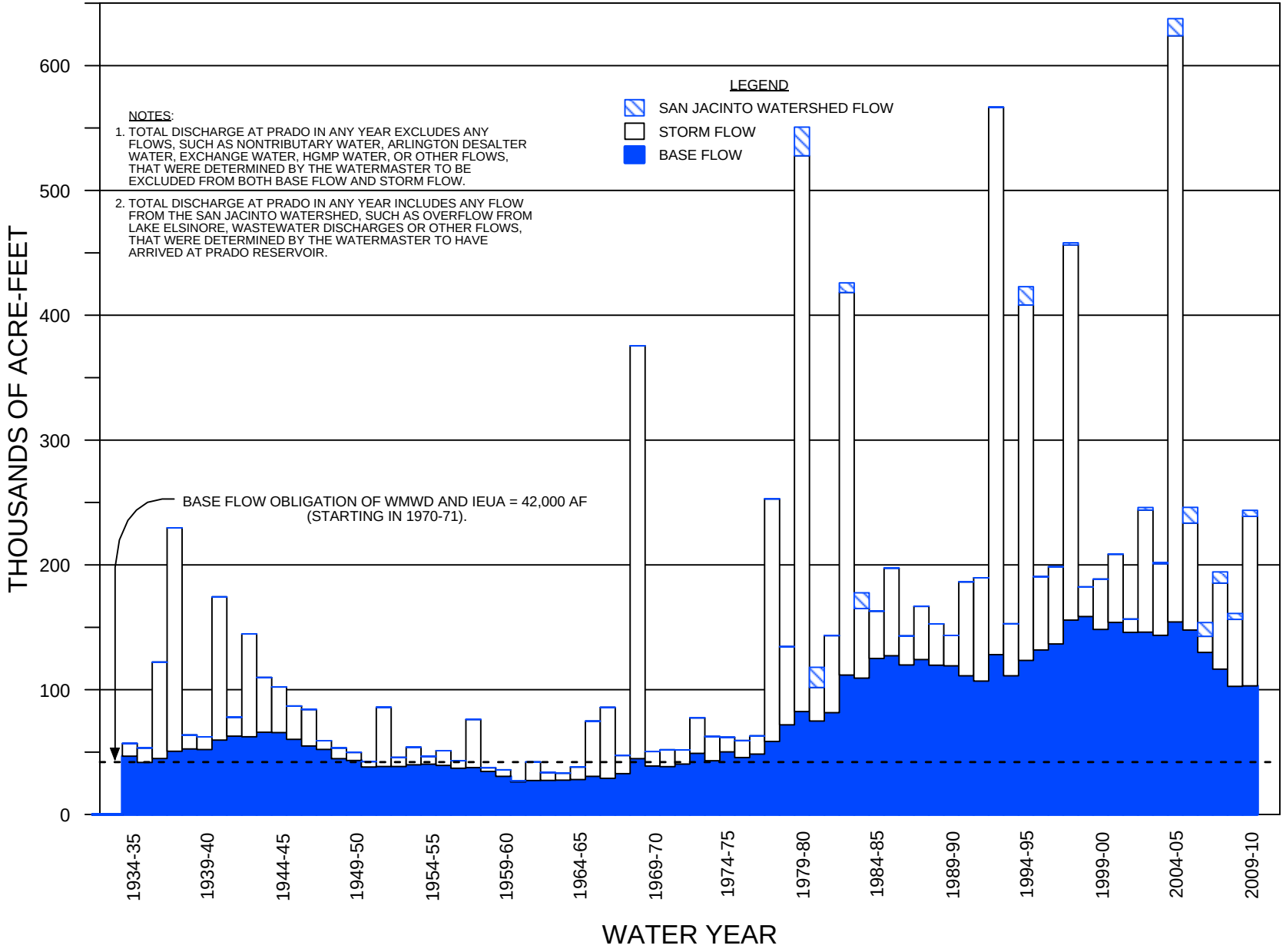
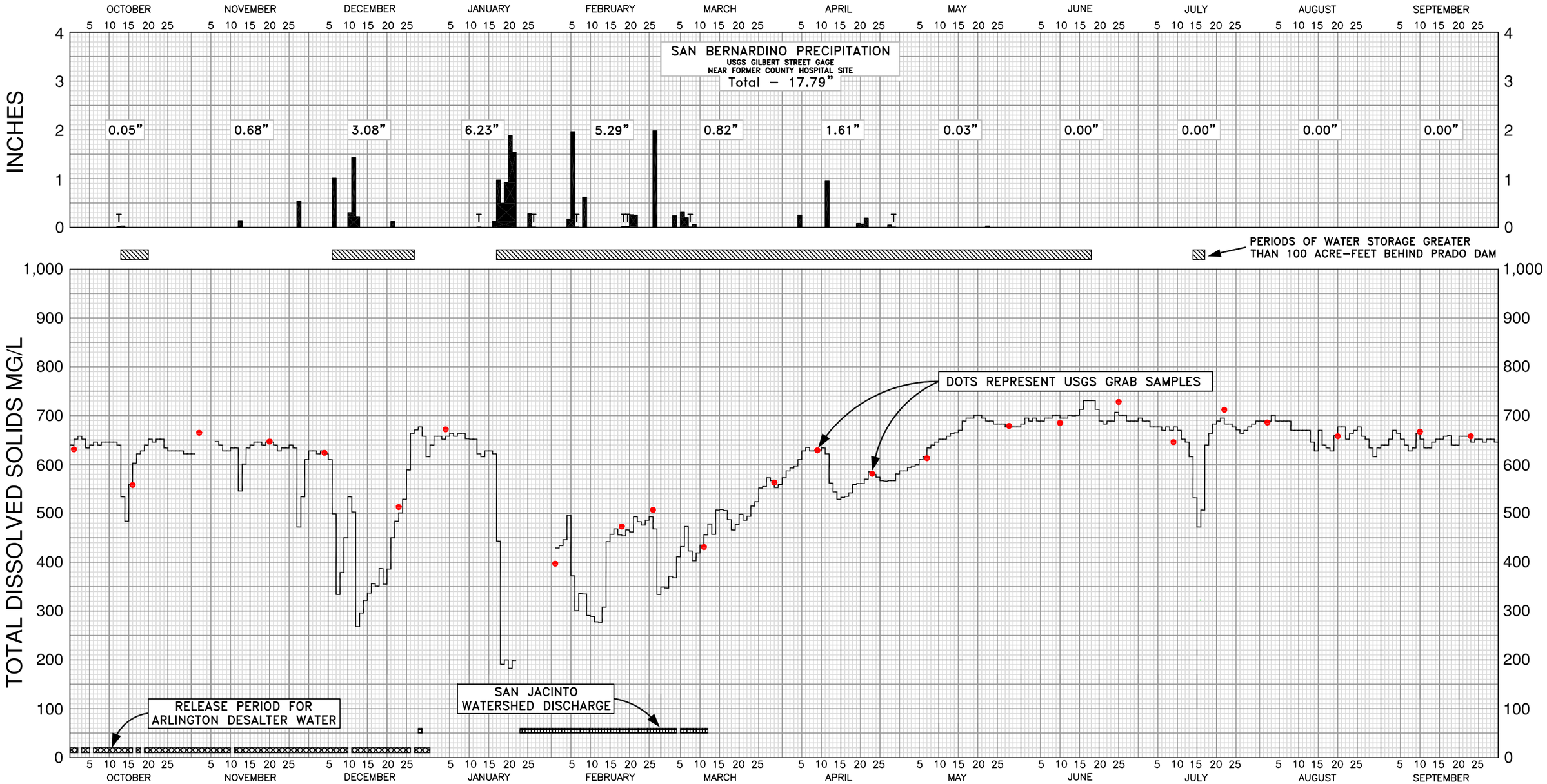
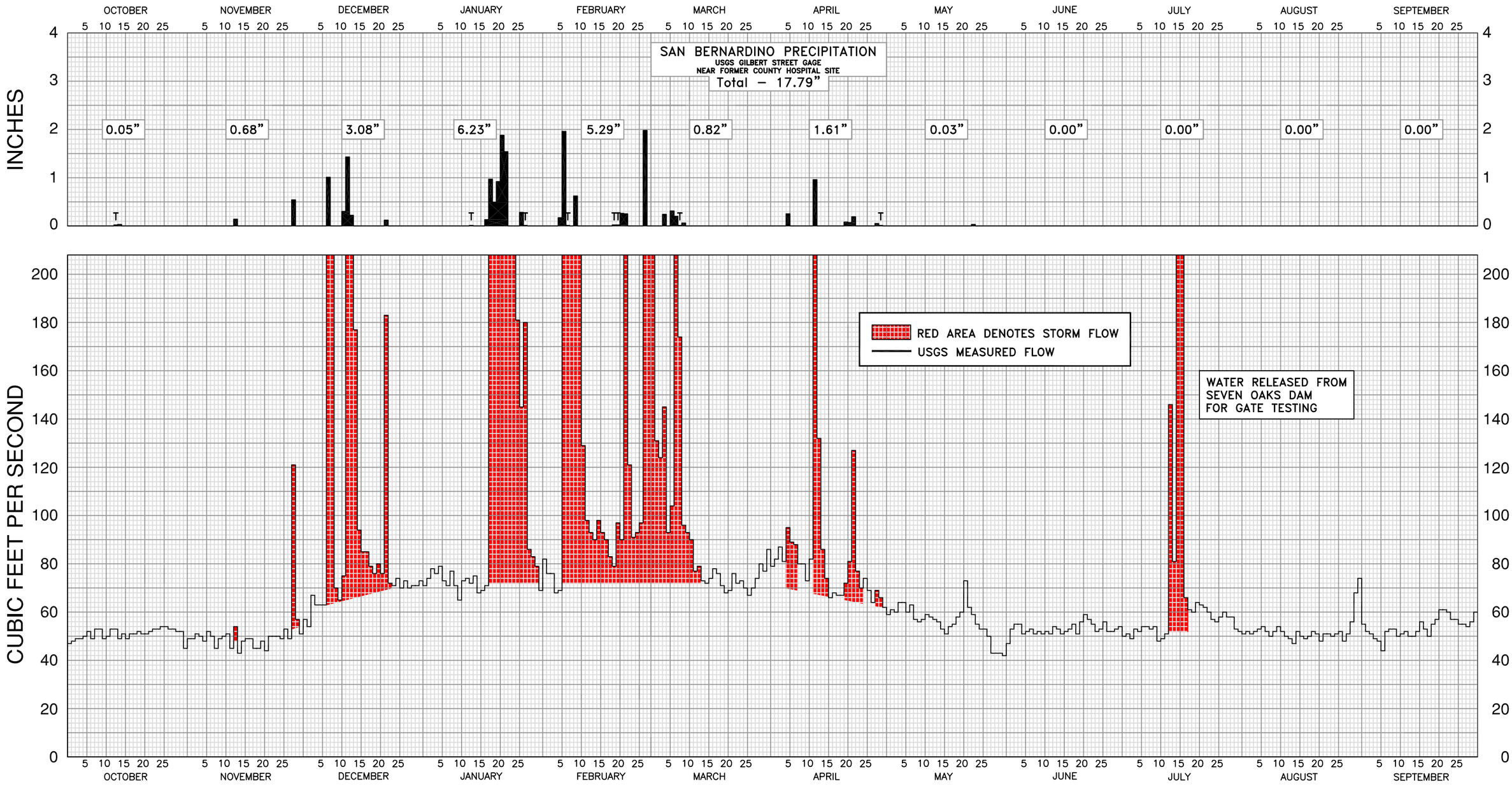


PLATE 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2009-10

Plate 6



DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2009-10

Plate 7

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

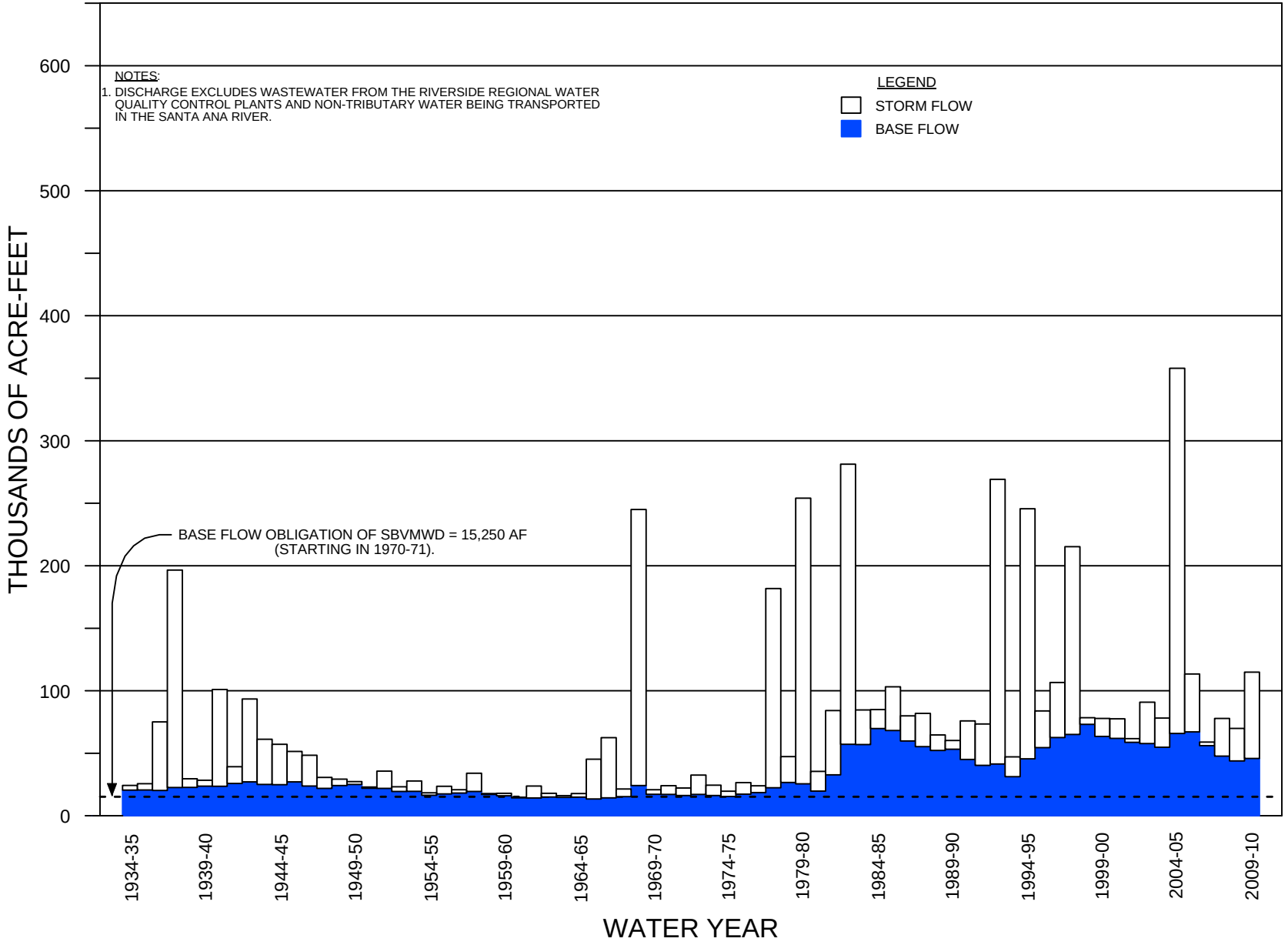


PLATE 8

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

FORTIETH ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2009 - SEPTEMBER 30, 2010

APRIL 30, 2011

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, AND OF TEMESCAL CREEK ABOVE MAIN STREET (AT CORONA), CUCAMONGA CREEK (NEAR MIRA LOMA) AND CHINO CREEK AT SCHAEFER AVENUE (NEAR CHINO)

WATER YEAR 2009-10

Water-Data Report 2010

11074000 Santa Ana River below Prado Dam, CA

Santa Ana River Basin

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

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

SURFACE-WATER RECORDS

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

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

REMARKS.--Records 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, no California Water Project releases were made. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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

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

11074000 Santa Ana River below Prado Dam, CA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	96	133	127	203	362	2,220	251	249	155	105	92	107
2	84	131	144	186	423	990	256	249	180	106	101	112
3	90	124	143	190	400	467	259	248	185	103	83	102
4	102	123	148	193	563	376	263	246	186	105	81	93
5	115	127	170	181	288	312	310	243	184	105	86	94
6	104	126	173	185	1,140	314	337	239	184	110	90	90
7	105	124	214	182	2,040	317	326	236	181	110	87	97
8	102	130	369	178	698	361	274	237	180	111	98	105
9	105	135	428	175	773	391	243	239	176	113	100	108
10	109	132	363	182	1,860	403	250	241	171	111	98	104
11	116	126	278	183	2,250	405	251	242	170	117	101	112
12	114	128	289	176	2,580	349	257	244	167	108	104	113
13	125	168	368	214	2,580	283	263	179	164	110	101	113
14	141	146	465	201	1,460	419	258	143	161	129	108	130
15	139	136	651	195	331	333	255	144	168	157	107	112
16	141	136	715	199	342	424	252	144	191	176	97	105
17	142	130	693	197	366	429	252	143	189	175	102	102
18	141	125	673	301	370	435	252	140	168	149	98	109
19	141	120	649	824	367	440	254	137	141	121	96	117
20	183	127	622	3,320	370	439	226	136	125	107	86	115
21	189	131	595	4,260	371	435	213	133	130	101	80	111
22	130	137	569	4,430	408	429	239	131	112	85	88	114
23	122	142	545	4,790	450	422	248	131	110	79	97	114
24	122	133	514	4,680	408	413	240	130	108	83	82	117
25	132	133	483	4,510	341	328	233	132	109	90	83	110
26	134	136	445	3,750	348	248	249	129	105	91	80	106
27	129	143	385	1,160	818	240	254	129	104	93	82	113
28	125	247	215	640	1,830	234	252	132	109	97	89	105
29	131	213	147	536	---	234	251	134	105	95	94	110
30	139	165	170	485	---	242	250	133	104	90	101	105
31	135	---	235	484	---	247	---	133	---	88	100	---
Total	3,883	4,207	11,985	37,390	24,537	13,579	7,718	5,526	4,522	3,420	2,892	3,245
Mean	125	140	387	1,206	876	438	257	178	151	110	93.3	108
Max	189	247	715	4,790	2,580	2,220	337	249	191	176	108	130
Min	84	120	127	175	288	234	213	129	104	79	80	90
Ac-ft	7,700	8,340	23,770	74,160	48,670	26,930	15,310	10,960	8,970	6,780	5,740	6,440

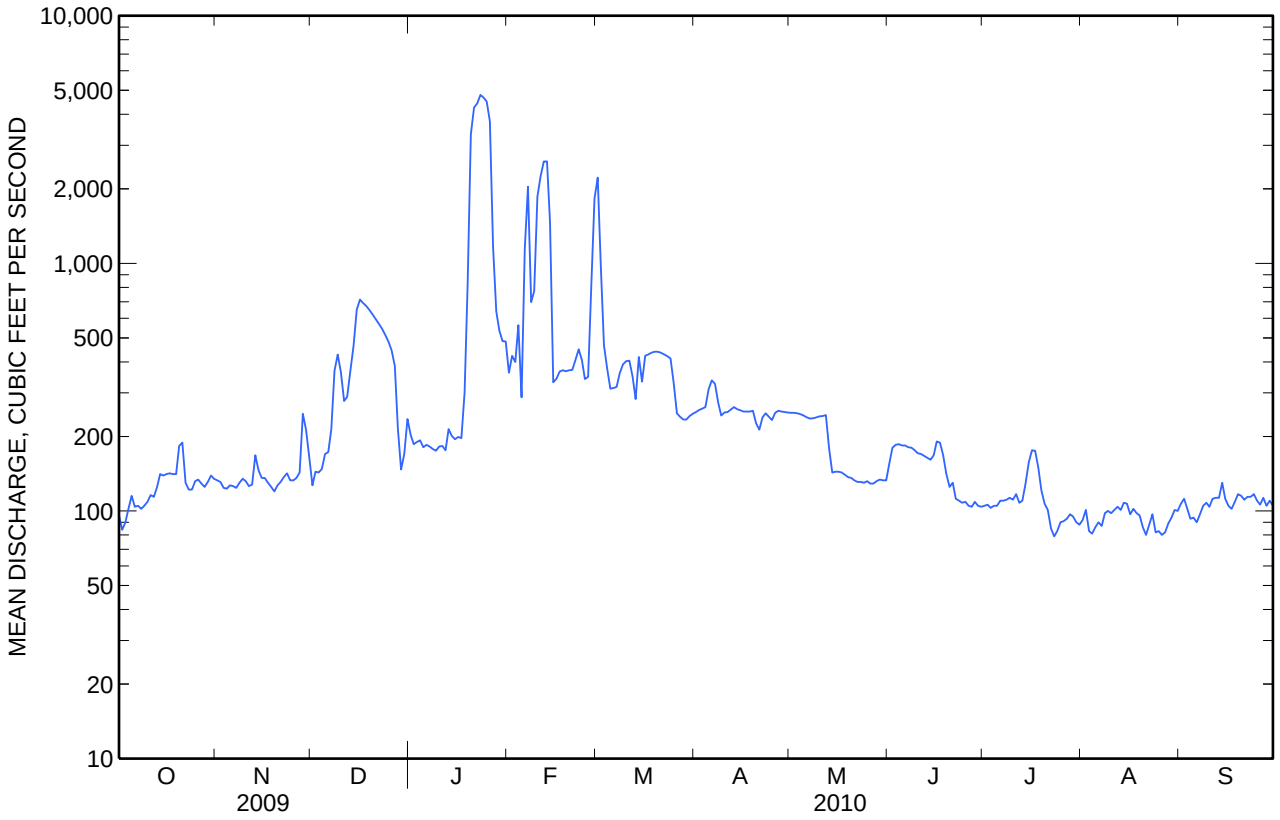
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	130	150	224	381	446	402	265	191	156	128	108	103
Max	910	322	709	3,543	2,733	2,556	1,101	915	736	446	402	372
(WY)	(2005)	(1997)	(1967)	(1993)	(1998)	(1980)	(1980)	(1998)	(1983)	(1998)	(2005)	(1997)
Min	22.4	33.5	39.5	49.2	49.8	54.3	43.3	35.2	29.0	17.7	14.8	16.2
(WY)	(1962)	(1963)	(1963)	(1963)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)	(1960)	(1960)

11074000 Santa Ana River below Prado Dam, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1941 - 2010	
Annual total	79,068		122,904			
Annual mean	217		337		223	
Highest annual mean					882	2005
Lowest annual mean					36.4	1961
Highest daily mean	1,750	Feb 10	4,790	Jan 23	11,400	Jan 14, 2005
Lowest daily mean	75	Sep 4	79	Jul 23	2.4	Jul 29, 1978
Annual seven-day minimum	79	Aug 30	85	Aug 21	3.0	Sep 24, 1973
Maximum peak flow			5,010	Jan 21	13,200	Jan 15, 2005
Maximum peak stage			7.54	Jan 21	8.73	Jan 15, 2005
Annual runoff (ac-ft)	156,800		243,800		161,200	
10 percent exceeds	418		484		388	
50 percent exceeds	145		164		138	
90 percent exceeds	96		98		41	



Water-Data Report 2010

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

Santa Ana River Basin

LOCATION.--Lat 33°58′07″, long 117°26′51″ referenced to North American Datum of 1927, in NE ¼ SW ¼ sec.30, T.2 S., R.5 W., Riverside County, CA, Hydrologic Unit 18070203, near center of Metropolitan Water District pipeline crossing, 0.8 mi downstream from Union Pacific Railroad Bridge, 1.1 mi upstream from bridge on Van Buren Boulevard, and 3.3 mi north of Arlington.

DRAINAGE AREA.--852 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--March 1970 to current year.

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

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

REMARKS.--Records fair except for discharges above 100 ft³/s and estimated daily discharges, which are poor. Flow partly regulated by Big Bear Lake (station 11049000) and, since November 1999, by Seven Oaks Flood-Control Reservoir, capacity, 145,600 acre-ft. Natural streamflow affected by ground-water withdrawals, diversions for irrigation, return flows from irrigated areas, and discharges of treated effluent. The records at this station are equivalent to those collected at "Santa Ana River at Riverside Narrows, near Arlington" minus the flow at "Riverside Water-Quality Control Plant at Riverside Narrows, near Arlington". See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,800 ft³/s, Jan. 11, 2005, gage height, 14.64 ft, from rating curve extended above 21,900 ft³/s on basis of area-velocity studies; maximum gage height, 20.23 ft, site and datum then in use, Mar. 4, 1978; minimum daily, 15 ft³/s, Sept. 7, 8, 1980.

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

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and (or) maximum (*),from rating curve extended as explained above:

Date	Time	Discharge (ft³/s)	Gage height (ft)
Dec 7	2045	5,100	10.00
Dec 13	0030	4,990	9.96
Jan 21	1815	*20,300	*13.31
Feb 6	1345	15,300	12.48
Feb 9	2130	1,800	8.57
Feb 27	2030	4,900	9.93
Mar 7	2015	2,270	8.79
Apr 12	0830	2,030	8.67
Jul 16	0045	1,540	8.38

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	47	49	57	71	82	217	79	59	47	50	51	55
2	e48	49	54	74	76	131	82	61	53	51	52	52
3	e49	51	67	78	76	124	87	60	55	49	51	51
4	e49	50	63	76	68	145	81	64	55	53	52	49
5	e50	48	63	79	69	93	95	64	51	52	53	48
6	52	52	63	73	3,130	104	89	60	52	54	54	44
7	49	50	1,290	71	500	332	88	63	53	54	52	52
8	53	45	280	77	220	174	80	57	51	53	50	53
9	53	49	e70	71	397	96	80	56	52	54	52	53
10	49	50	e65	65	294	93	73	57	51	48	54	50
11	50	51	e75	73	129	90	82	59	52	49	52	51
12	53	45	1,380	e74	98	77	423	58	51	51	50	52
13	53	54	1,620	e72	93	79	132	57	54	146	49	50
14	49	43	177	75	90	73	86	56	53	81	47	50
15	51	48	94	68	98	72	74	53	51	265	52	52
16	49	49	85	69	93	74	66	51	52	250	50	56
17	e51	49	85	71	90	78	68	54	53	66	49	53
18	e51	45	79	1,590	83	76	67	55	55	61	50	50
19	e52	45	76	1,780	79	71	67	58	51	60	52	55
20	e51	48	80	2,380	97	68	72	60	56	64	51	57
21	e51	44	76	6,950	90	69	81	73	59	63	48	61
22	e52	50	183	7,320	217	76	127	62	57	62	51	61
23	e53	50	72	1,090	121	72	77	59	55	60	51	60
24	e53	50	71	478	91	73	70	55	52	57	50	57
25	e54	49	74	181	93	70	74	53	53	56	51	57
26	e54	53	70	145	97	67	69	53	56	58	52	55
27	e53	49	73	180	1,530	70	64	50	52	60	48	55
28	e53	121	70	86	564	74	69	43	52	58	51	54
29	e52	57	71	83	---	80	66	43	53	58	56	56
30	52	51	71	79	---	77	62	43	54	53	68	60
31	45	---	73	69	---	86	---	42	---	52	74	---
Total	1,581	1,544	6,727	23,648	8,665	3,081	2,730	1,738	1,591	2,248	1,623	1,609
Mean	51.0	51.5	217	763	309	99.4	91.0	56.1	53.0	72.5	52.4	53.6
Max	54	121	1,620	7,320	3,130	332	423	73	59	265	74	61
Min	45	43	54	65	68	67	62	42	47	48	47	44
Ac-ft	3,140	3,060	13,340	46,910	17,190	6,110	5,410	3,450	3,160	4,460	3,220	3,190

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

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

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

SUMMARY STATISTICS

	Water Years 1970 - 1999		
Annual mean	134		
Highest annual mean	416		1983
Lowest annual mean	29.0		1975
Highest daily mean	11,500	Mar	2, 1983
Lowest daily mean	15	Sep	7, 1980
Annual seven-day minimum	16	Jul	1, 1981
Maximum peak flow	31,300	Feb	24, 1998
Maximum peak stage	20.23	Mar	4, 1978
Annual runoff (ac-ft)	97,140		
10 percent exceeds	209		
50 percent exceeds	63		
90 percent exceeds	23		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2010, BY WATER YEAR (WY)

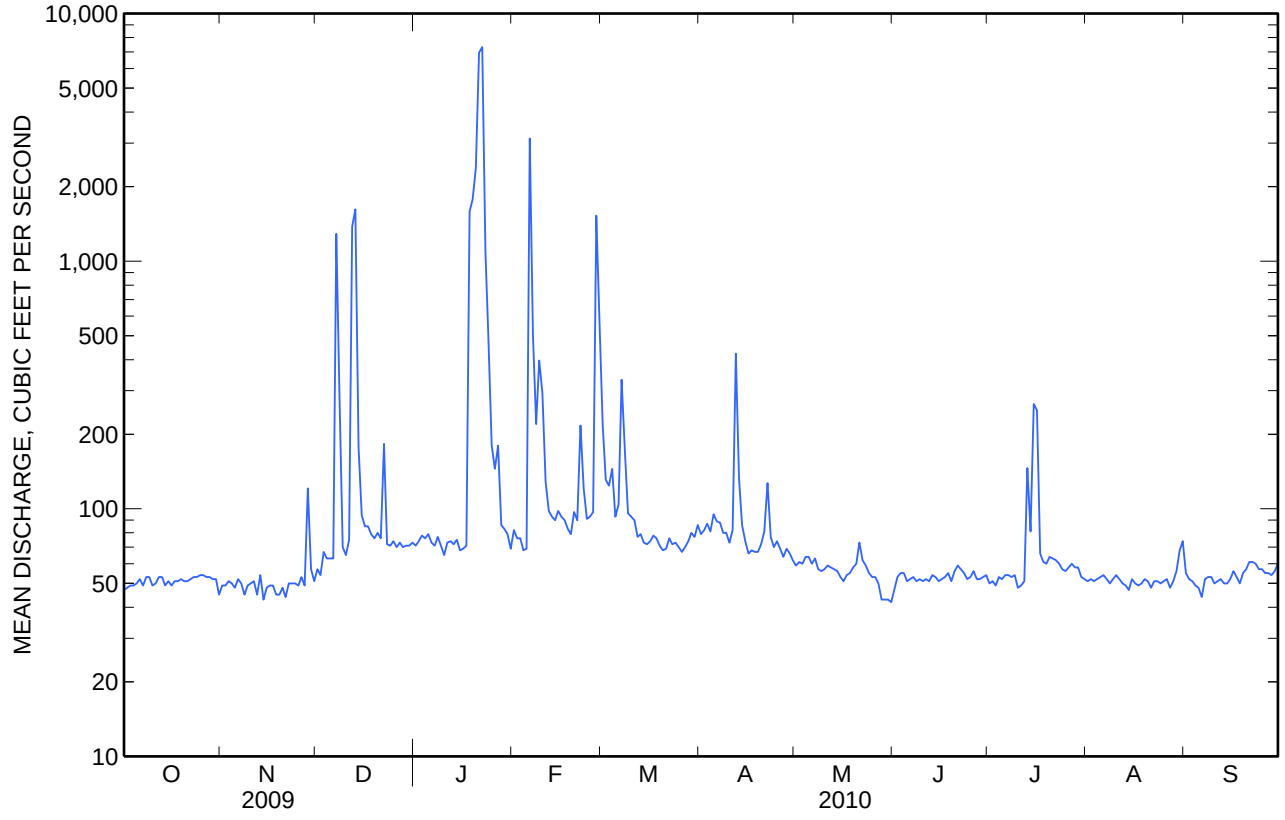
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	119	97.2	151	393	269	165	169	110	82.9	73.3	79.2	68.5
Max	498	141	255	2,350	755	498	500	314	192	137	201	86.6
(WY)	(2005)	(2003)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	51.0	51.5	85.9	74.8	87.9	74.8	56.2	48.1	53.0	51.5	44.4	39.3
(WY)	(2010)	(2010)	(2000)	(2009)	(2002)	(2009)	(2009)	(2009)	(2010)	(2008)	(2009)	(2009)

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

SUMMARY STATISTICS

[e, estimated]

	Calendar Year 2009		Water Year 2010		Water Years 2000 - 2010	
Annual total	32,154		56,785			
Annual mean	88.1		156		148	
Highest annual mean					491	2005
Lowest annual mean					79.9	2007
Highest daily mean	2,020	Feb 9	7,320	Jan 22	e22,000	Jan 11, 2005
Lowest daily mean	35	Aug 30	42	May 31	35	Aug 30, 2009
Annual seven-day minimum	38	Sep 7	46	May 26	38	Sep 7, 2009
Maximum peak flow			20,300	Jan 21	47,800	Jan 11, 2005
Maximum peak stage			13.31	Jan 21	16.58	Oct 20, 2004
Annual runoff (ac-ft)	63,780		112,600		107,000	
10 percent exceeds	80		125		160	
50 percent exceeds	54		58		81	
90 percent exceeds	43		49		57	



Water-Data Report 2010

11074000 Santa Ana River below Prado Dam, CA

Santa Ana River Basin

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967 to current year.
CHEMICAL DATA: Water years 1967 to current year.
SPECIFIC CONDUCTANCE: Water years 1968, 1970 to current year.
WATER TEMPERATURE: Water years 1968 (monthly max/min only), 1970 to current year.
BIOLOGICAL DATA: Water years 1975-81.
CHLORIDE: Water year 1971.
SEDIMENT DATA: Water years 1974-94, 1999 to current year.

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

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

REMARKS.--Specific conductance and water temperature records are affected by releases from Prado Dam. Interruptions in record at times due to malfunction of recording or sensing equipment. Sediment data and a portion of chemical data collected for the National Water-Quality Assessment (NAWQA) Program.

Specific conductance records rated good.

Water temperature records rated excellent.

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

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded, 1,240 microsiemens, June 25; minimum recorded, 257 microsiemens, Jan. 19.
WATER TEMPERATURE: Maximum recorded, 27.5°C, July 17; minimum recorded, 9.9°C, Jan. 22.

11074000 Santa Ana River below Prado Dam, CA—Continued

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
[ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter]

Sample date-time	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)	Dissolved solids dried at 180 °C, water, filtered, mg/L (70300)
10-01-2009 0935	31.0	105	1,060	20.6	631
10-16-2009 0935	32.0	139	922	20.3	558
11-02-2009 1055	23.5	140	1,030	17.1	665
11-20-2009 1110	26.0	129	1,060	14.6	647
12-04-2009 0945	20.0	150	1,040	13.8	624
12-23-2009 1520	16.5	544	804	12.5	513
01-04-2010 0955	15.0	199	1,090	13.0	672
02-01-2010 1025	14.5	190	656	11.7	397
02-18-2010 0955	20.0	370	784	14.4	473
02-26-2010 0920	20.0	350	818	14.7	507
03-11-2010 1235	22.5	407	717	14.6	431
03-29-2010 1400	26.0	235	945	18.0	563
04-09-2010 1210	23.5	244	1,050	17.9	629
04-23-2010 1340	25.5	247	975	17.8	581
05-07-2010 1140	29.5	238	1,040	20.5	613
05-28-2010 1030	28.5	135	1,130	20.2	679
06-10-2010 1030	23.0	171	1,160	22.7	685
06-25-2010 1140	29.0	112	1,190	22.6	728
07-09-2010 1125	29.0	115	1,120	21.6	646
07-22-2010 1130	30.0	88	1,160	23.5	712
08-02-2010 1345	29.0	107	1,150	23.6	686
08-20-2010 1210	31.0	86	1,080	24.4	658
09-10-2010 1135	29.5	103	1,110	20.4	667

09-23-2010 1105	20.5	112	1,100	19.8	658

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 1 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)	Alkalinity, water, filtered, inflection-point, incremental titration method, field, mg/L as CaCO3 (39086)
10-21-2009 0945	749	26.0	235	4.6	51	7.6	1,100	19.0	224
11-18-2009 1015	750	18.0	127	10.1	101	7.9	1,050	14.5	227
12-08-2009 1000	753	6.0	426	11.7	106	7.4	547	10.5	73
01-05-2010 1430	751	--	174	11.3	110	8.0	1,090	13.5	219
02-01-2010 1030	750	13.0	191	10.1	95	7.5	658	12.0	134
02-24-2010 1015	755	--	446	10.3	103	7.7	775	15.0	164
03-10-2010 1345	749	16.5	407	11.1	112	7.9	692	15.0	152
03-23-2010 1300	749	--	422	16.0	178	8.0	811	19.5	174
04-06-2010 1515	754	22.5	335	8.8	92	8.0	1,020	17.0	229
04-22-2010 1015	744	12.0	253	8.8	95	7.9	920	17.5	216
05-05-2010 1400	749	26.5	244	10.2	115	8.0	989	20.0	226
05-18-2010 1030	753	--	140	8.5	94	8.2	1,140	19.5	268
06-07-2010 1000	751	28.5	180	8.8	105	8.3	1,150	23.0	262
06-29-2010 1445	748	--	105	7.1	85	8.0	1,150	23.0	248
07-12-2010 0945	750	--	124	6.7	80	8.0	1,090	23.5	219
08-18-2010 1000	749	33.0	105	6.6	80	8.0	1,040	24.0	212
09-13-2010 1245	748	29.0	112	9.7	112	8.1	1,080	21.5	234

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 2 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Bicarbonate, water, filtered, inflection-point, incremental titration method, field, mg/L (00453)	Carbonate, water, filtered, inflection-point incremental titration method, field, mg/L (00452)	Chloride, water, filtered, mg/L (00940)	Sulfate, water, filtered, mg/L (00945)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrite, water, filtered, mg/L as N (00613)	Orthophosphate, water, filtered, mg/L as P (00671)	Phosphorus, water, unfiltered, mg/L as P (00665)
10-21-2009 0945	273	--	139	107	.065	2.21	.405	1.16	1.47
11-18-2009 1015	277	--	128	98.1	.074	4.46	.043	1.16	1.15
12-08-2009 1000	88	--	65.2	80.9	.172	2.85	.043	.622	.94
01-05-2010 1430	267	--	139	119	.085	6.12	.028	.786	.80
02-01-2010 1030	162	--	72.1	74.5	.682	2.45	.060	.548	.58
02-24-2010 1015	200	--	87.0	82.4	E .015	2.33	.063	.679	.69
03-10-2010 1345	183	1	77.2	68.6	< .020	2.58	.052	.547	.56
03-23-2010 1300	212	--	96.4	77.4	.043	2.69	.054	.746	.74
04-06-2010 1515	275	2	128	105	.030	3.19	.072	.965	.95
04-22-2010 1015	260	1	111	88.0	.124	2.19	.066	.917	.90
05-05-2010 1400	272	2	124	95.7	E .018	1.20	.067	.846	.87
05-18-2010 1030	322	2	141	110	< .020	.90	.046	.684	.82
06-07-2010 1000	314	3	143	110	.093	1.20	.054	1.06	1.15
06-29-2010 1445	296	3	145	114	.099	2.93	.056	.812	1.06
07-12-2010 0945	267	--	130	101	.201	4.06	.102	1.07	1.35
08-18-2010 1000	257	1	126	106	.096	3.54	.082	.818	.96
09-13-2010 1245	286	--	134	103	.045	4.15	.034	.959	1.05

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 3 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Total nitrogen, water, unfiltered, analytically determined, mg/L (62855)	1-Naphthol, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49295)	2,4-D methyl ester, water, filtered, recoverable, µg/L (50470)	2,4-D plus 2,4-D methyl ester, sum on a molar basis, micrograms per liter as 2,4-D (66496)	2,4-D, water, filtered, recoverable, µg/L (39732)	2,4-DB, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38746)	2,6-Diethylaniline, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82660)	2-Chloro-2',6'-diethylacetanilide, water, filtered, recoverable, µg/L (61618)	2-Chloro-4-isopropylamino-6-amino-s-triazine, water, filtered, recoverable, µg/L (04040)
10-21-2009 0945	3.56	< .04	--	--	--	--	< .006	< .010	< .014
11-18-2009 1015	4.75	< .04	--	--	--	--	< .006	< .010	E .009
12-08-2009 1000	4.93	< .04	--	--	--	--	< .006	< .010	< .014
01-05-2010 1430	E 6.71	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .015
02-01-2010 1030	3.04	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .014
02-24-2010 1015	2.84	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .014
03-10-2010 1345	E 3.02	< .04	< .200	.09	.09	< .02	< .006	< .010	E .010
03-23-2010 1300	3.07	< .04	< .200	E .05	E .05	< .02	< .006	< .010	E .012
04-06-2010 1515	3.65	< .04	< .200	< .06	< .06	< .02	< .006	< .010	E .013
04-22-2010 1015	E 2.70	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .014
05-05-2010 1400	E 2.09	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .014
05-18-2010 1030	2.14	< .04	< .200	E .04	E .04	< .02	< .006	< .010	< .014
06-07-2010 1000	2.22	< .04	< .200	< .06	< .06	< .02	< .006	< .010	E .018
06-29-2010 1445	3.97	< .04	< .200	E .02	E .02	< .02	< .006	< .010	< .017
07-12-2010 0945	5.04	< .04	< .200	< .06	< .06	< .02	< .006	< .010	E .020
08-18-2010 1000	4.57	< .04	< .200	< .06	< .06	< .02	< .006	< .010	E .019
09-13-2010 1245	4.76	< .04	< .200	< .06	< .06	< .02	< .006	< .010	< .017

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 4 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	2-Chloro-6-ethyl-amino-4-amino-s-triazine, water, filtered, recoverable, µg/L (04038)	2-Ethyl-6-methyl-aniline, water, filtered, recoverable, µg/L (61620)	2-Hydroxy-4-iso-propyl-amino-6-ethyl-amino-s-triazine, water, filtered, recoverable, µg/L (50355)	3,4-Dichloro-aniline, water, filtered, recoverable, µg/L (61625)	3,5-Di-chloro-aniline, water, filtered, recoverable, µg/L (61627)	3-Hydroxy carbo-furan, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49308)	4-Chloro-2-methyl-phenol, water, filtered, recoverable, µg/L (61633)	Aceto-chlor, water, filtered, recoverable, µg/L (49260)	Acifluor-fen, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49315)
10-21-2009 0945	--	< .010	--	< .018	< .003	--	< .003	< .010	--
11-18-2009 1015	--	< .010	--	E .008	< .003	--	< .003	< .010	--
12-08-2009 1000	--	< .010	--	E .046	< .003	--	< .003	< .011	--
01-05-2010 1430	< .06	< .010	< .060	E .011	< .003	< .040	< .003	< .010	< .040
02-01-2010 1030	< .06	< .010	< .060	E .016	< .003	< .040	< .003	< .010	< .040
02-24-2010 1015	< .06	< .010	< .060	E .027	< .003	< .040	< .003	< .010	< .040
03-10-2010 1345	< .06	< .010	< .060	E .034	< .003	< .040	E .006	< .010	< .040
03-23-2010 1300	< .06	< .010	< .060	E .028	< .003	< .040	E .006	< .010	< .040
04-06-2010 1515	< .06	< .010	< .060	E .018	< .003	< .040	< .005	< .010	< .040
04-22-2010 1015	< .06	< .010	< .060	E .048	< .003	< .040	< .003	< .010	< .040
05-05-2010 1400	< .06	< .010	< .060	E .023	< .003	< .040	E .006	< .010	< .040
05-18-2010 1030	< .06	< .010	< .060	E .014	< .003	< .040	< .003	< .010	< .040
06-07-2010 1000	< .06	< .010	< .060	E .016	< .003	< .040	< .003	< .010	< .040
06-29-2010 1445	< .06	< .010	< .060	< .010	< .003	< .040	< .003	< .010	< .040
07-12-2010 0945	< .06	< .010	< .060	E .014	< .004	< .040	< .003	< .010	< .040
08-18-2010 1000	< .06	< .010	< .060	E .009	< .003	< .040	< .003	< .010	< .040
09-13-2010 1245	< .06	< .010	< .060	E .012	< .003	< .040	< .003	< .010	< .040

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 5 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Alachlor, water, filtered, recoverable, µg/L (46342)	Aldicarb sulfone, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49313)	Aldicarb sulfoxide, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49314)	Aldicarb, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49312)	alpha-Endosulfan, water, filtered, recoverable, µg/L (34362)	Atrazine, water, filtered, recoverable, µg/L (39632)	Azinphos-methyl oxygen analog, water, filtered, recoverable, µg/L (61635)	Azinphos-methyl, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82686)	Bendiocarb, water, filtered, recoverable, µg/L (50299)
10-21-2009 0945	< .013	--	--	--	< .006	< .008	< .04	< .120	--
11-18-2009 1015	< .008	--	--	--	< .006	E .007	< .04	< .120	--
12-08-2009 1000	< .011	--	--	--	< .006	< .014	< .13	< .120	--
01-05-2010 1430	< .008	< .08	< .060	< .12	< .006	< .010	--	< .120	< .04
02-01-2010 1030	< .008	< .08	< .060	< .12	< .006	.008	< .04	< .120	< .04
02-24-2010 1015	< .011	< .08	< .060	< .12	< .006	< .007	< .04	< .120	< .04
03-10-2010 1345	< .012	< .08	< .060	< .12	< .006	E .009	< .04	< .120	< .04
03-23-2010 1300	< .012	< .08	< .060	< .12	< .006	.008	< .04	< .120	< .04
04-06-2010 1515	< .011	< .08	< .060	< .12	< .006	.008	< .04	< .120	< .04
04-22-2010 1015	< .011	< .08	< .060	< .12	< .006	.008	< .04	< .120	< .04
05-05-2010 1400	< .011	< .08	< .060	< .12	< .006	< .010	< .04	< .120	< .04
05-18-2010 1030	< .008	< .08	< .060	< .12	< .006	< .010	< .04	< .120	< .04
06-07-2010 1000	< .008	< .08	< .060	< .12	< .006	E .007	< .04	< .120	< .04
06-29-2010 1445	< .008	< .08	< .060	< .12	< .006	< .009	< .04	< .120	< .04
07-12-2010 0945	.013	< .08	< .060	< .12	< .006	.012	< .04	< .120	< .04
08-18-2010 1000	< .011	< .08	< .060	< .12	< .006	< .009	< .04	< .120	< .04
09-13-2010 1245	< .008	< .08	< .060	< .12	< .006	< .009	< .04	< .120	< .04

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 6 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Ben-fluralin, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82673)	Benomyl, water, filtered, recover-able, µg/L (50300)	Ben-sulfuron-methyl, water, filtered, recover-able, µg/L (61693)	Bentazon, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (38711)	Bromacil, water, filtered, recover-able, µg/L (04029)	Brom-oxynil, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49311)	Carbaryl, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49310)	Carbaryl, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82680)	Carbo-furan, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49309)
10-21-2009 0945	< .014	--	--	--	--	--	--	< .060	--
11-18-2009 1015	< .014	--	--	--	--	--	--	< .060	--
12-08-2009 1000	< .014	--	--	--	--	--	--	E .071	--
01-05-2010 1430	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
02-01-2010 1030	< .014	E .042	< .06	< .06	< .06	< .12	< .04	E .011	< .040
02-24-2010 1015	< .014	< .060	< .06	< .06	.77	< .12	< .04	E .011	< .040
03-10-2010 1345	< .014	E .034	< .06	< .06	.45	< .12	< .04	E .018	< .040
03-23-2010 1300	< .014	E .029	< .06	< .06	.26	< .12	< .04	E .011	< .040
04-06-2010 1515	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
04-22-2010 1015	< .014	E .036	< .06	< .06	< .06	< .12	< .04	< .060	< .040
05-05-2010 1400	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
05-18-2010 1030	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
06-07-2010 1000	< .014	E .007	< .06	< .06	< .06	< .12	< .04	< .060	< .040
06-29-2010 1445	< .014	E .014	< .06	< .06	< .06	< .12	< .04	< .060	< .040
07-12-2010 0945	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
08-18-2010 1000	< .014	< .060	< .06	< .06	< .06	< .12	< .04	< .060	< .040
09-13-2010 1245	< .014	< .060	< .06	< .06	< .06	< .12	< .04	E .010	< .040

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 7 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Carbofuran, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82674)	Chlorambenmethyl ester, water, filtered, recoverable, µg/L (61188)	Chlorimuronethyl, water, filtered, recoverable, µg/L (50306)	Chlorpyrifos oxygen analog, water, filtered, recoverable, µg/L (61636)	Chlorpyrifos, water, filtered, recoverable, µg/L (38933)	cis-Permethrin, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82687)	cis-Propiconazole, water, filtered, recoverable, µg/L (79846)	Clopyralid, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49305)	Cyanazine, water, filtered, recoverable, µg/L (04041)
10-21-2009 0945	< .060	--	--	< .05	< .010	< .014	< .006	--	< .083
11-18-2009 1015	< .060	--	--	< .05	< .010	< .014	< .006	--	< .022
12-08-2009 1000	< .060	--	--	< .05	< .016	< .014	< .022	--	< .022
01-05-2010 1430	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
02-01-2010 1030	< .060	< .10	< .080	< .05	< .010	< .014	E .012	< .06	< .022
02-24-2010 1015	< .060	< .10	< .080	< .05	< .010	< .014	E .011	< .06	< .022
03-10-2010 1345	< .060	< .10	< .080	< .05	< .010	< .014	E .007	< .06	< .022
03-23-2010 1300	< .060	< .10	< .080	< .05	< .010	< .014	E .010	< .06	< .022
04-06-2010 1515	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
04-22-2010 1015	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
05-05-2010 1400	< .060	< .10	< .080	< .05	< .010	< .014	< .007	< .06	< .022
05-18-2010 1030	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
06-07-2010 1000	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
06-29-2010 1445	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
07-12-2010 0945	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
08-18-2010 1000	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022
09-13-2010 1245	< .060	< .10	< .080	< .05	< .010	< .014	< .006	< .06	< .022

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 8 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Cycloate, water, filtered, recover-able, µg/L (04031)	Cyfluthrin, water, filtered, recover-able, µg/L (61585)	Cyper-methrin, water, filtered, recover-able, µg/L (61586)	Dacthal monoacid, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49304)	DCPA, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82682)	Desulfinylfipronil amide, water, filtered, recover-able, µg/L (62169)	Desulfinylfipronil, water, filtered, recover-able, µg/L (62170)	Diazinon, water, filtered, recover-able, µg/L (39572)	Dicamba, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (38442)
10-21-2009 0945	--	< .016	< .020	--	< .008	< .029	E .011	< .005	--
11-18-2009 1015	--	< .016	< .020	--	< .008	< .029	E .006	< .005	--
12-08-2009 1000	--	< .016	< .020	--	.019	< .029	.018	< .023	--
01-05-2010 1430	< .04	< .016	< .020	< .04	E .005	< .029	E .006	< .005	< .04
02-01-2010 1030	< .04	< .016	< .020	< .04	.019	E .004	E .007	< .006	< .04
02-24-2010 1015	< .04	< .016	< .020	< .04	.011	< .029	E .008	< .005	< .04
03-10-2010 1345	< .04	< .016	< .020	< .04	.009	E .010	E .010	< .005	< .04
03-23-2010 1300	< .04	< .016	< .020	< .04	.013	< .029	E .010	< .005	< .04
04-06-2010 1515	< .04	< .016	< .020	< .04	.008	< .029	E .009	< .005	< .04
04-22-2010 1015	< .04	< .016	< .020	< .04	E .005	< .029	E .009	< .005	< .04
05-05-2010 1400	< .04	< .016	< .020	< .04	E .005	E .003	E .010	< .005	< .04
05-18-2010 1030	< .04	< .016	< .020	< .04	E .002	< .029	E .009	< .005	< .04
06-07-2010 1000	< .04	< .016	< .020	< .04	< .008	E .002	E .007	< .005	< .04
06-29-2010 1445	< .04	< .016	< .020	< .04	< .008	< .029	E .006	< .005	< .04
07-12-2010 0945	< .04	< .016	< .020	< .04	< .008	< .029	E .010	< .005	< .04
08-18-2010 1000	< .04	< .016	< .020	< .04	E .003	< .029	.008	< .005	< .04
09-13-2010 1245	< .04	< .016	< .020	< .04	E .004	< .029	.009	< .005	< .04

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 9 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Dichlor-prop, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49302)	Dichlorvos, water, filtered, recover-able, µg/L (38775)	Dicro-tophos, water, filtered, recover-able, µg/L (38454)	Dieldrin, water, filtered, recover-able, µg/L (39381)	Dimetho-ate, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82662)	Dinoseb, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49301)	Di-phenamid, water, filtered, recover-able, µg/L (04033)	Di-sulfoton sulfone, water, filtered, recover-able, µg/L (61640)	Disulfoton, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82677)
10-21-2009 0945	--	< .02	< .08	< .009	< .006	--	--	< .01	< .04
11-18-2009 1015	--	< .02	< .08	< .009	< .006	--	--	< .01	< .04
12-08-2009 1000	--	< .02	< .08	< .009	< .009	--	--	< .01	< .04
01-05-2010 1430	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
02-01-2010 1030	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
02-24-2010 1015	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
03-10-2010 1345	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
03-23-2010 1300	< .04	M	< .08	< .009	< .006	< .04	< .04	< .01	< .04
04-06-2010 1515	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
04-22-2010 1015	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
05-05-2010 1400	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
05-18-2010 1030	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
06-07-2010 1000	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
06-29-2010 1445	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
07-12-2010 0945	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
08-18-2010 1000	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04
09-13-2010 1245	< .04	< .02	< .08	< .009	< .006	< .04	< .04	< .01	< .04

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 10 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Diuron, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49300)	Endo-sulfan sulfate, water, filtered, recover-able, µg/L (61590)	EPTC, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82668)	Ethion monoxon, water, filtered, recover-able, µg/L (61644)	Ethion, water, filtered, recover-able, µg/L (82346)	Ethoprop, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82672)	Fenami-phos sulfone, water, filtered, recover-able, µg/L (61645)	Fenami-phos sulfoxide, water, filtered, recover-able, µg/L (61646)	Fenami-phos, water, filtered, recover-able, µg/L (61591)
10-21-2009 0945	--	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
11-18-2009 1015	--	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
12-08-2009 1000	--	< .018	< .002	< .02	< .008	< .016	< .053	< .08	< .03
01-05-2010 1430	.05	< .014	< .002	< .02	< .008	< .016	< .053	--	< .03
02-01-2010 1030	.32	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
02-24-2010 1015	.80	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
03-10-2010 1345	.65	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
03-23-2010 1300	.49	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
04-06-2010 1515	E .15	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
04-22-2010 1015	.42	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
05-05-2010 1400	.32	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
05-18-2010 1030	.15	< .024	< .002	< .02	< .008	< .016	< .053	< .08	< .03
06-07-2010 1000	.10	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
06-29-2010 1445	< .04	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
07-12-2010 0945	E .03	E .011	< .002	< .02	< .008	< .016	< .053	< .08	< .03
08-18-2010 1000	E .02	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03
09-13-2010 1245	E .02	< .014	< .002	< .02	< .008	< .016	< .053	< .08	< .03

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 11 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Fenuron, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49297)	Fipronil sulfide, water, filtered, recoverable, µg/L (62167)	Fipronil sulfone, water, filtered, recoverable, µg/L (62168)	Fipronil, water, filtered, recoverable, µg/L (62166)	Flumetsulam, water, filtered, recoverable, µg/L (61694)	Fluometuron, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38811)	Fonofos, water, filtered, recoverable, µg/L (04095)	Hexazinone, water, filtered, recoverable, µg/L (04025)	Imazaquin, water, filtered, recoverable, µg/L (50356)
10-21-2009 0945	--	< .013	< .024	< .018	--	--	< .004	< .008	--
11-18-2009 1015	--	E .006	< .024	E .004	--	--	< .004	< .008	--
12-08-2009 1000	--	E .004	< .024	E .040	--	--	< .004	.127	--
01-05-2010 1430	< .06	< .013	< .024	< .018	< .06	< .04	< .004	< .008	< .06
02-01-2010 1030	< .06	E .002	E .008	E .013	< .06	< .04	< .004	.134	< .06
02-24-2010 1015	< .06	E .002	E .009	< .018	< .06	< .04	< .004	.083	< .06
03-10-2010 1345	< .06	E .007	E .005	E .008	< .06	< .04	< .004	.180	< .06
03-23-2010 1300	< .06	E .008	E .005	E .007	< .06	< .04	< .004	.060	< .06
04-06-2010 1515	< .06	< .013	< .024	E .004	< .06	< .04	< .004	.025	< .06
04-22-2010 1015	< .06	< .013	< .024	< .018	< .06	< .04	< .004	.045	< .06
05-05-2010 1400	< .06	< .013	E .006	< .018	< .06	< .04	< .004	.021	< .06
05-18-2010 1030	< .06	E .008	< .024	< .018	< .06	< .04	< .004	.032	< .06
06-07-2010 1000	< .06	E .003	E .009	E .003	< .06	E .02	< .004	.024	< .06
06-29-2010 1445	< .06	< .013	< .024	< .018	< .06	< .04	< .004	.016	< .06
07-12-2010 0945	< .06	E .005	E .002	< .018	< .06	< .04	< .004	.015	< .06
08-18-2010 1000	< .06	E .003	< .024	< .018	< .06	< .04	< .004	< .008	< .06
09-13-2010 1245	< .06	E .004	< .024	< .018	< .06	< .04	< .004	E .018	< .06

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 12 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Imaze-thapyr, water, filtered, recover-able, µg/L (50407)	Imi-dacloprid, water, filtered, recover-able, µg/L (61695)	Iprodione, water, filtered, recover-able, µg/L (61593)	Isofen-phos, water, filtered, recover-able, µg/L (61594)	lambda-Cyhalo-thrin, water, filtered, recover-able, µg/L (61595)	Linuron, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (38478)	Malaoxon, water, filtered, recover-able, µg/L (61652)	Malathion, water, filtered, recover-able, µg/L (39532)	MCPA, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (38482)
10-21-2009 0945	--	--	< .014	< .006	< .010	--	< .080	< .016	--
11-18-2009 1015	--	--	< .014	< .006	< .012	--	< .080	< .016	--
12-08-2009 1000	--	--	< .014	< .006	< .010	--	< .080	.060	--
01-05-2010 1430	< .06	< .060	< .020	< .006	< .010	< .04	< .080	< .016	< .04
02-01-2010 1030	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
02-24-2010 1015	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
03-10-2010 1345	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .020	< .04
03-23-2010 1300	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
04-06-2010 1515	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
04-22-2010 1015	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
05-05-2010 1400	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
05-18-2010 1030	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
06-07-2010 1000	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
06-29-2010 1445	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04
07-12-2010 0945	< .06	< .060	< .014	< .010	< .010	< .04	< .080	< .016	< .04
08-18-2010 1000	< .06	< .060	< .014	< .006	< .010	< 1.10	< .080	< .016	< .04
09-13-2010 1245	< .06	< .060	< .014	< .006	< .010	< .04	< .080	< .016	< .04

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 13 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	MCPB, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38487)	Metalaxyl, water, filtered, recoverable, µg/L (50359)	Metalaxyl, water, filtered, recoverable, µg/L (61596)	Methidathion, water, filtered, recoverable, µg/L (61598)	Methiocarb, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38501)	Methomyl, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49296)	Methyl paraoxon, water, filtered, recoverable, µg/L (61664)	Methyl parathion, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82667)	Metolachlor, water, filtered, recoverable, µg/L (39415)
10-21-2009 0945	--	--	< .113	< .006	--	--	< .03	< .013	< .014
11-18-2009 1015	--	--	< .009	< .006	--	--	< .01	< .008	< .014
12-08-2009 1000	--	--	< .055	< .052	--	--	< .01	< .008	< .014
01-05-2010 1430	< .20	< .04	< .007	< .006	< .040	< .120	< .02	< .008	< .014
02-01-2010 1030	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
02-24-2010 1015	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
03-10-2010 1345	< .20	< .04	< .026	< .006	< .040	< .120	< .01	< .008	< .014
03-23-2010 1300	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	E .008
04-06-2010 1515	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
04-22-2010 1015	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
05-05-2010 1400	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
05-18-2010 1030	< .20	< .04	< .102	< .006	< .040	< .120	< .01	< .008	< .014
06-07-2010 1000	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
06-29-2010 1445	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	E .008
07-12-2010 0945	< .20	< .04	< .007	< .006	< .040	< .120	< .02	< .008	< .014
08-18-2010 1000	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014
09-13-2010 1245	< .20	< .04	< .007	< .006	< .040	< .120	< .01	< .008	< .014

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 14 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Metribuzin, water, filtered, recoverable, µg/L (82630)	Metsulfuron-methyl, water, filtered, recoverable, µg/L (61697)	Molinate, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82671)	Myclobutanil, water, filtered, recoverable, µg/L (61599)	N-(4-Chlorophenyl)-N'-methylurea, water, filtered, recoverable, µg/L (61692)	Neburon, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49294)	Nicosulfuron, water, filtered, recoverable, µg/L (50364)	Norflurazon, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49293)	Oryzalin, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49292)
10-21-2009 0945	< .012	--	< .003	< .010	--	--	--	--	--
11-18-2009 1015	< .012	--	< .003	< .010	--	--	--	--	--
12-08-2009 1000	< .012	--	< .003	< .010	--	--	--	--	--
01-05-2010 1430	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
02-01-2010 1030	< .012	< .14	< .003	< .010	< .06	< .02	< .10	E .01	< .04
02-24-2010 1015	< .012	< .14	< .003	< .010	< .06	< .02	< .10	E .01	< .04
03-10-2010 1345	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
03-23-2010 1300	< .012	< .14	< .003	< .010	< .06	< .02	< .10	E .01	< .04
04-06-2010 1515	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
04-22-2010 1015	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
05-05-2010 1400	< .012	< .14	< .003	.015	< .06	< .02	< .10	< .04	< .04
05-18-2010 1030	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
06-07-2010 1000	< .012	< .14	< .003	< .010	< .06	< .02	< .10	E .01	< .04
06-29-2010 1445	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04
07-12-2010 0945	< .012	< .14	< .003	.013	< .06	< .02	< .10	< .04	< .04
08-18-2010 1000	< .012	< .14	< .003	.009	< .06	< .02	< .10	< .04	< .04
09-13-2010 1245	< .012	< .14	< .003	< .010	< .06	< .02	< .10	< .04	< .04

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 15 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Oxamyl, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38866)	Oxyfluorfen, water, filtered, recoverable, µg/L (61600)	Pendimethalin, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82683)	Phorate oxygen analog, water, filtered, recoverable, µg/L (61666)	Phorate, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82664)	Phosmet oxygen analog, water, filtered, recoverable, µg/L (61668)	Phosmet, water, filtered, recoverable, µg/L (61601)	Picloram, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49291)	Prometon, water, filtered, recoverable, µg/L (04037)
10-21-2009 0945	--	< .010	< .012	< .03	< .020	< .05	< .034	--	.03
11-18-2009 1015	--	< .010	< .012	< .03	< .020	< .05	< .034	--	E .01
12-08-2009 1000	--	< .010	< .035	< .03	< .020	< .05	< .034	--	.02
01-05-2010 1430	< .12	< .010	< .012	< .03	< .020	--	--	< .12	E .01
02-01-2010 1030	< .12	< .010	.016	< .03	< .020	< .05	< .034	< .12	E .01
02-24-2010 1015	< .12	< .010	< .016	< .03	< .020	< .05	< .034	< .12	E .01
03-10-2010 1345	< .12	< .010	.020	< .03	< .020	< .05	< .034	< .12	.02
03-23-2010 1300	< .12	< .010	E .011	E .01	< .020	< .05	< .034	< .12	.02
04-06-2010 1515	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.02
04-22-2010 1015	< .12	< .010	< .019	< .03	< .020	< .05	< .034	< .12	.02
05-05-2010 1400	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.03
05-18-2010 1030	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.04
06-07-2010 1000	< .12	< .010	< .026	< .03	< .020	< .05	< .034	< .12	.02
06-29-2010 1445	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.02
07-12-2010 0945	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.01
08-18-2010 1000	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	< .01
09-13-2010 1245	< .12	< .010	< .012	< .03	< .020	< .05	< .034	< .12	.06

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 16 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Prometryn, water, filtered, recoverable, µg/L (04036)	Propanil, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82679)	Propargite, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82685)	Propham, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (49236)	Propiconazole, water, filtered, recoverable, µg/L (50471)	Propoxur, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (38538)	Propyzamide, water, filtered (0.7 micron glass fiber filter), recoverable, µg/L (82676)	Siduron, water, filtered, recoverable, µg/L (38548)	Simazine, water, filtered, recoverable, µg/L (04035)
10-21-2009 0945	< .006	< .010	< .02	--	--	--	< .013	--	.026
11-18-2009 1015	< .006	< .010	< .02	--	--	--	< .004	--	.106
12-08-2009 1000	< .006	< .010	< .15	--	--	--	< .012	--	.603
01-05-2010 1430	< .006	< .020	< .02	< .040	< .04	< .060	< .004	< .04	.042
02-01-2010 1030	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.074
02-24-2010 1015	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.050
03-10-2010 1345	< .006	< .030	< .02	< .040	< .04	< .060	< .004	< .04	.136
03-23-2010 1300	< .006	< .017	< .02	< .040	< .04	< .060	< .004	< .04	.055
04-06-2010 1515	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.036
04-22-2010 1015	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.048
05-05-2010 1400	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.030
05-18-2010 1030	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.032
06-07-2010 1000	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.034
06-29-2010 1445	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.036
07-12-2010 0945	< .006	< .010	< .02	< .040	< .04	< .060	< .009	< .04	.029
08-18-2010 1000	< .006	< .010	< .02	< .040	< .04	< .060	< .004	< .04	.027
09-13-2010 1245	< .006	< .010	< .02	< .040	< .04	E .005	< .004	< .04	.027

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 17 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Sulfo-meturon-methyl, water, filtered, recover-able, µg/L (50337)	Tebu-thiuron, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82670)	Teflu-thrin, water, filtered, recover-able, µg/L (61606)	Terbacil, water, filtered, recover-able, µg/L (04032)	Terbufos oxygen analog sulfone, water, filtered, recover-able, µg/L (61674)	Terbufos, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82675)	Terbuthyl azine, water, filtered, recover-able, µg/L (04022)	Thioben-carb, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82681)	trans-Propicon azole, water, filtered, recover-able, µg/L (79847)
10-21-2009 0945	--	< .03	< .010	--	< .04	< .02	< .01	< .016	< .02
11-18-2009 1015	--	< .03	< .010	--	< .04	< .02	.01	< .016	< .02
12-08-2009 1000	--	< .03	< .012	--	< .04	< .02	< .01	< .016	< .05
01-05-2010 1430	< .060	< .03	< .010	< .040	< .04	< .02	< .01	< .016	< .02
02-01-2010 1030	E .038	E .02	< .010	< .040	< .04	< .02	< .01	< .016	E .02
02-24-2010 1015	E .075	< .03	< .010	< .040	< .04	< .02	.01	< .016	E .02
03-10-2010 1345	E .102	< .03	< .010	< .040	< .09	< .02	.01	< .016	E .01
03-23-2010 1300	E .045	.05	< .010	< .040	< .04	< .02	.01	< .016	E .01
04-06-2010 1515	E .023	E .02	< .010	< .040	< .14	< .02	.01	< .016	M
04-22-2010 1015	E .033	< .03	< .010	< .040	< .04	< .02	< .01	< .016	< .02
05-05-2010 1400	E .042	< .03	< .010	< .040	< .04	< .02	< .01	< .016	E .01
05-18-2010 1030	E .068	< .03	< .010	< .040	< .04	< .02	.01	< .016	< .02
06-07-2010 1000	E .008	< .03	< .010	< .040	< .04	< .02	< .01	< .016	< .02
06-29-2010 1445	< .060	< .03	< .010	< .040	< .04	< .02	< .01	< .016	< .02
07-12-2010 0945	< .060	< .03	< .010	< .040	< .04	< .02	.01	< .016	< .02
08-18-2010 1000	< .060	< .03	< .010	< .040	< .08	< .02	.02	< .016	< .02
09-13-2010 1245	< .060	< .03	< .010	< .040	< .04	< .02	< .01	< .016	< .02

11074000 Santa Ana River below Prado Dam, CA—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 18 of 18

[%, percent; CaCO3, calcium carbonate; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; --, no data; <, less than; E, estimated; M, presence verified but not quantified]

Sample date-time	Tri-buphos, water, filtered, recover-able, µg/L (61610)	Triclopyr, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (49235)	Tri-fluralin, water, filtered (0.7 micron glass fiber filter), recover-able, µg/L (82661)	Caffeine, water, filtered, recover-able, µg/L (50305)
10-21-2009 0945	< .018	--	< .018	--
11-18-2009 1015	< .018	--	< .018	--
12-08-2009 1000	< .054	--	< .018	--
01-05-2010 1430	< .018	< .08	< .018	< .080
02-01-2010 1030	< .031	< .08	< .018	E .078
02-24-2010 1015	< .018	< .08	< .018	E .061
03-10-2010 1345	< .063	< .08	< .018	.085
03-23-2010 1300	< .066	< .08	< .018	< .080
04-06-2010 1515	< .018	< .08	< .018	< .080
04-22-2010 1015	< .018	< .08	< .018	.096
05-05-2010 1400	< .018	< .08	< .018	.190
05-18-2010 1030	< .018	< .08	< .018	.130
06-07-2010 1000	< .018	< .08	< .018	< .080
06-29-2010 1445	< .018	< .08	< .018	< .080
07-12-2010 0945	< .018	< .08	< .018	E .195
08-18-2010 1000	< .018	< .08	< .018	< .080
09-13-2010 1245	< .018	< .08	< .018	< .080

11074000 Santa Ana River below Prado Dam, CA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

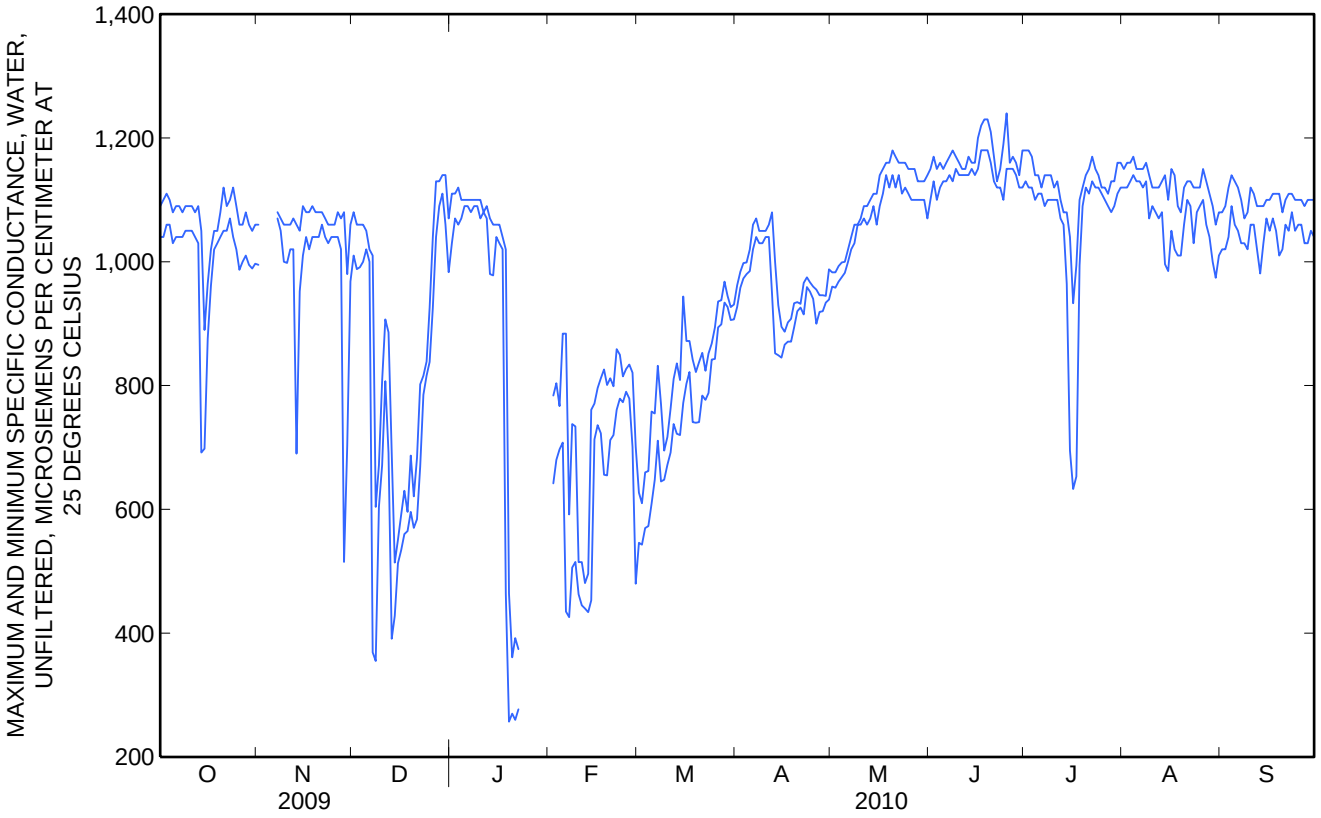
Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	October		November		December		January		February		March	
1	1,090	1,040	1,060	995	1,080	1,010	1,110	1,030	---	---	627	546
2	1,100	1,040	---	---	1,060	988	1,110	1,070	784	642	610	543
3	1,110	1,060	---	---	1,060	991	1,120	1,060	804	680	660	570
4	1,100	1,060	---	---	1,060	1,000	1,100	1,070	767	697	662	573
5	1,080	1,030	---	---	1,050	1,020	1,100	1,090	884	708	758	609
6	1,090	1,040	---	---	1,020	1,000	1,100	1,090	884	435	755	648
7	1,090	1,040	1,080	1,070	1,010	369	1,100	1,080	592	426	832	711
8	1,080	1,040	1,070	1,050	604	355	1,100	1,090	738	506	770	645
9	1,090	1,050	1,060	1,000	671	604	1,100	1,090	734	515	695	648
10	1,090	1,050	1,060	998	807	671	1,100	1,070	515	463	717	672
11	1,090	1,050	1,060	1,020	907	807	1,080	1,080	515	445	763	692
12	1,080	1,040	1,070	1,020	886	691	1,090	1,070	481	440	811	738
13	1,090	1,030	1,060	690	691	391	1,070	980	496	434	836	722
14	1,050	692	1,050	952	514	428	1,060	978	761	453	809	720
15	890	698	1,090	1,010	551	513	1,060	1,040	771	713	944	772
16	965	876	1,080	1,040	591	534	1,060	1,030	796	736	872	803
17	1,020	961	1,080	1,020	630	560	1,040	1,020	812	723	872	822
18	1,050	1,020	1,090	1,040	596	565	1,020	464	826	656	842	741
19	1,050	1,030	1,080	1,040	687	596	464	257	801	655	822	740
20	1,080	1,040	1,080	1,040	621	570	361	270	812	712	838	741
21	1,120	1,050	1,080	1,060	683	584	392	260	799	720	853	784
22	1,090	1,050	1,070	1,040	802	669	374	277	859	761	824	777
23	1,100	1,070	1,060	1,030	816	785	---	---	850	779	852	788
24	1,120	1,040	1,060	1,040	839	816	---	---	815	773	868	842
25	1,090	1,020	1,060	1,040	926	838	---	---	827	790	894	843
26	1,060	987	1,080	1,040	1,040	926	---	---	834	779	936	894
27	1,060	1,000	1,070	1,020	1,130	1,040	---	---	821	701	938	899
28	1,080	1,010	1,080	515	1,130	1,090	---	---	701	480	968	934
29	1,060	995	980	703	1,140	1,110	---	---	---	---	945	927
30	1,050	989	1,060	968	1,140	1,060	---	---	---	---	927	906
31	1,060	997	---	---	1,070	983	---	---	---	---	931	907
Month	1,120	692	---	---	1,140	355	---	---	---	---	968	543

11074000 Santa Ana River below Prado Dam, CA—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	April		May		June		July		August		September	
1	962	927	983	960	1,150	1,100	1,180	1,130	1,150	1,120	1,080	1,020
2	984	958	983	958	1,170	1,130	1,180	1,120	1,160	1,120	1,090	1,020
3	998	973	993	968	1,150	1,100	1,170	1,120	1,160	1,130	1,120	1,040
4	999	980	999	975	1,160	1,120	1,140	1,100	1,170	1,140	1,140	1,090
5	1,020	985	1,000	982	1,150	1,130	1,140	1,110	1,150	1,130	1,130	1,060
6	1,060	1,020	1,020	1,000	1,160	1,130	1,120	1,110	1,150	1,130	1,120	1,050
7	1,070	1,040	1,040	1,020	1,170	1,140	1,140	1,090	1,150	1,120	1,100	1,030
8	1,050	1,030	1,060	1,030	1,180	1,130	1,140	1,100	1,160	1,130	1,070	1,030
9	1,050	1,030	1,060	1,060	1,170	1,150	1,140	1,100	1,140	1,070	1,080	1,020
10	1,050	1,040	1,070	1,060	1,160	1,140	1,120	1,100	1,120	1,090	1,120	1,060
11	1,060	1,040	1,090	1,070	1,150	1,140	1,130	1,100	1,120	1,080	1,110	1,060
12	1,080	948	1,090	1,060	1,150	1,140	1,100	1,070	1,120	1,070	1,090	1,020
13	1,000	852	1,100	1,070	1,170	1,140	1,080	1,060	1,130	1,080	1,090	981
14	930	849	1,110	1,090	1,160	1,150	1,080	964	1,140	996	1,090	1,030
15	895	845	1,110	1,060	1,160	1,140	1,040	695	1,100	985	1,100	1,070
16	887	866	1,140	1,090	1,200	1,150	933	633	1,150	1,050	1,100	1,050
17	902	871	1,150	1,110	1,220	1,180	994	653	1,140	1,020	1,110	1,070
18	908	871	1,160	1,140	1,230	1,180	1,100	994	1,090	1,010	1,110	1,050
19	933	894	1,160	1,120	1,230	1,180	1,120	1,090	1,080	1,010	1,110	1,010
20	935	920	1,180	1,140	1,210	1,160	1,140	1,120	1,120	1,060	1,080	1,020
21	932	926	1,170	1,120	1,170	1,130	1,150	1,110	1,130	1,100	1,100	1,060
22	966	915	1,160	1,140	1,130	1,120	1,170	1,130	1,130	1,090	1,110	1,050
23	975	959	1,160	1,110	1,150	1,120	1,150	1,120	1,120	1,030	1,110	1,080
24	967	952	1,160	1,120	1,190	1,100	1,140	1,120	1,120	1,080	1,100	1,050
25	960	940	1,150	1,110	1,240	1,150	1,120	1,110	1,120	1,090	1,100	1,060
26	955	900	1,150	1,100	1,160	1,150	1,120	1,100	1,150	1,100	1,100	1,060
27	946	919	1,150	1,100	1,170	1,150	1,110	1,090	1,130	1,060	1,090	1,030
28	946	920	1,130	1,100	1,160	1,140	1,130	1,080	1,110	1,040	1,100	1,030
29	945	934	1,130	1,100	1,140	1,120	1,130	1,090	1,090	1,000	1,100	1,050
30	988	939	1,130	1,100	1,180	1,120	1,160	1,110	1,060	974	1,100	1,040
31	---	---	1,140	1,070	---	---	1,160	1,120	1,080	1,010	---	---
Month	1,080	845	1,180	958	1,240	1,100	1,180	633	1,170	974	1,140	981

11074000 Santa Ana River below Prado Dam, CA—Continued



11074000 Santa Ana River below Prado Dam, CA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

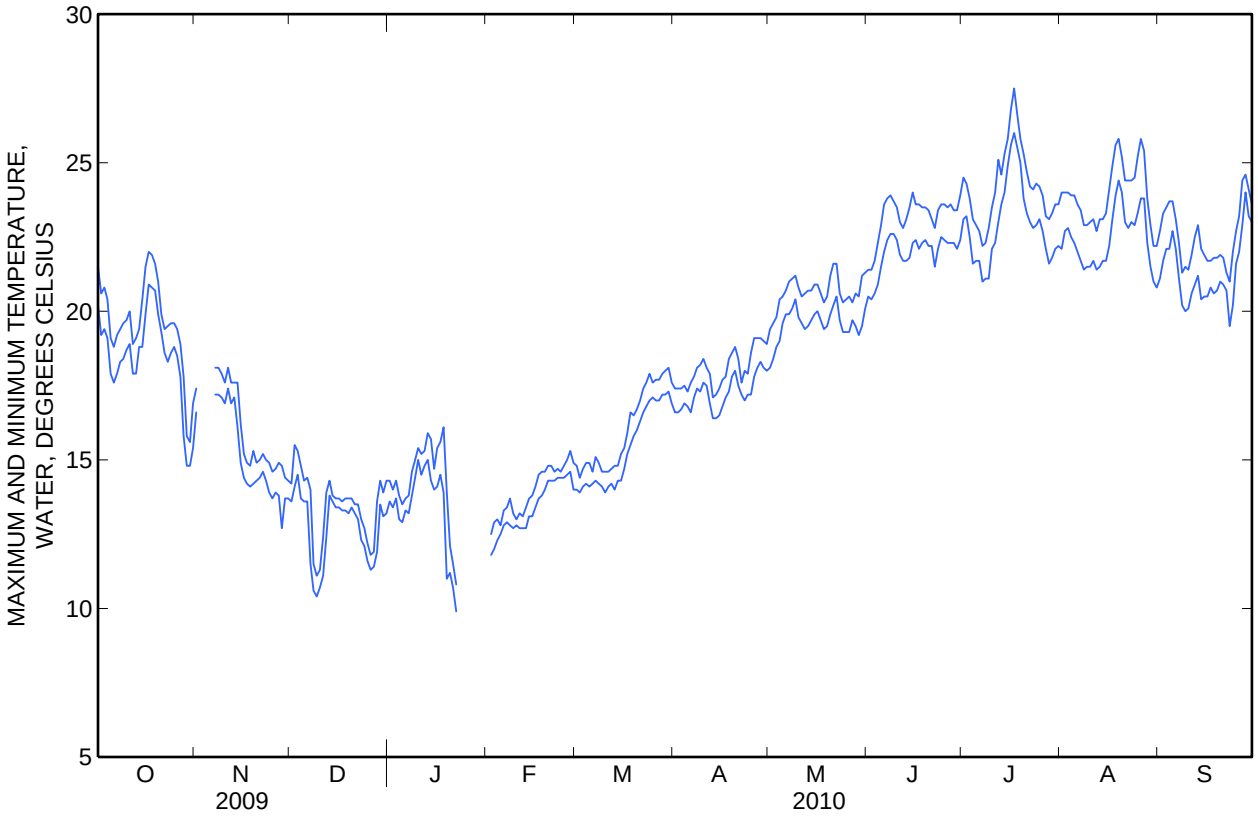
Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	October		November		December		January		February		March	
1	21.5	20.2	17.4	16.6	14.2	13.6	14.3	13.6	---	---	14.8	14.0
2	20.6	19.2	---	---	15.5	14.1	14.0	13.4	12.5	11.8	14.4	13.9
3	20.8	19.4	---	---	15.3	14.5	14.3	13.7	12.9	12.0	14.7	14.1
4	20.4	19.1	---	---	14.8	13.7	13.8	13.0	13.0	12.3	14.9	14.2
5	19.1	17.9	---	---	14.3	13.6	13.5	12.9	12.8	12.5	14.9	14.1
6	18.8	17.6	---	---	14.4	13.6	13.7	13.3	13.3	12.8	14.6	14.2
7	19.2	17.9	18.1	17.2	14.0	11.5	13.8	13.2	13.4	12.9	15.1	14.3
8	19.4	18.3	18.1	17.2	11.5	10.6	14.6	13.8	13.7	12.8	14.9	14.2
9	19.6	18.4	17.9	17.1	11.1	10.4	15.0	14.4	13.2	12.7	14.6	14.1
10	19.7	18.7	17.6	16.9	11.3	10.7	15.4	15.0	13.0	12.8	14.6	13.9
11	20.0	18.9	18.1	17.4	12.4	11.1	15.2	14.5	13.2	12.7	14.6	14.1
12	18.9	17.9	17.6	16.9	13.9	12.4	15.3	14.8	13.1	12.7	14.7	14.2
13	19.1	17.9	17.6	17.1	14.3	13.8	15.9	15.0	13.4	12.7	14.8	14.0
14	19.4	18.8	17.6	16.1	13.8	13.6	15.7	14.3	13.7	13.1	14.8	14.3
15	20.4	18.8	16.2	14.9	13.7	13.4	14.7	14.0	13.8	13.1	15.2	14.3
16	21.5	19.9	15.2	14.4	13.7	13.4	15.4	14.1	14.1	13.4	15.4	14.7
17	22.0	20.9	14.9	14.2	13.6	13.3	15.6	14.5	14.5	13.7	15.9	15.2
18	21.9	20.8	14.8	14.1	13.7	13.3	16.1	13.9	14.6	13.8	16.6	15.5
19	21.6	20.7	15.3	14.2	13.7	13.2	13.9	11.0	14.6	14.0	16.5	15.8
20	21.0	19.9	14.9	14.3	13.7	13.4	12.1	11.2	14.8	14.3	16.7	16.0
21	19.9	19.3	15.0	14.4	13.5	13.2	11.5	10.7	14.8	14.3	17.0	16.3
22	19.4	18.6	15.2	14.6	13.5	13.0	10.8	9.9	14.6	14.3	17.4	16.6
23	19.5	18.3	15.0	14.3	13.0	12.3	---	---	14.7	14.4	17.6	16.8
24	19.6	18.6	14.9	13.9	12.7	12.1	---	---	14.6	14.4	17.9	17.0
25	19.6	18.8	14.6	13.7	12.2	11.6	---	---	14.8	14.4	17.6	17.1
26	19.4	18.5	14.7	13.9	11.8	11.3	---	---	15.0	14.5	17.7	17.0
27	18.9	17.8	14.9	13.8	11.9	11.4	---	---	15.3	14.6	17.7	17.0
28	17.8	15.8	14.8	12.7	13.6	11.9	---	---	14.9	14.0	17.9	17.2
29	15.8	14.8	14.4	13.7	14.3	13.5	---	---	---	---	18.0	17.2
30	15.6	14.8	14.3	13.7	13.9	13.1	---	---	---	---	18.1	17.3
31	16.9	15.4	---	---	14.3	13.2	---	---	---	---	17.6	16.9
Month	22.0	14.8	---	---	15.5	10.4	---	---	---	---	18.1	13.9

11074000 Santa Ana River below Prado Dam, CA—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Day	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
	April		May		June		July		August		September	
1	17.4	16.6	19.4	18.1	21.4	20.5	24.5	23.1	24.0	22.1	22.7	21.1
2	17.4	16.6	19.6	18.4	21.4	20.4	24.3	23.2	24.0	22.7	23.3	21.7
3	17.4	16.7	19.8	18.8	21.7	20.6	23.8	22.5	24.0	22.8	23.5	22.1
4	17.5	16.9	20.4	19.0	22.3	20.9	23.1	21.6	23.9	22.5	23.7	22.1
5	17.3	16.8	20.5	19.6	22.9	21.5	22.9	21.7	23.9	22.3	23.7	22.7
6	17.6	16.6	20.7	19.9	23.6	22.0	22.7	21.7	23.6	22.0	23.1	22.1
7	17.8	17.1	21.0	19.9	23.8	22.4	22.2	21.0	23.4	21.7	22.3	21.1
8	18.1	17.4	21.1	20.1	23.9	22.6	22.3	21.1	22.9	21.4	21.3	20.2
9	18.2	17.3	21.2	20.4	23.7	22.6	22.8	21.1	22.9	21.5	21.5	20.0
10	18.4	17.6	20.8	19.8	23.5	22.4	23.5	22.1	23.0	21.5	21.4	20.1
11	18.1	17.5	20.5	19.6	23.0	21.9	24.0	22.3	23.1	21.7	21.9	20.6
12	17.9	16.9	20.6	19.4	22.8	21.7	25.1	23.0	22.7	21.4	22.5	20.9
13	17.1	16.4	20.7	19.5	23.1	21.7	24.6	23.6	23.1	21.5	22.9	21.2
14	17.2	16.4	20.7	19.7	23.5	21.8	25.3	24.0	23.1	21.7	22.1	20.4
15	17.4	16.5	20.9	19.9	24.0	22.3	25.8	24.9	23.3	21.7	21.9	20.5
16	17.7	16.8	20.9	20.0	23.6	22.4	26.8	25.6	24.1	22.2	21.7	20.5
17	17.8	17.1	20.6	19.7	23.6	22.1	27.5	26.0	24.9	23.1	21.7	20.8
18	18.4	17.3	20.3	19.4	23.5	22.3	26.6	25.5	25.6	23.9	21.8	20.6
19	18.6	17.8	20.5	19.5	23.5	22.4	25.8	25.0	25.8	24.4	21.8	20.7
20	18.8	18.0	21.2	19.9	23.4	22.2	25.3	23.8	25.2	24.0	21.9	21.0
21	18.4	17.5	21.6	20.2	23.1	22.2	24.7	23.3	24.4	23.0	21.8	20.9
22	17.6	17.2	21.6	20.5	22.8	21.5	24.2	23.0	24.4	22.8	21.3	20.7
23	18.0	17.0	20.6	19.7	23.4	22.1	24.1	22.8	24.4	23.0	21.0	19.5
24	17.9	17.2	20.3	19.3	23.6	22.5	24.3	22.9	24.5	22.9	22.0	20.2
25	18.6	17.2	20.4	19.3	23.6	22.4	24.2	23.1	25.2	23.3	22.7	21.6
26	19.1	17.8	20.5	19.3	23.5	22.3	23.9	22.7	25.8	23.8	23.2	22.0
27	19.1	18.1	20.3	19.7	23.6	22.3	23.2	22.1	25.4	23.8	24.4	22.9
28	19.1	18.3	20.6	19.5	23.4	22.3	23.1	21.6	23.8	22.3	24.6	24.0
29	19.0	18.1	20.5	19.2	23.4	22.1	23.3	21.8	22.9	21.5	24.1	23.2
30	18.9	18.0	21.2	19.5	23.9	22.4	23.6	22.1	22.2	21.0	23.6	23.0
31	---	---	21.3	20.1	---	---	23.6	22.2	22.2	20.8	---	---
Month	19.1	16.4	21.6	18.1	24.0	20.4	27.5	21.0	25.8	20.8	24.6	19.5

11074000 Santa Ana River below Prado Dam, CA—Continued



11074000 Santa Ana River below Prado Dam, CA—Continued

SUSPENDED SEDIMENT DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
[ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; --, no data]

Sample date-time	Discharge, instantaneous, ft³/s (00061)	Temperature, water, °C (00010)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-21-2009 0945…SS	235	19.0	19	12
11-18-2009 1015…SS	127	14.5	24	8.2
12-08-2009 1000…SS	426	10.5	104	120
01-05-2010 1430…SS	174	13.5	31	15
02-01-2010 1030…SS	191	12.0	29	15
02-24-2010 1015…SS	446	15.0	7	8.4
03-10-2010 1345…SS	407	15.0	8	8.8
03-23-2010 1300…SS	422	19.5	3	3.4
04-06-2010 1515…SS	335	17.0	2	1.8
04-22-2010 1015…SS	253	17.5	3	2.0
05-05-2010 1400…SS	244	20.0	17	11
05-18-2010 1030…SS	140	19.5	28	11
06-07-2010 1000…SS	180	23.0	27	13
06-29-2010 1445…SS	105	23.0	99	28
07-12-2010 0945…SS	124	23.5	77	26
09-13-2010 1245…SS	112	21.5	54	16

SS Suspended-sediment data determined from a sample collected and processed according to National Water-Quality Assessment (NAWQA) Program protocol.

11074000 Santa Ana River below Prado Dam, CA—Continued

CROSS SECTION ANALYSES
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
Part 1 of 2

[%, percent; ft, feet; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; E, estimated]

Sample date-time	Barometric pressure, mm Hg (00025)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conduct-ance, water, unfiltered, µS/cm at 25 °C (00095)	Tempera-ture, water, °C (00010)	Depth to bottom at sample location, ft (81903)	Sampling depth, ft (00003)	Stream width, ft (00004)
04-06-2010 1546	754	10.0	106	7.8	1,050	17.5	E 1.00	E .50	142
04-06-2010 1549	754	9.0	94	7.7	1,050	17.0	E 4.00	E 1.00	142
04-06-2010 1550	754	8.9	93	7.7	1,050	17.0	E 4.00	E 3.00	142
04-06-2010 1551	754	8.8	92	7.7	1,050	17.0	4.00	E 1.00	142
04-06-2010 1552	754	8.8	92	7.7	1,050	17.0	E 4.00	E 3.00	142
04-06-2010 1553	754	8.9	93	7.7	1,040	17.0	E 4.00	E 1.00	142
04-06-2010 1554	754	8.8	92	7.7	1,040	17.0	E 4.00	E 3.00	142
04-06-2010 1556	754	10.9	116	8.0	1,040	17.5	E 1.00	E 1.00	142
06-25-2010 1142	--	--	--	--	1,190	23.0	1.05	.60	32.3
06-25-2010 1143	--	--	--	--	1,190	22.8	1.77	.70	32.3
06-25-2010 1144	--	--	--	--	1,190	22.8	1.77	1.40	32.3
06-25-2010 1145	--	--	--	--	1,190	22.6	1.78	.70	32.3
06-25-2010 1146	--	--	--	--	1,190	22.5	1.78	1.40	32.3
06-25-2010 1147	--	--	--	--	1,190	22.5	1.78	.70	32.3
06-25-2010 1148	--	--	--	--	1,190	22.4	1.78	1.40	32.3
06-25-2010 1149	--	--	--	--	1,190	22.5	1.78	.70	32.3
06-25-2010 1150	--	--	--	--	1,190	22.5	1.78	1.40	32.3
06-25-2010 1151	--	--	--	--	1,190	22.7	1.79	.80	32.3

Note: Instantaneous discharge at the mean time of cross-sectional measurements: Apr. 6, 335 ft^3/s; June 25, 112 ft^3/s.

11074000 Santa Ana River below Prado Dam, CA—Continued

**CROSS SECTION ANALYSES
WATER YEAR OCTOBER 2009
TO SEPTEMBER 2010**

Part 2 of 2
[%, percent; ft, feet; mg/L, milligrams per liter; mm Hg, millimeters of mercury; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; E, estimated]

Sample date-time	Location in cross section, distance from left bank looking downstream, ft (00009)
04-06-2010 1546	14.0
04-06-2010 1549	42.0
04-06-2010 1550	42.0
04-06-2010 1551	70.0
04-06-2010 1552	70.0
04-06-2010 1553	98.0
04-06-2010 1554	98.0
04-06-2010 1556	126
06-25-2010 1142	2.10
06-25-2010 1143	7.10
06-25-2010 1144	7.10
06-25-2010 1145	12.1
06-25-2010 1146	12.1
06-25-2010 1147	17.1
06-25-2010 1148	17.1
06-25-2010 1149	22.1
06-25-2010 1150	22.1
06-25-2010 1151	27.1

Note: Instantaneous discharge at the mean time of cross-sectional measurements: Apr. 6, 335 ft^3/s; June 25, 112 ft^3/s.

Water-Data Report 2010

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

Santa Ana River Basin

WATER-QUALITY RECORDS

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

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

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
[ft^3/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter]

Date	Sample start time	Temperature, air, °C (00020)	Discharge, instantaneous, ft^3/s (00061)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)	Dissolved solids dried at 180 °C, water, filtered, mg/L (70300)
10-05-2009	1230	19.5	50	985	21.8	607
10-30-2009	1135	17.3	56	972	17.6	630
11-09-2009	1225	25.4	50	966	21.5	596
11-19-2009	1055	14.7	47	984	17.2	614
12-03-2009	1145	14.0	58	947	18.8	594
12-14-2009	1445	14.3	147	690	17.8	413
01-06-2010	1050	15.5	74	926	15.3	584
01-25-2010	1355	18.0	145	846	17.5	527
02-03-2010	1045	14.2	76	952	15.5	600
02-23-2010	1015	15.3	121	808	14.0	522
03-02-2010	1335	17.8	116	824	21.0	500
03-22-2010	1245	23.1	73	940	21.4	576
04-06-2010	1515	21.1	91	967	24.8	600
04-20-2010	1625	18.1	66	975	21.5	603
05-21-2010	1045	19.2	69	950	23.0	585
05-28-2010	1245	25.2	44	1,020	25.0	629
06-08-2010	1645	28.2	49	1,010	29.9	624
07-01-2010	1530	32.1	49	965	31.9	607
07-23-2010	0900	20.5	64	995	21.0	622
08-13-2010	1215	29.4	50	997	27.3	621
08-30-2010	1615	26.6	69	984	28.6	621
09-10-2010	1455	25.0	52	1,000	28.6	637
09-30-2010	1115	25.3	56	975	22.4	608

Water-Data Report 2010

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

Santa Ana River Basin

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

DRAINAGE AREA.--541 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

Date	Time	Discharge (ft³/s)	Gage height (ft)
Nov 28	0845	1,640	4.75
Dec 7	1515	2,770	5.15
Dec 12	1515	2,300	5.02
Dec 22	0945	2,030	4.91
Jan 21	1515	*9,580	*6.25
Feb 6	1100	3,150	5.12
Feb 9	2000	1,160	4.40
Feb 27	2015	2,700	4.99
Mar 7	1745	3,530	5.27
Apr 12	0515	2,530	4.99
Jul 13	1200	2,740	5.05

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.00	2.0	2.0	3.3	6.5	85	4.5	e0.78	0.00	0.00	0.00	0.00
2	0.00	2.5	2.6	3.5	6.8	33	e1.8	e0.60	0.00	0.00	0.00	0.00
3	0.00	e1.1	5.1	3.8	5.3	22	e1.1	e0.35	0.00	0.00	0.00	0.00
4	0.00	e1.2	4.7	3.8	4.9	39	e0.99	0.00	0.00	0.00	0.00	0.00
5	0.00	e1.3	4.7	3.8	5.2	15	e20	0.00	0.00	0.00	5.5	0.00
6	0.00	1.4	5.6	3.7	1,340	38	e3.4	0.00	0.00	0.00	0.00	0.00
7	0.00	1.2	370	4.2	355	289	e2.1	0.00	0.00	0.00	0.00	0.00
8	0.25	0.58	54	4.5	108	49	e1.1	0.00	0.00	0.00	0.00	0.00
9	0.42	0.75	5.6	4.9	210	19	e0.99	0.00	0.00	0.00	0.00	0.00
10	0.17	0.40	3.8	5.4	169	13	e0.89	0.00	0.00	0.00	0.00	0.00
11	1.1	0.00	35	5.3	39	9.8	e0.79	0.00	0.00	0.00	0.00	0.00
12	2.8	0.13	620	5.3	16	7.1	308	0.00	0.00	0.00	0.00	0.00
13	4.1	5.5	506	5.3	11	4.9	28	0.00	0.00	242	0.00	0.00
14	3.8	0.28	85	4.8	7.0	4.3	1.0	0.00	0.00	302	0.00	0.00
15	4.5	0.00	7.4	4.6	5.6	3.8	e1.1	0.00	0.00	375	0.00	0.00
16	1.3	0.00	3.8	5.4	5.2	e3.0	e0.84	0.00	0.00	62	0.00	0.00
17	e0.36	0.00	3.7	7.3	5.5	e2.7	e0.62	0.00	0.00	0.00	0.00	0.00
18	e0.32	0.00	2.3	525	5.1	e2.3	e0.53	0.00	0.00	0.00	0.00	0.00
19	e0.25	0.00	2.4	732	5.2	e2.0	e0.52	0.00	0.00	0.00	0.00	0.00
20	e0.25	0.00	2.4	858	6.2	e1.7	1.9	0.07	0.00	0.00	0.00	0.00
21	e0.25	0.00	3.0	2,990	29	e1.4	39	0.00	0.00	0.00	0.00	0.00
22	e0.27	0.00	136	2,640	172	e1.2	69	0.00	0.00	0.00	0.00	0.00
23	e0.29	0.00	6.8	358	25	e1.1	4.4	0.00	0.00	0.00	0.00	0.00
24	e0.29	0.00	3.4	102	8.9	e1.1	e3.3	0.00	0.00	0.00	0.00	0.00
25	e0.29	0.00	3.8	54	5.6	e1.1	e2.6	0.00	0.00	0.00	0.00	0.00
26	e0.27	0.00	3.3	59	3.6	e1.1	e2.1	0.00	0.00	0.00	0.00	0.00
27	e0.20	0.00	3.6	36	894	e1.0	e1.7	0.00	0.00	0.00	0.00	0.00
28	e0.20	93	3.8	16	428	e0.99	e1.4	0.00	0.00	0.00	0.00	0.00
29	0.51	2.2	3.2	9.9	---	e0.89	e1.2	0.00	0.00	0.00	0.00	0.00
30	0.96	2.0	3.1	7.7	---	e0.79	e1.0	0.00	0.00	0.00	0.00	0.00
31	1.7	---	3.3	7.0	---	e0.69	---	0.00	---	0.00	0.00	---
Total	24.85	115.54	1,899.4	8,473.5	3,882.6	654.96	505.87	1.80	0.00	981.00	5.50	0.00
Mean	0.80	3.85	61.3	273	139	21.1	16.9	0.06	0.00	31.6	0.18	0.00
Max	4.5	93	620	2,990	1,340	289	308	0.78	0.00	375	5.5	0.00
Min	0.00	0.00	2.0	3.3	3.6	0.69	0.52	0.00	0.00	0.00	0.00	0.00
Ac-ft	49	229	3,770	16,810	7,700	1,300	1,000	3.6	0.00	1,950	11	0.00

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

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

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

SUMMARY STATISTICS

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

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

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

SUMMARY STATISTICS

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

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

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

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

SUMMARY STATISTICS

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

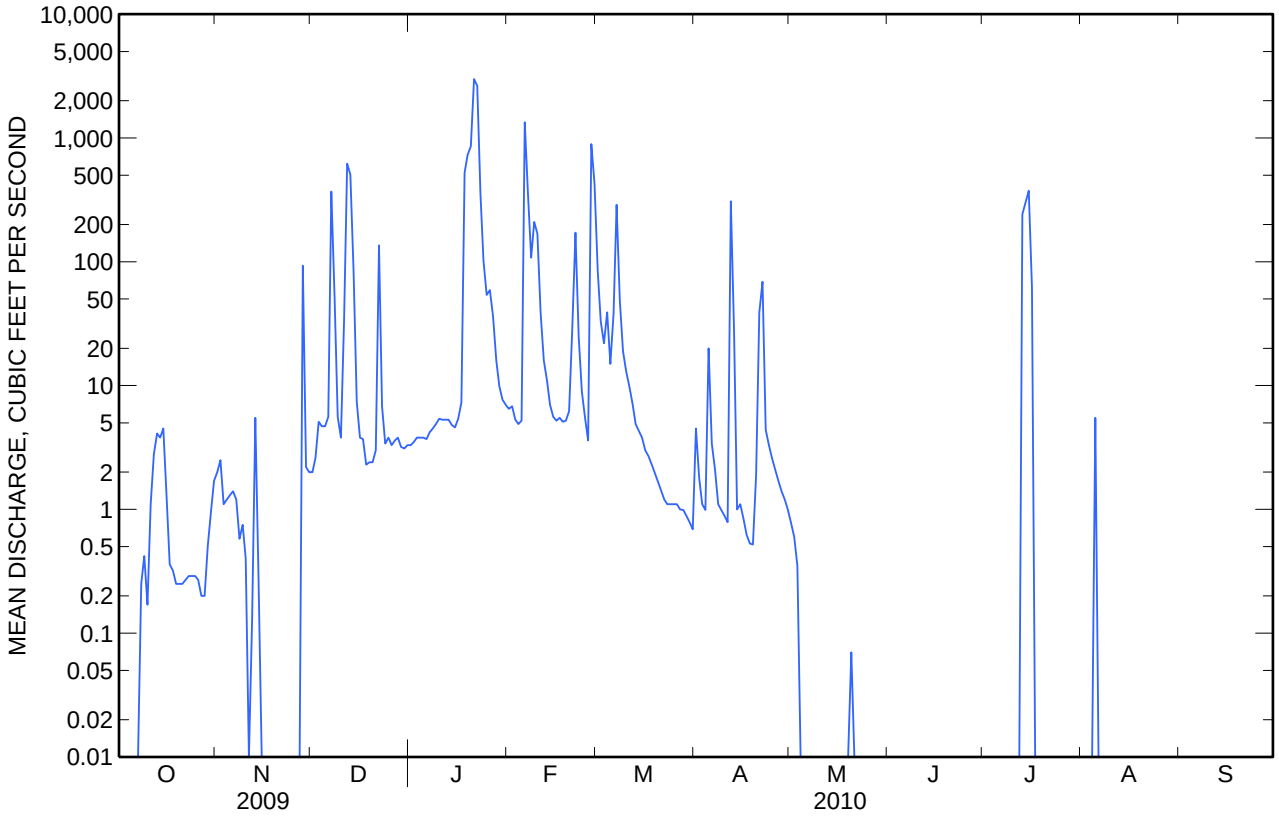
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	23.8	12.5	35.8	155	105	60.9	66.1	34.1	10.5	8.01	9.71	4.91
Max	200	39.7	96.9	1,185	376	398	351	247	112	52.9	102	40.6
(WY)	(2005)	(2003)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	0.00	0.67	1.16	0.00	0.82	4.10	0.04	0.00	0.00	0.00	0.00	0.00
(WY)	(2003)	(2001)	(2001)	(2003)	(2002)	(2008)	(2002)	(2002)	(2002)	(2002)	(2002)	(2002)

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 2000 - 2010	
Annual total	5,836.47		16,545.02			
Annual mean	16.0		45.3		43.6	
Highest annual mean					265	2005
Lowest annual mean					1.70	2002
Highest daily mean	950	Feb 9	2,990	Jan 21	12,500	Jan 11, 2005
Lowest daily mean	0.00	May 10	0.00	Oct 1	0.00	May 14, 2000
Annual seven-day minimum	0.00	Jul 8	0.00	Oct 1	0.00	Sep 11, 2000
Maximum peak flow			9,580	Jan 21	35,700	Jan 11, 2005
Maximum peak stage			6.25	Jan 21	9.04	Jan 11, 2005
Annual runoff (ac-ft)	11,580		32,820		31,600	
10 percent exceeds	8.1		38		64	
50 percent exceeds	1.5		0.36		1.1	
90 percent exceeds	0.00		0.00		0.00	

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



Water-Data Report 2010

11072100 Temescal Creek above Main Street, at Corona, CA

Santa Ana River Basin

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

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

SURFACE-WATER RECORDS

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

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

REMARKS.--Records fair above 500 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 FOR PERIOD OF RECORD.--Maximum discharge, 4,720 ft³/s, Mar. 1, 1983, gage height, 11.67 ft, site and datum then in use, on basis of slope-conveyance study; minimum daily, 0.27 ft³/s, Sept. 25, 1981.

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.

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3.4	4.8	2.8	2.7	69	56	8.1	3.7	3.0	3.3	3.9	e2.8
2	3.7	4.2	3.9	2.8	71	55	11	4.0	3.2	2.8	3.1	e3.2
3	3.1	4.2	4.0	2.8	74	52	11	4.2	2.9	4.2	2.6	e2.7
4	4.4	4.0	4.8	3.3	68	79	12	4.0	3.5	4.3	2.5	e2.5
5	3.7	3.9	3.1	3.1	97	50	e19	4.9	3.8	4.7	2.6	e3.4
6	4.1	4.7	3.2	3.4	426	111	e12	4.2	4.3	3.6	e2.8	e2.9
7	8.7	3.4	253	3.3	139	53	e9.0	4.1	4.8	3.4	e2.9	e3.0
8	4.8	3.5	6.0	3.5	105	41	e8.1	3.7	5.0	3.2	e2.7	e2.8
9	7.4	5.4	3.8	3.9	106	43	e7.5	3.8	5.7	3.5	e2.6	e2.8
10	6.2	4.7	2.4	4.4	88	50	e7.0	3.8	5.9	3.7	e2.5	e2.6
11	5.9	3.3	12	3.4	80	49	e7.2	4.0	5.0	3.0	e2.9	e2.4
12	5.6	4.8	228	3.5	75	50	e139	3.9	5.1	3.7	e2.6	e2.5
13	7.6	11	31	25	69	67	29	3.9	4.3	4.9	e2.5	e3.6
14	19	5.6	3.4	3.1	55	69	16	3.4	4.6	5.5	e2.5	e3.1
15	4.2	2.7	2.5	2.8	60	56	13	3.4	4.6	2.6	e2.9	e2.2
16	3.0	2.9	2.3	3.2	79	48	9.3	2.9	5.4	3.3	e2.6	2.3
17	2.7	2.2	2.1	29	84	37	7.5	3.3	4.2	2.6	e3.3	2.0
18	3.9	3.3	2.1	292	79	31	8.2	3.2	1.9	2.7	e2.8	2.3
19	4.3	3.1	2.0	264	62	26	7.0	3.3	2.1	3.6	e2.7	1.7
20	4.6	4.7	2.1	307	84	20	9.7	3.2	2.3	3.7	e2.9	2.0
21	5.3	5.6	2.6	817	56	18	8.9	2.7	2.7	3.6	e2.9	2.3
22	5.9	6.1	26	1,070	57	16	42	2.7	3.1	3.8	e2.5	2.4
23	5.2	3.7	2.0	335	47	15	5.3	2.4	3.6	3.5	e2.4	e1.8
24	6.3	4.0	2.1	e131	54	13	6.1	2.6	3.9	4.3	e2.6	e2.7
25	5.8	3.3	2.2	78	61	12	5.9	2.5	3.9	3.3	e2.8	1.5
26	5.8	3.1	2.2	117	68	11	5.1	2.5	4.1	3.4	e2.7	1.6
27	5.9	6.3	2.1	88	246	9.0	4.7	2.3	1.8	3.6	e3.1	1.5
28	5.6	15	2.2	76	74	7.0	6.7	2.0	2.0	3.6	e3.0	1.5
29	5.8	2.6	2.4	71	---	7.4	3.8	2.9	2.0	3.8	e2.9	1.5
30	6.1	3.7	3.0	69	---	8.3	3.7	2.8	3.0	4.1	e3.0	1.8
31	5.3	---	3.1	71	---	9.0	---	2.5	---	4.3	e2.8	---
Total	173.3	139.8	624.4	3,889.2	2,633	1,168.7	442.8	102.8	111.7	113.6	86.6	71.4
Mean	5.59	4.66	20.1	125	94.0	37.7	14.8	3.32	3.72	3.66	2.79	2.38
Max	19	15	253	1,070	426	111	139	4.9	5.9	5.5	3.9	3.6
Min	2.7	2.2	2.0	2.7	47	7.0	3.7	2.0	1.8	2.6	2.4	1.5
Ac-ft	344	277	1,240	7,710	5,220	2,320	878	204	222	225	172	142

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

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

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

SUMMARY STATISTICS

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

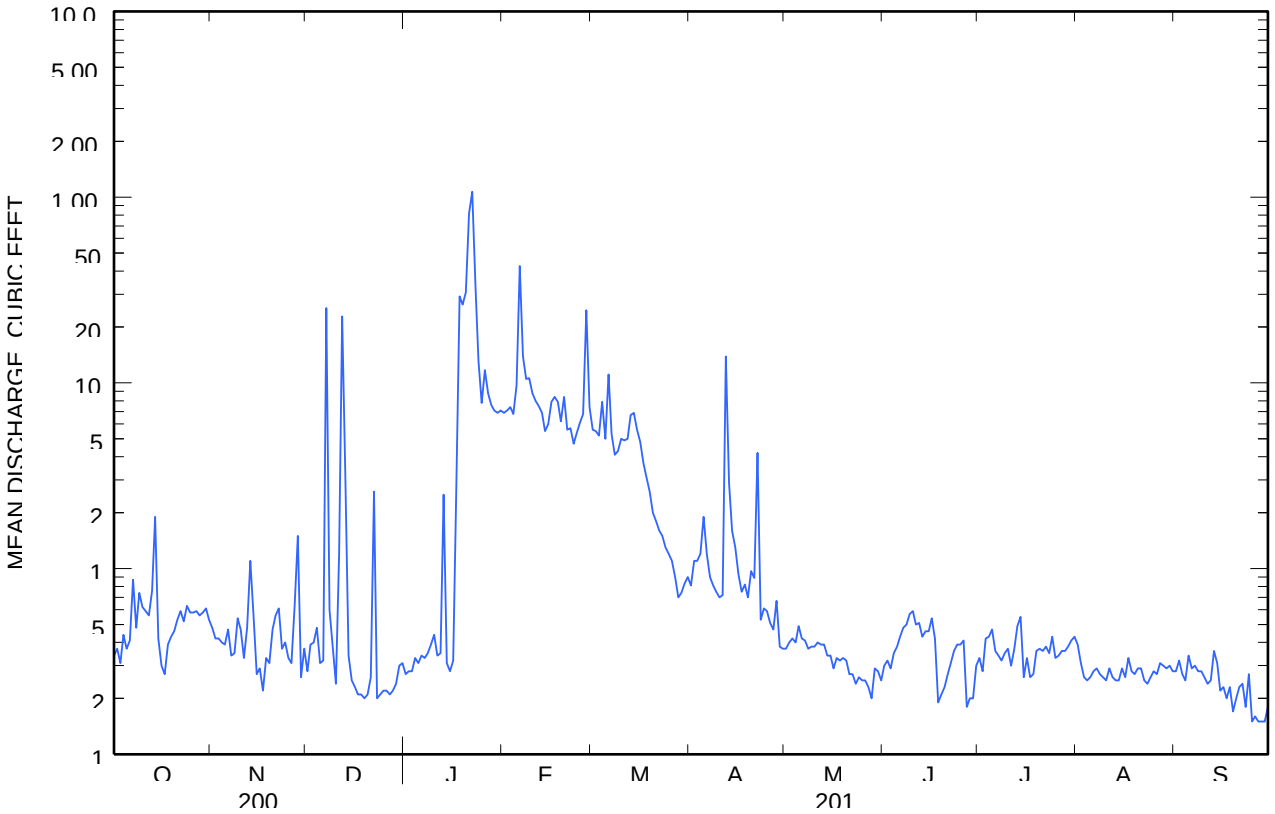
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	15.0	18.2	21.9	62.0	95.4	61.8	37.8	20.9	12.5	10.9	10.5	11.1
Max	52.5	58.2	66.5	335	400	349	190	100	34.3	24.9	20.7	30.4
(WY)	(2005)	(2006)	(2005)	(2005)	(2005)	(1995)	(1995)	(1995)	(1995)	(1993)	(2005)	(2005)
Min	4.22	4.66	9.35	10.7	10.5	5.19	2.89	3.24	3.25	3.56	2.79	2.38
(WY)	(2009)	(2010)	(1999)	(2003)	(2002)	(2001)	(1991)	(1992)	(2003)	(1994)	(2010)	(2010)

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

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1991 - 2010
Annual total	6,096.1		9,557.3		
Annual mean	16.7		26.2		31.1
Highest annual mean					104 2005
Lowest annual mean					12.5 2004
Highest daily mean	303 7	Feb 22	1,070	Jan	2,090 Feb 24, 1998
Lowest daily mean	2.0 Dec 19		1.5 Sep 25		0.34 Jul 3, 1992
Annual seven-day minimum	2.2 Dec 23		1.7 Sep 23		0.89 Jan 13, 1992
Maximum peak flow		18	4,050	Jan	4,050 Jan 18, 2010
Maximum peak stage		18	6.73	Jan	6.73 Jan 18, 2010
Annual runoff (ac-ft)	12,090		18,960		22,570
10 percent exceeds	54		69		61
50 percent exceeds	5.6		3.9		13
90 percent exceeds	2.8		2.4		3.7



Water-Data Report 2010

11073495 Cucamonga Creek near Mira Loma, CA

Santa Ana River Basin

LOCATION.--Lat 33°58′58″, long 117°35′55″ referenced to North American Datum of 1927, in SW ¼ NE ¼ sec.22, T.2 S., R.7 W., San Bernardino County, CA, Hydrologic Unit 18070203, on right bank, 300 ft upstream from Merrill Avenue Bridge, and 4.6 mi west of Mira Loma.

DRAINAGE AREA.--75.8 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.

11073495 Cucamonga Creek near Mira Loma, CA—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	8.2	42	34	38	59	69	35	13	11	5.3	6.1	15
2	5.0	27	40	36	58	65	15	9.6	7.5	4.3	3.0	12
3	7.6	19	39	41	54	50	18	8.3	7.3	6.8	3.2	8.2
4	16	18	40	36	53	79	33	6.1	5.7	4.2	6.7	13
5	13	21	55	31	80	61	114	9.3	8.5	5.8	5.6	16
6	7.2	22	55	27	1,750	157	26	11	8.6	5.2	8.2	14
7	8.0	23	309	23	82	92	15	11	10	4.5	11	15
8	9.0	34	53	21	50	65	16	14	13	5.9	16	17
9	6.6	30	48	27	251	59	17	21	11	2.7	10	18
10	8.3	20	51	32	78	61	30	9.7	15	7.9	18	21
11	13	19	132	28	56	66	34	9.8	7.4	14	16	33
12	11	22	698	29	52	75	291	8.1	11	10	17	35
13	41	85	279	49	48	68	27	6.3	11	9.7	18	23
14	144	23	53	40	51	70	21	8.9	9.4	3.6	29	13
15	37	27	43	41	54	64	25	11	6.0	5.4	17	13
16	18	23	41	47	62	47	14	13	5.6	5.4	16	15
17	28	16	41	58	71	43	19	15	3.4	4.9	23	13
18	32	17	43	915	81	39	22	23	3.5	4.0	21	21
19	17	15	36	535	89	39	21	13	5.6	4.1	15	32
20	15	9.6	39	1,090	91	36	47	10	5.9	6.9	8.6	17
21	19	18	35	1,110	193	44	29	11	3.9	5.7	13	14
22	12	26	76	912	89	31	32	12	5.6	7.9	21	6.0
23	7.0	26	37	86	73	29	11	20	3.5	4.6	11	12
24	16	26	39	57	66	22	12	18	5.6	3.5	6.0	25
25	33	24	34	60	65	15	22	12	3.6	3.7	8.9	13
26	28	36	39	141	70	13	14	12	4.5	2.2	11	16
27	22	26	45	61	712	22	20	3.4	9.1	2.6	11	17
28	21	157	44	50	98	33	16	1.3	7.2	6.2	19	19
29	36	48	42	49	---	37	12	4.0	3.1	3.4	21	18
30	35	34	47	44	---	35	7.5	9.1	4.3	2.8	18	9.5
31	45	---	46	51	---	43	---	12	---	4.5	12	---
Total	718.9	933.6	2,613	5,765	4,536	1,629	1,015.5	345.9	216.8	167.7	420.3	513.7
Mean	23.2	31.1	84.3	186	162	52.5	33.9	11.2	7.23	5.41	13.6	17.1
Max	144	157	698	1,110	1,750	157	291	23	15	14	29	35
Min	5.0	9.6	34	21	48	13	7.5	1.3	3.1	2.2	3.0	6.0
Ac-ft	1,430	1,850	5,180	11,430	9,000	3,230	2,010	686	430	333	834	1,020

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

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

11073495 Cucamonga Creek near Mira Loma, CA—Continued

SUMMARY STATISTICS

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

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

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

SUMMARY STATISTICS

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

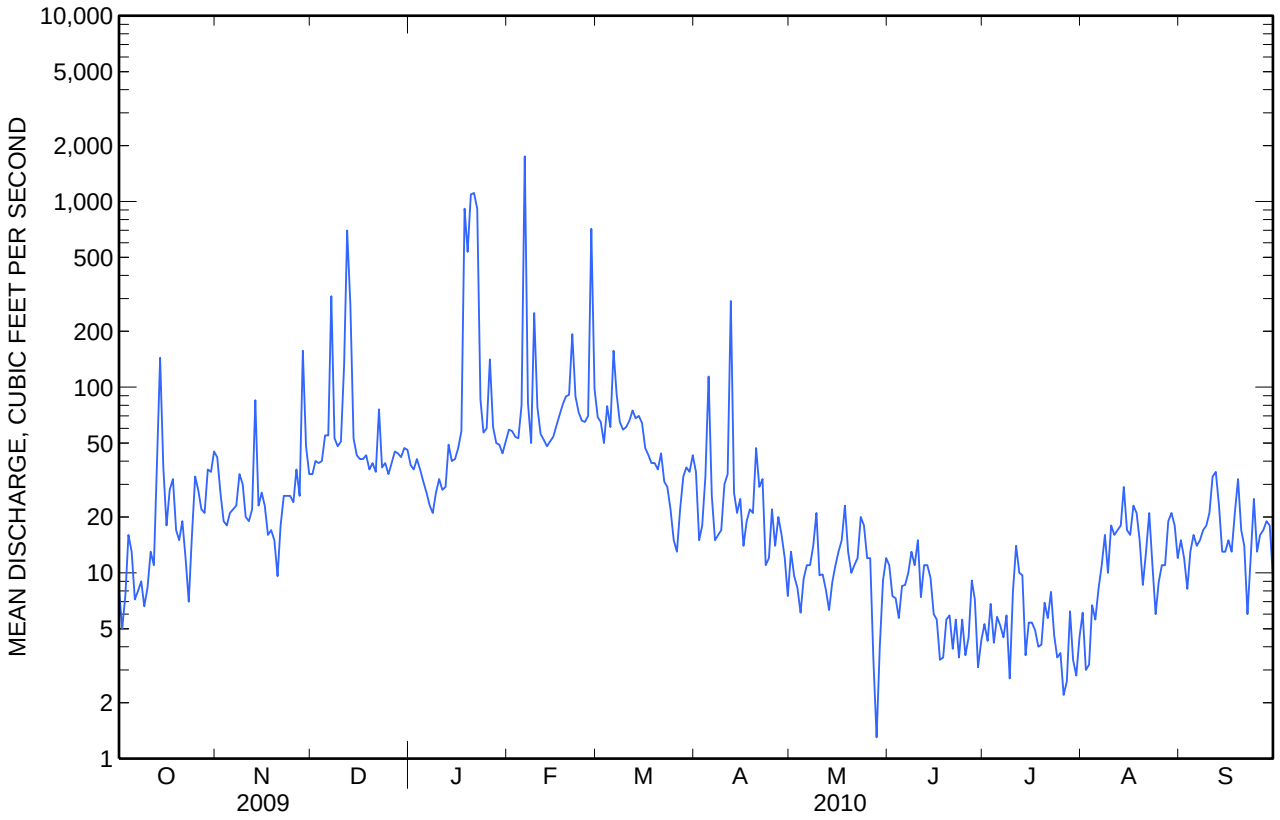
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	45.9	44.8	56.6	95.2	111	67.1	49.3	38.0	35.1	33.0	32.6	36.5
Max	223	102	113	442	350	198	114	69.4	57.1	53.4	51.8	52.0
(WY)	(2005)	(2003)	(2005)	(2005)	(2005)	(1995)	(2006)	(2003)	(1992)	(2004)	(1992)	(1986)
Min	20.4	23.4	21.0	26.1	34.9	25.3	20.5	11.2	7.23	5.41	13.6	16.4
(WY)	(1987)	(1989)	(1987)	(1989)	(1989)	(1988)	(1987)	(2010)	(2010)	(2010)	(2010)	(1988)

11073495 Cucamonga Creek near Mira Loma, CA—Continued

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1986 - 2010	
Annual total	13,876.6		18,875.4			
Annual mean	38.0		51.7		53.5	
Highest annual mean					137	2005
Lowest annual mean					26.6	1987
Highest daily mean	698	Dec 12	1,750	Feb 6	5,200	Jan 9, 2005
Lowest daily mean	3.5	Sep 4	1.3	May 28	1.3	May 28, 2010
Annual seven-day minimum	5.6	Aug 26	3.5	Jul 24	3.5	Jul 24, 2010
Maximum peak flow			12,900	Jan 18	17,300	Oct 20, 2004
Maximum peak stage			5.85	Jan 18	6.58	Oct 20, 2004
Annual runoff (ac-ft)	27,520		37,440		38,750	
10 percent exceeds	50		70		62	
50 percent exceeds	30		20		37	
90 percent exceeds	10		5.6		20	



Water-Data Report 2010

11073360 Chino Creek at Schaefer Avenue, near Chino, CA

Santa Ana River Basin

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

DRAINAGE AREA.--48.9 mi².

SURFACE-WATER RECORDS

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

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

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

REMARKS.--Records rated 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 year, no California Water Project releases were made. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

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.

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.

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

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.76	1.1	1.0	1.1	0.95	2.0	1.7	1.7	1.3	0.54	0.27	0.72
2	0.87	1.1	1.00	1.1	1.1	2.5	1.8	1.7	1.3	0.56	0.30	0.81
3	0.84	1.2	1.0	0.88	0.90	1.7	1.9	1.8	1.4	0.55	0.35	0.72
4	0.77	1.1	1.0	0.82	0.88	9.2	2.2	1.9	1.1	0.50	0.38	0.70
5	0.83	0.95	0.94	0.83	44	1.7	12	2.0	0.95	0.53	0.34	0.68
6	0.78	1.1	0.94	0.86	753	41	1.4	1.8	0.95	0.55	0.39	0.74
7	0.83	0.98	128	0.84	5.4	3.5	1.5	1.9	0.99	0.56	0.38	0.68
8	0.77	1.2	1.5	0.84	2.8	1.8	1.7	1.8	0.95	0.62	0.36	0.70
9	0.83	1.0	1.4	0.77	175	3.0	1.6	1.5	0.91	0.59	0.43	0.67
10	0.76	0.96	1.3	0.76	5.2	1.5	1.6	1.4	0.86	0.57	0.41	0.71
11	0.74	0.98	46	0.82	2.4	1.7	1.5	1.5	0.93	0.56	0.43	0.67
12	0.76	0.97	196	0.81	2.1	1.6	86	1.5	0.86	0.61	0.46	0.68
13	5.6	1.8	29	7.3	2.1	1.6	1.9	1.7	0.86	0.60	0.46	0.69
14	37	0.89	2.3	0.91	1.9	1.6	1.8	1.6	1.1	0.64	0.51	0.71
15	1.5	0.89	1.6	0.89	1.8	1.7	1.8	1.6	0.96	5.2	0.45	0.81
16	1.3	0.94	1.7	0.86	1.8	1.8	1.7	1.5	1.0	0.70	0.56	0.68
17	1.2	1.0	1.3	17	1.9	1.8	1.8	1.5	0.92	0.58	0.54	0.65
18	1.1	0.97	1.3	393	1.8	1.8	1.8	1.7	0.93	0.55	0.58	0.64
19	1.1	0.97	1.3	172	4.0	1.8	1.9	1.7	0.81	0.56	0.51	0.78
20	1.1	0.97	1.2	521	3.4	1.8	3.9	1.6	0.80	0.53	0.52	0.66
21	1.0	1.00	1.2	430	13	1.8	1.6	2.0	0.81	0.50	0.64	0.57
22	1.0	0.93	4.2	272	7.8	1.8	3.3	1.5	0.66	0.48	0.54	0.60
23	1.0	0.97	1.2	5.3	1.7	1.9	1.6	1.4	0.71	0.44	0.59	0.59
24	0.97	1.0	0.99	2.3	1.8	1.8	1.6	1.6	0.62	0.42	0.66	0.63
25	0.98	0.98	1.0	2.0	1.7	1.7	1.9	1.6	0.62	0.39	0.68	0.67
26	1.0	0.98	0.97	38	1.6	1.8	1.8	1.5	1.9	0.36	0.66	0.56
27	1.0	0.99	0.95	2.7	206	1.8	1.7	1.3	0.55	0.33	0.70	0.61
28	0.87	15	0.96	1.4	2.9	1.7	5.6	1.3	0.55	0.33	0.63	0.61
29	0.90	1.0	1.1	1.1	---	1.9	1.7	1.3	0.58	0.36	0.61	0.62
30	0.91	1.1	5.9	1.1	---	1.8	1.8	1.4	0.61	0.35	0.65	0.60
31	0.99	---	1.3	0.94	---	1.9	---	1.4	---	0.32	0.63	---
Total	70.06	45.02	439.55	1,880.23	1,248.93	105.0	154.1	49.7	27.49	20.38	15.62	20.16
Mean	2.26	1.50	14.2	60.7	44.6	3.39	5.14	1.60	0.92	0.66	0.50	0.67
Max	37	15	196	521	753	41	86	2.0	1.9	5.2	0.70	0.81
Min	0.74	0.89	0.94	0.76	0.88	1.5	1.4	1.3	0.55	0.32	0.27	0.56
Ac-ft	139	89	872	3,730	2,480	208	306	99	55	40	31	40

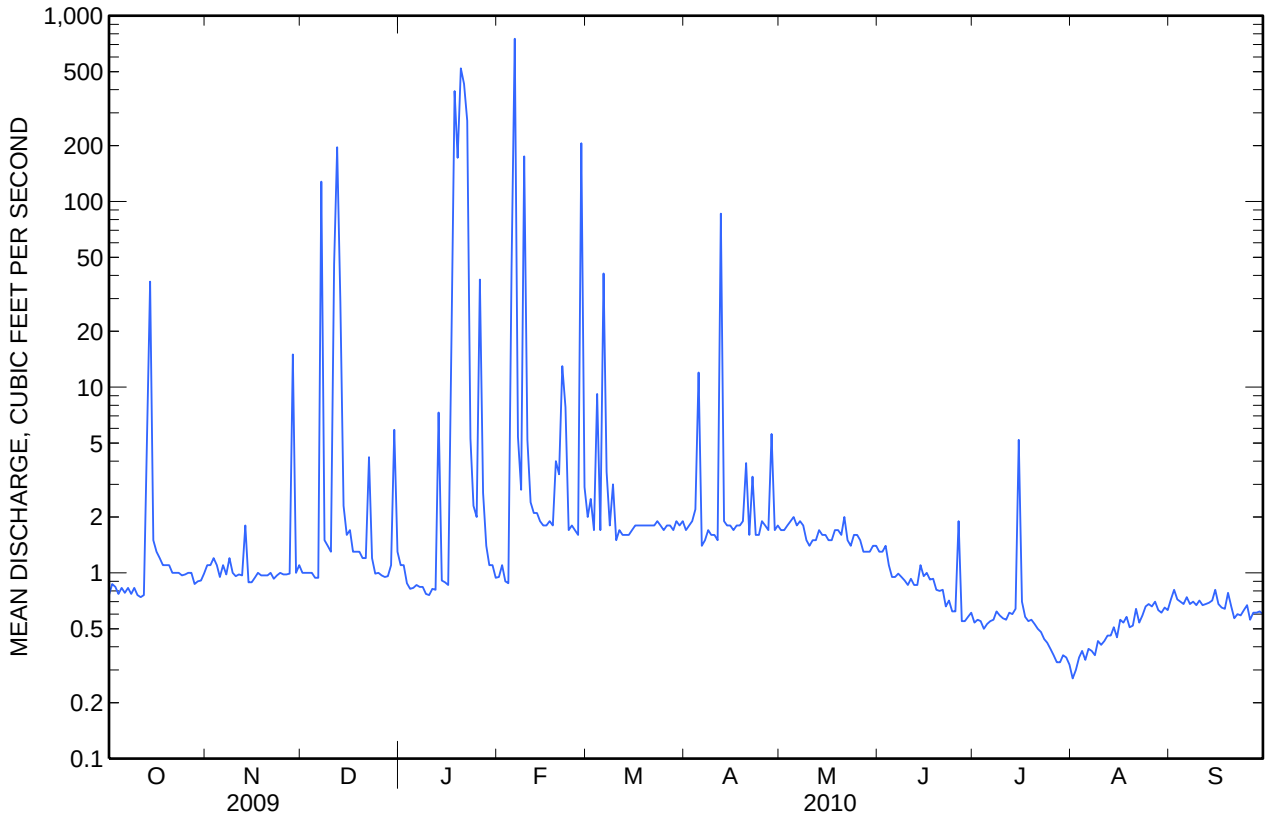
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	16.6	15.5	24.1	35.8	38.9	25.7	9.45	11.8	15.9	16.3	14.4	12.9
Max	126	113	189	221	193	257	68.6	104	184	176	191	198
(WY)	(1979)	(1976)	(1976)	(2005)	(1980)	(1978)	(1974)	(1997)	(1976)	(1974)	(1974)	(1997)
Min	0.06	0.23	0.53	0.55	0.33	0.30	0.14	0.22	0.06	0.07	0.14	0.13
(WY)	(1978)	(1978)	(1970)	(1972)	(1972)	(1972)	(1977)	(1973)	(1977)	(1977)	(1976)	(1977)

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

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1970 - 2010	
Annual total	1,896.39		4,076.24			
Annual mean	5.20		11.2		19.7	
Highest annual mean					92.4	1974
Lowest annual mean					2.81	2007
Highest daily mean	237	Feb 9	753	Feb 6	2,060	Mar 1, 1978
Lowest daily mean	0.51	Jun 14	0.27	Aug 1	0.00	May 21, 1977
Annual seven-day minimum	0.56	Jun 9	0.32	Jul 27	0.02	Oct 28, 1977
Maximum peak flow			5,250	Jan 18	12,700	Feb 27, 1983
Maximum peak stage			7.85	Jan 18	10.32	Feb 27, 1983
Annual runoff (ac-ft)	3,760		8,090		14,280	
10 percent exceeds	3.0		3.3		64	
50 percent exceeds	0.95		1.0		1.3	
90 percent exceeds	0.67		0.55		0.42	



APPENDIX B

DAILY PRECIPITATION DATA
FOR SAN BERNARDINO

WATER YEAR 2009-10

TABLE B-1

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

	2009			2010								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0.24	0	0	0	0	0	0
5	0	0	0	0	0.17	0	0.25	0	0	0	0	0
6	0	0	0	0	1.96	0.31	0	0	0	0	0	0
7	0	0	1.01	0	0.01	0.20	0	0	0	0	0	0
8	0	0	0	0	0	0.01	0	0	0	0	0	0
9	0	0	0	0	0.62	0.06	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0.30	0	0	0	0	0	0	0	0	0
12	0	0	1.43	0	0	0	0.96	0	0	0	0	0
13	0.02	0.14	0.22	0.01	0	0	0	0	0	0	0	0
14	0.03	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0.13	0	0	0	0	0	0	0	0
18	0	0	0	0.97	0	0	0	0	0	0	0	0
19	0	0	0	0.49	0.02	0	0	0	0	0	0	0
20	0	0	0	0.92	0.02	0	0.08	0	0	0	0	0
21	0	0	0	1.88	0.26	0	0.07	0	0	0	0	0
22	0	0	0.12	1.54	0.25	0	0.19	0	0	0	0	0
23	0	0	0	0	0	0	0	0.03	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0.28	0	0	0	0	0	0	0	0
27	0	0	0	0.01	1.98	0	0	0	0	0	0	0
28	0	0.54	0	0	0	0	0.05	0	0	0	0	0
29	0	0	0	0		0	0.01	0	0	0	0	0
30	0	0	0	0		0	0	0	0	0	0	0
31	0		0	0		0		0		0	0	
Total	0.05	0.68	3.08	6.23	5.29	0.82	1.61	0.03	0.00	0.00	0.00	0.00

Total Rainfall = 17.79 Inches

99% of average of 17.98 inches per year

APPENDIX C

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

WATER YEAR 2009-10

SINCE 1933

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

March 30, 2011

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

Subject: Review of Fiscal Year 2009-10 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, 2010. This review includes examining supporting documentation that supports the amounts and disclosures in the financial statements. We have reviewed minutes of meetings, annual budgets as well as Bank of America Checking and Savings Accounts' transactions and statements, and have concluded that all transactions were properly recorded.

Best Regards,

ORANGE COUNTY WATER DISTRICT

Vishav Sharma
Finance Manager

CC: R. Fick

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

JUNE 30, 2010

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

JUNE 30, 2010

ASSETS

Cash in Bank Account	$ 10,100

LIABILITIES AND NET ASSETS

Total Net Assets	$ 10,100

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUE AND EXPENSES ARISING FROM CASH TRANSACTIONS

FOR THE PERIOD JULY 1, 2009 - JUNE 30, 2010

	Actual	Budget	Variance - Favorable (Unfavorable)	
REVENUE COLLECTED:				
Water District Contributions				
Orange County Water District	$ 5,600	$ 5,600	0	
Inland Empire Utilities Agency	2,800	2,800	0	
Western Municipal Water District	5,600	2,800	2,800	(A)
San Bernardino Valley Municipal Water District	2,800	2,800	0	
TOTAL REVENUE COLLECTED	$ 16,800	$ 14,000	$ 2,800	
EXPENSES PAID:				
Professional Engineering Services	$ 9,277	$ 12,500	3,223	(B)
Administrative Expenses:				
Auditing Services				
Reproduction of Annual Report	1,001	1,500	499	(B)
Bank service charges	$ 14			
	$ 10,292	$ 14,000	$ 3,708	
CHANGE IN NET ASSETS	$ 6,508			
NET ASSETS - BEGINNING OF THE YEAR	$ 3,592			
NET ASSETS - END OF THE YEAR	$ 10,100			

(A) Contributions from Western Municipal Water District were outstanding as of June 30, 2009 they were collected in FY 2010

(B) Expenses represent 2009-10 year of payments to OCWD and WMWD.

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 2010

1. SIGNIFICANT ACCOUNTING POLICIES:

Basis of Accounting:

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

2. ORGANIZATION AND HISTORY:

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

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

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

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

3. CASH IN BANK:

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

Cash at June 30, 2010 consisted of the following:

Bank of America:	$10,100

All cash is fully insured by the FDIC.

APPENDIX D

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

WATER YEAR 2009-10

There was no discharge of HGMP water to Santa Ana River in the Bunker Hill area during the 2009-10 water year.

APPENDIX E

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

WATER YEAR 2009-10

There was no discharge by MWDSC to San Antonio Creek near Upland (Connection OC-59) during the 2009-10 water year.

APPENDIX F

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

WATER YEAR 2009-10

TABLE F-1

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2009-10

OCTOBER 2009

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L)[1]	Outflow X TDS
1	0.25	0.50	382	224	56
2	0.24	0.47	421	246	58
3	0.00	0.00	---	---	---
4	0.02	0.03	374	219	3
5	0.01	0.01	464	272	1
6	0.00	0.00	---	---	---
7	2.62	5.20	452	264	692
8	0.04	0.07	481	281	10
9	0.35	0.70	418	244	86
10	1.38	2.74	418	244	337
11	0.56	1.12	421	246	139
12	0.13	0.25	434	254	32
13	0.80	1.58	442	259	206
14	0.22	0.43	432	253	55
15	0.82	1.63	425	248	204
16	0.16	0.32	458	268	43
17	0.00	0.00	---	---	---
18	0.17	0.34	485	283	49
19	0.00	0.00	---	---	---
20	0.50	0.99	202	118	59
21	0.29	0.58	172	100	29
22	0.21	0.42	447	261	55
23	0.04	0.08	481	282	11
24	0.05	0.09	454	265	12
25	0.03	0.05	503	294	7
26	0.19	0.38	470	275	53
27	0.05	0.10	460	269	14
28	0.36	0.71	469	274	98
29	0.84	1.66	442	258	216
30	0.48	0.95	445	260	125
31	1.36	2.69	473	276	374
Total	12	24			3,026
	Monthly Flow Weighted TDS			252	

1. TDS and EC data per WMWD

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2009-10

NOVEMBER 2009

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L)[1]	Outflow X TDS
1	0.76	1.51	443	259	197
2	0.64	1.26	425	248	158
3	0.06	0.11	410	240	13
4	0.03	0.06	397	232	7
5	0.03	0.05	414	242	6
6	0.89	1.77	542	317	283
7	0.03	0.06	434	254	8
8	0.35	0.69	436	255	89
9	0.64	1.26	408	239	152
10	0.47	0.94	469	274	130
11	0.00	0.00	---	---	---
12	0.94	1.87	434	254	239
13	2.17	4.30	431	252	546
14	1.95	3.86	421	246	479
15	0.57	1.14	438	256	147
16	0.90	1.79	431	252	227
17	0.15	0.30	454	266	40
18	0.11	0.21	452	265	28
19	0.12	0.24	680	398	48
20	2.33	4.62	866	507	1,181
21	4.04	8.02	1,026	600	2,426
22	3.20	6.35	1,031	603	1,930
23	0.14	0.28	425	249	35
24	0.42	0.83	433	253	106
25	0.28	0.56	405	237	67
26	0.05	0.10	424	248	13
27	0.31	0.61	412	241	74
28	2.25	4.47	426	249	561
29	0.02	0.03	445	260	4
30	0.19	0.37	444	260	49
Total	24	48			8,556
	Monthly Flow Weighted TDS			356	

1. TDS and EC data per WMWD

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2009-10

DECEMBER 2009

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L)[1]	Outflow X TDS
1	0.11	0.22	446	261	29
2	0.16	0.31	444	260	41
3	0.36	0.71	459	269	96
4	1.09	2.17	446	261	286
5	0.17	0.34	432	253	43
6	0.01	0.02	---	---	---
7	0.01	0.02	492	288	3
8	0.25	0.50	483	283	71
9	1.65	3.28	435	254	420
10	0.47	0.94	693	405	192
11	0.00	0.00	---	---	---
12	0.07	0.14	463	271	19
13	0.34	0.67	433	253	85
14	0.51	1.01	417	244	124
15	0.24	0.47	405	237	56
16	0.06	0.12	443	259	16
17	0.07	0.14	810	474	33
18	0.07	0.14	454	265	19
19	0.02	0.03	440	257	4
20	0.03	0.05	438	256	6
21	0.39	0.77	430	251	97
22	0.05	0.10	404	236	12
23	0.02	0.04	394	231	5
24	0.15	0.29	405	237	35
25	0.20	0.40	407	238	48
26	0.06	0.11	420	246	14
27	0.00	0.00	---	---	---
28	0.05	0.10	412	241	12
29	0.13	0.26	406	237	31
30	0.03	0.06	430	252	8
31	0.51	1.01	433	253	129
Total	7	14			1,934
	Monthly Flow Weighted TDS			276	

1. TDS and EC data per WMWD

TABLE F-2

QUALITY OF WATER DISCHARGED
FROM THE ARLINGTON DESALTER
TO THE ARLINGTON VALLEY DRAIN

WATER YEAR 2009-10

Month	Discharge (acre-feet)	TDS (mg/L)[1]	Discharge X TDS
2009			
October	24	252	6,048
November	48	356	17,088
December	14	276	3,864
2010			
January	0	---	---
February	0	---	---
March	0	---	---
April	0	---	---
May	0	---	---
June	0	---	---
July	0	---	---
August	0	---	---
September	0	---	---
Total	86		27,000
	Flow-weighted TDS =	314	

APPENDIX G

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2009-10

TABLE G-1

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2009-10
JANUARY 2010

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	3	2.7	0	0	0	0	0
2	3	2.8	0	0	0	0	0
3	3	2.8	0	0	0	0	0
4	3	3.3	0	0	0	0	0
5	3	3.1	0	0	0	0	0
6	3	3.4	0	0	0	0	0
7	3	3.3	0	0	0	0	0
8	4	3.5	0	0	0	0	0
9	4	3.9	0	0	0	0	0
10	4	4.4	0	0	0	0	0
11	3	3.4	0	0	0	0	0
12	4	3.5	0	0	0	0	0
13	25	3.5	22	0	0	0	0
14	3	3.1	0	0	0	0	0
15	3	2.8	0	0	0	0	0
16	3	3.2	0	0	0	0	0
17	29	3.5	26	0	0	0	0
18	292	3.8	288	0	0	437	0
19	264	4.0	260	0	0	628	0
20	307	4.3	303	0	0	2,865	0
21	817	4.5	813	0	0	3,955	0
22	1,070	4.8	1,065	0	0	4,425	0
23	335	5.0	330	0	0	4,125	0
24	131	5.5	126	78	0	3,955	0
25	78	6.0	72	77	0	3,905	0
26	117	6.5	46	67	65	3,865	0
27	88	7.0	7	74	74	985	0
28	76	7.5	0	69	69	214	0
29	71	8.0	0	71	63	36	27
30	69	8.5	0	67	61	0	61
31	71	9.0	0	71	62	0	62
Total (cfs)	3,889	140	3,356	573	392	29,395	150
(acre-feet)	7,714	279	6,657	1,137	777	58,304	297

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2009-10
FEBRUARY 2010

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	69	9.5	0	74	60	0	60
2	71	10.0	0	74	61	0	61
3	74	10.5	0	65	64	0	64
4	68	11.0	0	70	57	0	57
5	97	11.5	27	66	59	0	59
6	426	12.0	358	69	56	1,215	0
7	139	12.5	55	71	72	1,615	0
8	105	12.8	25	74	67	594	0
9	106	13.0	32	70	61	521	0
10	88	13.3	21	59	54	1,205	0
11	80	13.5	10	57	57	1,255	0
12	75	13.8	5	39	56	1,635	0
13	69	14.0	2	33	53	1,585	0
14	55	14.3	0	62	41	1,025	0
15	60	14.5	0	71	46	0	46
16	79	14.8	0	69	64	0	64
17	84	15.0	0	57	69	0	69
18	79	15.3	0	22	64	0	64
19	62	15.5	0	34	47	0	47
20	84	15.8	54	27	14	0	15
21	56	16.0	25	11	15	0	15
22	57	16.1	13	28	28	0	28
23	47	16.2	0	38	31	0	31
24	54	16.3	0	37	38	0	38
25	61	16.4	5	36	40	0	40
26	68	16.5	0	35	52	0	52
27	246	16.6	176	37	53	643	0
28	74	16.7	26	38	31	877	0
Total (cfs)	2,633	393	834	1,424	1,406	12,170	806
(acre-feet)	5,222	780	1,654	2,825	2,789	24,139	1,599

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2009-10
MARCH 2010

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	56	16.8	6	40	33	1,085	0
2	55	16.9	0	42	38	588	0
3	52	17.0	0	47	35	0	35
4	79	16.9	24	38	38	0	38
5	50	16.8	0	6	33	0	33
6	111	16.7	57	32	37	2	35
7	53	16.6	20	54	16	10	6
8	41	16.5	10	35	15	0	15
9	43	16.4	0	54	27	0	27
10	50	16.3	0	18	34	0	34
11	49	16.1	0	45	33	0	33
12	50	15.8	0	67	34	0	34
13	67	15.6	0	26	51	0	51
14	69	15.3	0	0	54	0	54
15	56	15.1	0	0	41	0	41
16	48	14.8	0	0	33	0	33
17	37	14.6	0	0	22	0	22
18	31	14.1	0	0	17	0	17
19	26	13.6	0	0	12	0	12
20	20	13.1	0	0	7	0	7
21	18	12.6	0	0	5	0	5
22	16	12.1	0	0	4	0	4
23	15	11.6	0	0	3	0	3
24	13	11.1	0	0	2	0	2
25	12	10.6	0	0	1	0	1
26	11	10.1	0	0	1	0	1
27	9	9.0	0	0	0	0	0
28	7	7.0	0	0	0	0	0
29	7	7.4	0	0	0	0	0
30	8	8.3	0	0	0	0	0
31	9	9.0	0	0	0	0	0
Total (cfs)	1,169	423	117	504	629	1,685	545
(acre-feet)	2,318	839	232	999	1,248	3,342	1,081

TABLE G-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2009-10

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

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

3. Temescal Creek flow attributed to storm events.

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

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

6. Flow of the Santa Ana River at Ball Road has historically been lost to the ocean. OCWD Forebay Operations currently percolates up to 35 cfs between Ball Road and Orangewood Avenue. Therefore, the Ball Road figure minus 35 cfs was used for "Santa Ana River Flow Lost to the Ocean."

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

TABLE G-2

SUMMARY OF SAN JACINTO WATERSHED DISCHARGE
WATER YEAR 2009-10

MONTHLY TOTALS

Month	EMWD Discharge to Temescal Creek	San Jacinto Watershed Outflow At Prado	Santa Ana River Flow Lost to the Ocean	San Jacinto Outflow Recharged By OCWD
2009				
October	0	0	0	0
November	0	0	0	0
December	0	0	591	0
2010				
January	573	392	29,395	150
February	1,424	1,406	12,170	806
March	504	629	1,685	545
April	0	0	197	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Total (cfs)	2,501	2,427	44,038	1,501
(acre-feet)	4,961	4,814	87,348	2,977

TABLE G-3

SUMMARY OF FLOW-WEIGHTED AVERAGE TDS
OF SAN JACINTO WATERSHED DISCHARGE
CALCULATED TO REACH PRADO RESERVOIR
WATER YEAR 2009-10

Month	EMWD Discharge to Temescal Creek (acre-feet) [1]	EMWD Discharge TDS (mg/L) [2]	San Jacinto Watershed Outflow At Prado (acre-feet) [3]	EMWD Flow at Prado Reservoir x TDS
2009				
October	0	---	0	0
November	0	---	0	0
December	0	---	0	0
2010				
January	1,137	717	777	815,229
February	2,825	810	2,789	2,288,250
March	999	813	1,248	812,187
April	0	---	0	0
May	0	---	0	0
June	0	---	0	0
July	0	---	0	0
August	0	---	0	0
September	0	---	0	0
Total	4,961		4,814	3,915,666

Flow-weighted TDS at Discharge [4] = 789 mg/L

Flow-weighted TDS of San Jacinto Watershed Outflow At Prado [5] = 813 mg/L

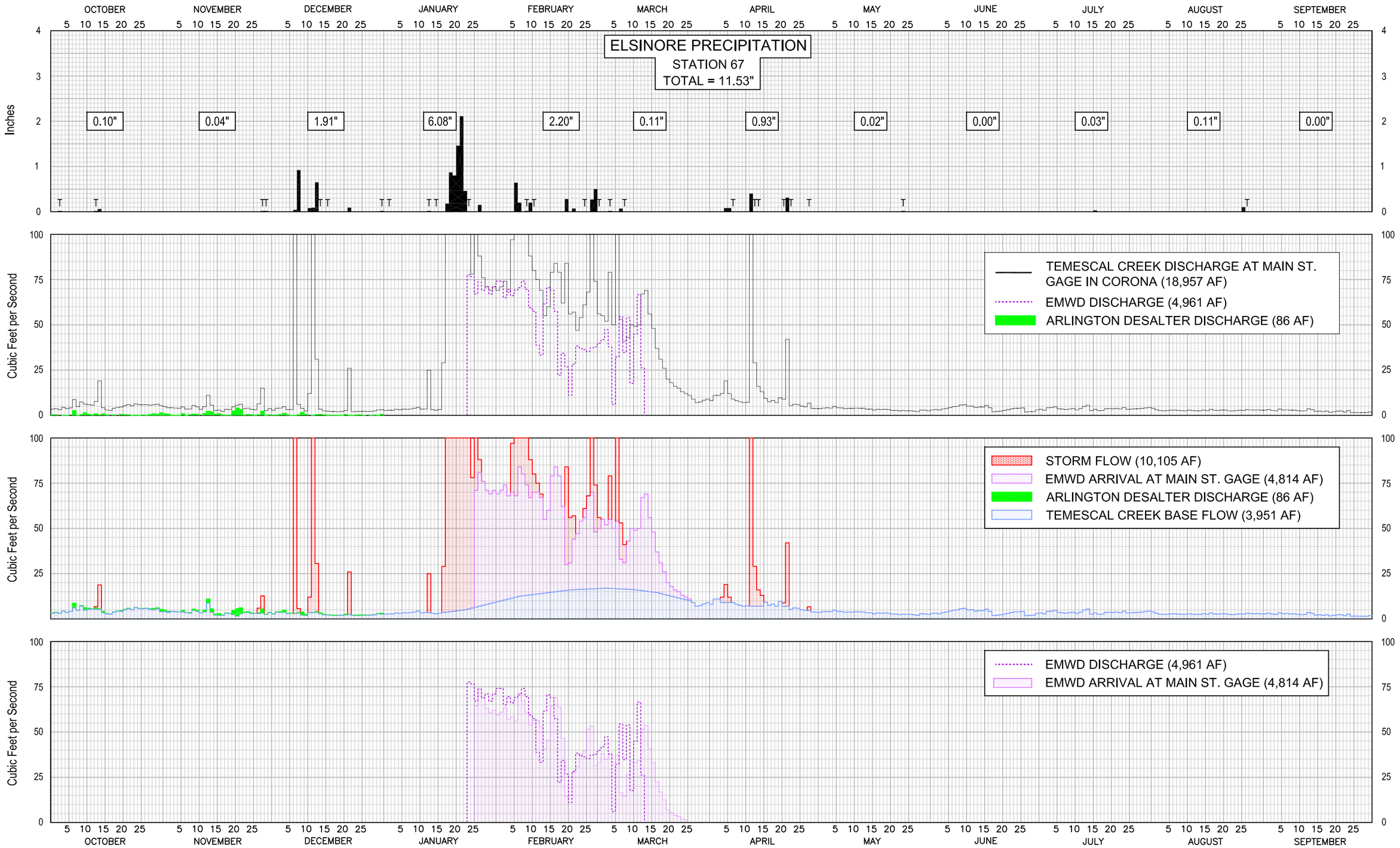
(1) Actual EMWD discharge to Temescal Creek at Wasson Canyon.

(2) Monthly Average TDS of EMWD Surface Water Discharge to Wasson Canyon.

(3) In the past 70-85% of the discharge reached Prado, and it had been assumed that 5% of the discharge was lost to evapotranspiration. This year 97% of the discharge was estimated to have reached Prado, so the volume reaching Prado was used in the TDS calculation.

(4) Water quality for EMWD discharge at Wasson Canyon =
(Sum of Monthly Discharge Volume X Discharge TDS)/Total Discharge Volume.

(5) Water quality for EMWD discharge arriving at Prado reservoir =
(Sum of Volume Arriving at Prado X Discharge TDS)/Sum of Monthly Volume Arriving at Prado



DISCHARGE OF TEMESCAL CREEK AT MAIN STREET IN CORONA, EMWD DISCHARGE, ARLINGTON DESALTER DISCHARGE, AND ELSINORE PRECIPITATION
WATER YEAR 2009-10

APPENDIX H

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

WATER YEAR 2009-10

TABLE H-1

WATER QUALITY SAMPLES BELOW PRADO DAM
WATER YEAR 2009-10

Date	EC (microsiemens/cm)	TDS (mg/L)	Source
10/01/09	1,060	631	USGS
10/06/09	997	622	OCWD
10/16/09	922	558	USGS
11/02/09	1,030	665	USGS
11/03/09	1,080	650	OCWD
11/20/09	1,060	647	USGS
12/01/09	1,080	664	OCWD
12/04/09	1,040	624	USGS
12/23/09	804	513	USGS
01/04/10	1,090	672	USGS
01/05/10	1,140	676	OCWD
02/01/10	656	397	USGS
02/02/10	758	444	OCWD
02/18/10	784	473	USGS
02/26/10	818	507	USGS
03/09/10	657	380	OCWD
03/11/10	717	431	USGS
03/29/10	945	563	USGS
04/06/10	1,050	628	OCWD
04/09/10	1,050	629	USGS
04/23/10	975	581	USGS
05/04/10	965	622	OCWD
05/07/10	1,040	613	USGS
05/28/10	1,130	679	USGS
06/08/10	1,170	694	OCWD
06/10/10	1,160	685	USGS
06/25/10	1,190	728	USGS
07/06/10	1,150	686	OCWD
07/09/10	1,120	646	USGS
07/22/10	1,160	712	USGS
08/02/10	1,150	686	USGS
08/18/10	1,050	664	OCWD
08/20/10	1,080	658	USGS
09/07/10	1,120	698	OCWD
09/10/10	1,110	667	USGS
09/23/10	1,100	658	USGS

TABLE H-2

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

OCTOBER 2009

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	96	1,060	640	61,440
2	84	1,080	652	54,768
3	90	1,090	658	59,220
4	102	1,080	652	66,504
5	115	1,050	634	72,910
6	104	1,060	640	66,560
7	105	1,070	646	67,830
8	102	1,060	640	65,280
9	105	1,070	646	67,830
10	109	1,070	646	70,414
11	116	1,070	646	74,936
12	114	1,070	646	73,644
13	125	1,060	640	80,000
14	141	885	534	75,294
15	139	801	484	67,276
16	141	925	559	78,819
17	142	998	603	85,626
18	141	1,030	622	87,702
19	141	1,040	628	88,548
20	183	1,060	640	117,120
21	189	1,080	652	123,228
22	130	1,070	646	83,980
23	122	1,080	652	79,544
24	122	1,080	652	79,544
25	132	1,050	634	83,688
26	134	1,040	628	84,152
27	129	1,040	628	81,012
28	125	1,040	628	78,500
29	131	1,040	628	82,268
30	139	1,030	622	86,458
31	135	1,030	622	83,970
Total	3,883			2,428,065

Monthly Flow-weighted TDS = 625 mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

NOVEMBER 2009

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	133	1,030	622	82,726
2	131	---	---	---
3	124	---	---	---
4	123	---	---	---
5	127	---	---	---
6	126	---	---	---
7	124	1,070	647	80,228
8	130	1,060	640	83,200
9	135	1,040	628	84,780
10	132	1,040	628	82,896
11	126	1,050	634	79,884
12	128	1,050	634	81,152
13	168	904	546	91,728
14	146	995	601	87,746
15	136	1,050	634	86,224
16	136	1,060	640	87,040
17	130	1,070	646	83,980
18	125	1,070	646	80,750
19	120	1,060	640	76,800
20	127	1,070	646	82,042
21	131	1,070	646	84,626
22	137	1,060	640	87,680
23	142	1,040	628	89,176
24	133	1,050	634	84,322
25	133	1,050	634	84,322
26	136	1,060	640	87,040
27	143	1,050	634	90,662
28	247	782	472	116,584
29	213	883	534	113,742
30	165	1,010	610	100,650
Total	3,576 [2]			2,189,980

Monthly Flow-weighted TDS[3] = 612 mg/L

1. TDS = EC x 0.604053
2. EC data missing 11/2/2009-11/6/2009
3. Flow data for period of missing EC is not included.

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

DECEMBER 2009

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	127	1,040	628	79,756
2	144	1,040	628	90,432
3	143	1,030	622	88,946
4	148	1,040	628	92,944
5	170	1,030	622	105,740
6	173	1,010	610	105,530
7	214	826	499	106,786
8	369	553	334	123,246
9	428	628	379	162,212
10	363	745	450	163,350
11	278	885	534	148,452
12	289	833	503	145,367
13	368	443	268	98,624
14	465	490	296	137,640
15	651	534	322	209,622
16	715	558	337	240,955
17	693	590	356	246,708
18	673	582	351	236,223
19	649	641	387	251,163
20	622	588	355	220,810
21	595	639	386	229,670
22	569	745	450	256,050
23	545	801	484	263,780
24	514	830	501	257,514
25	483	876	529	255,507
26	445	976	589	262,105
27	385	1,100	664	255,640
28	215	1,110	671	144,265
29	147	1,120	677	99,519
30	170	1,090	658	111,860
31	235	1,020	616	144,760
Total	11,985			4,113,703

Monthly Flow-weighted TDS = 343 mg/L

1. TDS = EC x 0.604053 2. EC data missing 12/19/2009-12/23/2009
3. Flow data for period of missing EC is not included.

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

JANUARY 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	203	1,060	640	129,920
2	186	1,090	658	122,388
3	190	1,090	658	125,020
4	193	1,080	652	125,836
5	181	1,090	658	119,098
6	185	1,100	664	122,840
7	182	1,090	658	119,756
8	178	1,100	664	118,192
9	175	1,100	664	116,200
10	182	1,080	653	118,846
11	183	1,080	652	119,316
12	176	1,080	652	114,752
13	214	1,030	622	133,108
14	201	1,020	616	123,816
15	195	1,040	628	122,460
16	199	1,040	628	124,972
17	197	1,030	622	122,534
18	301	733	443	133,343
19	824	316	191	157,384
20	3,320	331	200	664,000
21	4,260	302	183	779,580
22	4,430	329	199	881,570
23	4,790	---	---	---
24	4,680	---	---	---
25	4,510	---	---	---
26	3,750	---	---	---
27	1,160	---	---	---
28	640	---	---	---
29	536	---	---	---
30	485	---	---	---
31	484	---	---	---
Total	16,355 [2]			4,694,931

Monthly Flow-weighted TDS[3]= 287 mg/L

1. TDS = EC x 0.604053
2. EC data missing 1/23/2010-1/31/2010
3. Flow data for period of missing EC is not included.

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

FEBRUARY 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	362	---	---	---
2	423	710	429	181,467
3	400	719	434	173,600
4	563	739	446	251,098
5	288	821	496	142,848
6	1,140	616	372	424,080
7	2,040	498	301	614,040
8	698	556	336	234,528
9	773	555	335	258,955
10	1,860	481	291	541,260
11	2,250	478	289	650,250
12	2,580	460	278	717,240
13	2,580	459	277	714,660
14	1,460	510	308	449,680
15	331	732	442	146,302
16	342	757	457	156,294
17	366	775	468	171,288
18	370	755	456	168,720
19	367	752	454	166,618
20	370	771	466	172,420
21	371	765	462	171,402
22	408	816	493	201,144
23	450	799	483	217,350
24	408	788	476	194,208
25	341	805	486	165,726
26	348	815	493	171,564
27	818	774	468	382,824
28	1,830	552	334	611,220
Total	24,175 [2]			8,450,786

Monthly Flow-weighted TDS[3] = 350 mg/L

1. TDS = EC x 0.604053
2. EC data missing 2/1/2010
3. Flow data for period of missing EC is not included.

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

MARCH 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	2,220	578	349	774,780
2	990	575	347	343,530
3	467	614	371	173,257
4	376	610	368	138,368
5	312	680	411	128,232
6	314	715	432	135,648
7	317	784	473	149,941
8	361	700	423	152,703
9	391	667	403	157,573
10	403	693	419	168,857
11	405	721	435	176,175
12	349	755	456	159,144
13	283	791	478	135,274
14	419	756	457	191,483
15	333	839	507	168,831
16	424	841	508	215,392
17	429	837	506	217,074
18	435	806	487	211,845
19	440	771	466	205,040
20	439	790	477	209,403
21	435	825	498	216,630
22	429	805	486	208,494
23	422	818	494	208,468
24	413	853	515	212,695
25	328	867	524	171,872
26	248	913	552	136,896
27	240	919	555	133,200
28	234	948	573	134,082
29	234	938	567	132,678
30	242	916	553	133,826
31	247	925	559	138,073
Total	13,579			6,039,464
		Monthly Flow-weighted TDS =	445	mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

APRIL 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	251	948	573	143,823
2	256	973	587	150,272
3	259	982	593	153,587
4	263	989	597	157,011
5	310	1,010	610	189,100
6	337	1,040	628	211,636
7	326	1,050	635	207,010
8	274	1,040	628	172,072
9	243	1,040	628	152,604
10	250	1,040	628	157,000
11	251	1,050	634	159,134
12	257	1,030	622	159,854
13	263	931	562	147,806
14	258	901	544	140,352
15	255	876	529	134,895
16	252	882	533	134,316
17	252	885	535	134,820
18	252	898	542	136,584
19	254	925	559	141,986
20	226	928	561	126,786
21	213	929	561	119,493
22	239	943	570	136,230
23	248	968	585	145,080
24	240	960	580	139,200
25	233	950	574	133,742
26	249	939	567	141,183
27	254	937	566	143,764
28	252	938	567	142,884
29	251	939	567	142,317
30	250	961	581	145,250
Total	7,718			4,499,791
		Monthly Flow-weighted TDS =	583	mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

MAY 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	249	972	587	146,163
2	249	972	587	146,163
3	248	984	594	147,312
4	246	988	597	146,862
5	243	994	600	145,800
6	239	1,010	610	145,790
7	236	1,020	616	145,376
8	237	1,050	634	150,258
9	239	1,060	640	152,960
10	241	1,070	646	155,686
11	242	1,080	652	157,784
12	244	1,080	652	159,088
13	179	1,090	658	117,782
14	143	1,100	664	94,952
15	144	1,100	665	95,760
16	144	1,110	670	96,480
17	143	1,140	689	98,527
18	140	1,150	695	97,300
19	137	1,150	695	95,215
20	136	1,160	701	95,336
21	133	1,160	701	93,233
22	131	1,150	695	91,045
23	131	1,140	689	90,259
24	130	1,140	689	89,570
25	132	1,130	683	90,156
26	129	1,130	683	88,107
27	129	1,130	683	88,107
28	132	1,120	677	89,364
29	134	1,120	677	90,718
30	133	1,120	677	90,041
31	133	1,120	677	90,041
Total	5,526			3,581,235
		Monthly Flow-weighted TDS =	648	mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

JUNE 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	155	1,130	683	105,865
2	180	1,150	695	125,100
3	185	1,140	689	127,465
4	186	1,150	695	129,270
5	184	1,140	689	126,776
6	184	1,140	689	126,776
7	181	1,150	695	125,795
8	180	1,150	695	125,100
9	176	1,160	701	123,376
10	171	1,160	701	119,871
11	170	1,150	695	118,150
12	167	1,150	695	116,065
13	164	1,160	701	114,964
14	161	1,160	700	112,700
15	168	1,160	701	117,768
16	191	1,180	713	136,183
17	189	1,210	731	138,159
18	168	1,210	731	122,808
19	141	1,210	731	103,071
20	125	1,180	713	89,125
21	130	1,140	689	89,570
22	112	1,130	683	76,496
23	110	1,140	689	75,790
24	108	1,140	689	74,412
25	109	1,170	707	77,063
26	105	1,160	701	73,605
27	104	1,160	701	72,904
28	109	1,140	689	75,101
29	105	1,140	689	72,345
30	104	1,140	689	71,656
Total	4,522			3,163,329
		Monthly Flow-weighted TDS =	700	mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

JULY 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	105	1,150	695	72,975
2	106	1,140	689	73,034
3	103	1,140	689	70,967
4	105	1,120	677	71,085
5	105	1,120	677	71,085
6	110	1,120	677	74,470
7	110	1,110	670	73,700
8	111	1,120	677	75,147
9	113	1,110	670	75,710
10	111	1,120	677	75,147
11	117	1,110	670	78,390
12	108	1,080	652	70,416
13	110	1,070	646	71,060
14	129	1,020	616	79,464
15	157	881	532	83,524
16	176	782	472	83,072
17	175	839	507	88,725
18	149	1,060	640	95,360
19	121	1,100	664	80,344
20	107	1,130	683	73,081
21	101	1,140	689	69,589
22	85	1,150	695	59,075
23	79	1,130	683	53,957
24	83	1,130	683	56,689
25	90	1,120	677	60,930
26	91	1,110	671	61,061
27	93	1,100	664	61,752
28	97	1,110	670	64,990
29	95	1,120	677	64,315
30	90	1,130	683	61,470
31	88	1,140	689	60,632
Total	3,420			2,211,216

Monthly Flow-weighted TDS = 647 mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

AUGUST 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	92	1,140	689	63,388
2	101	1,140	689	69,589
3	83	1,140	689	57,187
4	81	1,160	701	56,781
5	86	1,140	689	59,254
6	90	1,140	689	62,010
7	87	1,140	689	59,943
8	98	1,140	689	67,522
9	100	1,110	670	67,000
10	98	1,110	670	65,660
11	101	1,110	670	67,670
12	104	1,110	670	69,680
13	101	1,110	670	67,670
14	108	1,070	646	69,768
15	107	1,040	628	67,196
16	97	1,110	670	64,990
17	102	1,060	640	65,280
18	98	1,050	634	62,132
19	96	1,040	628	60,288
20	86	1,090	659	56,674
21	80	1,120	677	54,160
22	88	1,120	677	59,576
23	97	1,080	652	63,244
24	82	1,100	664	54,448
25	83	1,110	670	55,610
26	80	1,120	677	54,160
27	82	1,090	658	53,956
28	89	1,080	652	58,028
29	94	1,050	634	59,596
30	101	1,020	616	62,216
31	100	1,050	634	63,400
Total	2,892			1,918,076
		Monthly Flow-weighted TDS =	663	mg/L

1. TDS = EC x 0.604053

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2009-10

SEPTEMBER 2010

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	107	1,060	640	68,480
2	112	1,060	640	71,680
3	102	1,080	652	66,504
4	93	1,110	670	62,310
5	94	1,100	664	62,416
6	90	1,080	652	58,680
7	97	1,060	640	62,080
8	105	1,040	628	65,940
9	108	1,050	634	68,472
10	104	1,100	664	69,056
11	112	1,080	652	73,024
12	113	1,050	634	71,642
13	113	1,050	634	71,642
14	130	1,070	646	83,980
15	112	1,080	652	73,024
16	105	1,080	652	68,460
17	102	1,090	658	67,116
18	109	1,090	659	71,831
19	117	1,060	640	74,880
20	115	1,060	640	73,600
21	111	1,090	658	73,038
22	114	1,090	658	75,012
23	114	1,090	658	75,012
24	117	1,070	646	75,582
25	110	1,080	652	71,720
26	106	1,080	652	69,112
27	113	1,070	646	72,998
28	105	1,080	652	68,460
29	110	1,080	652	71,720
30	105	1,070	646	67,830
Total	3,245			2,105,301
		Monthly Flow-weighted TDS =	649	mg/L

1. TDS = EC x 0.604053

TABLE H-3

ANNUAL SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM

WATER YEAR 2009-10

Month	Monthly Flow (1) (cfs-days)	Monthly Flow-weighted TDS (1) (mg/L)	Monthly Flow x TDS
2009			
October	3,883	625	2,426,875
November	3,576	612	2,188,512
December	11,985	343	4,110,855
2010			
January	16,355	287	4,693,885
February	24,175	350	8,461,250
March	13,579	445	6,042,655
April	7,718	583	4,499,594
May	5,526	648	3,580,848
June	4,522	700	3,165,400
July	3,420	647	2,212,740
August	2,892	663	1,917,396
September	3,245	649	2,106,005
Total	100,876 (1)		45,406,015
	Yearly Flow-weighted TDS (1) =	450	

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

APPENDIX I

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

WATER YEAR 2009-10

PREPARED BY

JOHN V. ROSSI

TABLE I-1

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

WATER YEAR 2009-10

MONTH	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2009			
October	187	704	131,648
November	181	740	133,940
December	188	700	131,600
2010			
January	190	724	137,560
February	171	772	132,012
March	188	716	134,608
April	180	740	133,200
May	186	684	127,224
June	184	780	143,520
July	188	760	142,880
August	190	752	142,880
September	183	744	136,152
Total	2,216		1,627,224

Flow-weighted TDS = $\frac{1,627,224}{2,216}$ = 734 mg/L

APPENDIX J

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

WATER YEAR 2009-10

PREPARED BY

JOHN V. ROSSI

TABLE J-1

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2009-10

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Average	
2009	10/5/09	985	607	USGS	0.62		
	10/07/09	1,057	664	C of R	0.63		
	10/14/09	1,051	646	C of R	0.61		
	10/21/09	1,030	632	C of R	0.61		
	10/28/09	1,013	619	C of R	0.61		
	10/30/09	972	630	USGS	0.65	633	
	11/04/09	1,034	686	C of R	0.66		
	11/9/09	966	596	USGS	0.62		
	11/11/09	1,034	645	C of R	0.62		
	11/19/09	984	614	USGS	0.62		
	11/19/09	1,029	630	C of R	0.61		
	11/25/09	995	598	C of R	0.60	628	
	12/02/09	1,029	634	C of R	0.62		
	12/3/09	947	594	USGS	0.63		*
	12/9/09	938	578	C of R	0.62		*
	12/14/09	690	413	USGS	0.60		*
	12/16/09	934	578	C of R	0.62		*
	12/23/09	955	588	C of R	0.62		*
	12/30/09	1,006	627	C of R	0.62	631	
2010	1/6/10	926	584	USGS	0.63		
	1/6/10	953	584	C of R	0.61		
	1/13/10	965	594	C of R	0.62		
	1/20/10	487	341	C of R	0.70		*
	1/25/10	846	527	USGS	0.62		*
	1/27/10	692	423	C of R	0.61	587	*

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

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2009-10

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Average	
2010	2/3/10	952	600	USGS	0.63		
	2/3/10	1,017	618	C of R	0.61		
	2/10/10	548	357	C of R	0.65		*
	2/14/10	994	614	C of R	0.62		*
	2/17/10	993	619	C of R	0.62		*
	2/23/10	808	522	USGS	0.65	609	*
	3/2/10	824	500	USGS	0.61		*
	3/3/10	930	570	C of R	0.61		*
	3/10/10	902	541	C of R	0.60		*
	3/17/10	1,008	613	C of R	0.61		
	3/22/10	940	576	USGS	0.61		
	3/24/10	1,050	645	C of R	0.61		
	3/31/10	1,064	648	C of R	0.61	621	
	4/6/10	967	600	USGS	0.62		*
	4/7/10	1,072	689	C of R	0.64		*
	4/14/10	958	592	C of R	0.62		*
	4/20/10	975	603	USGS	0.62		*
	4/21/10	1,005	612	C of R	0.61		*
	4/28/10	1,066	659	C of R	0.62	659	
	5/5/10	1,062	676	C of R	0.64		
	5/12/10	1,072	668	C of R	0.62		
	5/19/10	1,100	690	C of R	0.63		
	5/21/10	950	585	USGS	0.62		
	5/26/10	1,083	684	C of R	0.63		
	5/28/10	1,020	629	USGS	0.62	655	

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

TABLE J-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2009-10

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Average	
2010	6/2/10	1,091	696	C of R	0.64		
	6/8/10	1,010	624	USGS	0.62		
	6/9/10	1,122	712	C of R	0.63		
	6/16/10	1,092	700	C of R	0.64		
	6/23/10	1,060	681	C of R	0.64		
	6/30/10	1,093	707	C of R	0.65	687	
	7/1/10	965	607	USGS	0.63		
	7/7/10	1,112	705	C of R	0.63		
	7/14/10	1,000	626	C of R	0.63		*
	7/21/10	1,076	660	C of R	0.61		
	7/23/10	995	622	USGS	0.63		
	7/28/10	1,105	677	C of R	0.61	654	
	8/4/10	1,120	688	C of R	0.61		
	8/11/10	1,105	684	C of R	0.62		
	8/13/10	997	621	USGS	0.62		
	8/18/10	1,122	693	C of R	0.62		
	8/25/10	1,132	691	C of R	0.61		
	8/30/10	984	621	USGS	0.63	666	
	9/8/10	1,096	680	C of R	0.62		
	9/10/10	1,000	637	USGS	0.64		
	9/15/10	1,114	686	C of R	0.62		
	9/22/10	1,069	651	C of R	0.61		
	9/29/10	1,091	669	C of R	0.61		
	9/30/10	975	608	USGS	0.62	655	

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

TABLE J-2

ANNUAL SUMMARY OF FLOW WEIGHTED TDS AT RIVERSIDE NARROWS
WATER YEAR 2009-10

	Month	Stream Flow [1] (acre-feet)	Monthly Average TDS [2] (mg/L)	Monthly Flow x TDS
2009	October	3,136	633	1,985,088
	November	2,909	628	1,827,337
	December	4,107	631	2,589,464
2010	January	4,447	587	2,611,871
	February	4,021	609	2,448,789
	March	4,487	621	2,784,184
	April	4,179	659	2,753,961
	May	3,447	655	2,258,934
	June	3,156	687	2,167,120
	July	3,372	650	2,190,114
	August	3,219	666	2,144,927
	September	3,191	655	2,090,637
	Total Stream Flow	43,671		27,852,425

$$\text{Flow-weighted TDS} = \frac{27{,}852{,}425}{43{,}671} = 638 \text{ mg/L}$$

(1) USGS measured flow minus storm flow.

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

APPENDIX K

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

WATER YEAR 2009-10

There was no discharge of WMWD Transfer Program water to the Santa Ana River above Riverside Narrows during the 2009-10 water year.